# E-Learning Implementation in Higher Education Institutions

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# E-LEARNING IMPLEMENTATION IN HIGHER EDUCATION INSTITUTIONS

A Thesis Submitted for the Award of PhD

in Planning and Development

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Supervisor: Anders Henten

# E-LEARNING IMPLEMENTATION IN HIGHER EDUCATION INSTITUTIONS

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This thesis is submitted to the Aalborg University
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Department of Electronics, Aalborg University
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# Dedication

This thesis is dedicated to God the Father (YAHWEH), Jesus, and the Holy Spirit

# Acknowledgement

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# Abstract

Till today, very few higher educational institutions in Ghana can boast of having successfully implemented a Learning Management System (LMS) for e-learning purposes. The delivery of teaching and learning services via information and communication technologies (ICT) in places where they are most needed as in developing countries like Ghana should no longer be a myth. The inability of higher educational institutions to to deploy such innovations can no longer be attributed to only inadequate or unavailable finance or other technological challenges, but more to the lack of institutional willingness, lack of understanding and leadership in how technology can be used to support teaching and learning activities as well as take advantage of the opportunities provided by information and telecommunications technology.

In Ghana today, many students still get turned down when they apply for higher educational opportunities. In the past, many students failed to gain admission into the programmes they believed they could do and were qualified for. Though this has not changed with the traditional universities, the establishment of private universities has worsened the plight of many potential students who cannot afford fee-payment as the fees of private institutions are very exorbitant. In the 2014/2015 academic year, out of the 52, 202 undergraduate students who applied for admission into the University of Ghana, only 14, 695 students were admitted. Again, out of a total 5, 768 masters' applicants into the same university, a total of 3, 630 could be accommodated by the institution. In 2013, an article in a Ghanaian newspaper, The Chronicle, analysed how 40,000 senior secondary graduates would fail to make any meaningful headway with their future careers as a result of admission challenges in Ghana. Though many of these HEIs had attempted to introduce e-learning to support the current challenges, few of these could be argued to have been successful.

Using a variety of research approaches – dialectical hermeneutics, IS implementation framework and Structuration theory, an understanding of institutional implementation efforts was engaged in to try to understand how HEIs in Ghana undertook their implementation. The IS implementation provided the sensitizing framework for investigation, the dialectical hermeneutics provided the thick description while the structuration theory dug deep into the central problem among Ghanaian institutions.

The current research therefore sought to understand how Ghanaian HEIs implement LMS for e-learning purposes through a description and conceptualisation of the LMS implementation processes of Ghanaian HEIs, an identification of the factors influencing the implementation process and outcomes. The investigation was to lead to the development of a framework to guide the implementation efforts of HEIs in Ghana.

The current research highlights how varied the institutional leadership, management commitment and support, institutional readiness in terms of IT infrastructure, faculty and students, and institutional processes and practices are in relation to the LMS to be introduced. Detailed holistic planning in terms of how to arrive at the anticipated end was shown to be missing from institutional considerations with many institutions failing to consider the implications of their actions for the future. A number of contextual factors highlighted how the different motivational factors from the initiation stage to the infusion stage influences anticipated outcomes of the institutions.

The institutional process highlights a neglect of essential considerations by the institutions. In particular, as highlighted by structuration theory, the institutional practices and processes relating to traditional teaching and learning are often neglected leading to challenges with user acceptance and usage.

With institutions committing themselves to introducing this technological innovation, a lot of benefit could be gained from considering the proposed e-learning implementation framework adapted from Kwon & Zmud.

# Dansk Resume

Indtil videre er der kun meget få højere uddannelsesinstitutioner i Ghana, som kan bryste sig af med succes at have implementeret et Learning Management System (LMS) med henblik på e-læring. Levering af undervisning og læring via informations- og kommunikationsteknologi (IKT) de steder, hvor der er mest behov som i udviklingslande såsom Ghana, bør ikke længere have en mytisk status. Højere uddannelsesinstitutioners manglende evne til at indføre sådanne innovationer kan ikke længere henføres alene til utilstrækkelige eller ikke tilgængelige finansielle ressourcer eller teknologiske udfordringer, men mere til mangel på institutionel parathed, mangel på forståelse og lederskab mht. hvordan teknologi kan bruges til at understøtte undervisnings- og læringsaktiviteter og til at drage fordel af de muligheder, som informations- og kommunikationsteknologi stiller til rådighed.

I dagens Ghana bliver mange studerende afvist, når de søger optagelse på højere uddannelsesinstitutioner. Tidligere lykkedes det ikke for mange studerende at blive optaget på de programmer, de mente at være kvalificerede til. Selvom dette ikke har ændret sig mht. de traditionelle universiteter, har etableringen af private universiteter forværret denne situation for mange potentielle studerende, som ikke har råd til betaling af undervisningsafgifter, eftersom disse afgifter for private universiteter er meget høje. For det akademiske år 2014/2015 var det kun 14.695 studerende, som blev optaget på University of Ghana's bacheloruddannelser ud af 52.202 ansøgere. Endvidere, ud af en total på 5.768 ansøgere til kandidatuddannelserne blev 3.630 optaget. I 2013 fremlagde en ghanesisk avis, The Chronicle, en analyse, som viser, at 40.000 studenter ville blive forhindret i at komme videre i deres uddannelsesforløb som et resultat af optagelsesproblemer i Ghana. Selvom flere af de højere uddannelsesinstitutioner har forsøgt at introducere e-læring til at understøtte løsningen af de nuværende udfordringer, er det kun få af disse, som kan siges at have været succesfulde.

Ved anvendelse af forskellige forskningstilgange – dialektisk hermeneutik, IS implementering og strukturationsteori – er en forståelse af tiltag til institutionel implementering blevet udviklet mhp. at begribe, hvordan højere uddannelsesinstitutioner i Ghana har udført deres implementering. IS implementering har udgjort en forståelsesramme for undersøgelsen; den dialektiske hermeneutik har dannet rammen for en 'tyk' beskrivelse, mens strukturationsteorien blev brugt til at få en dyb indsigt i centrale problemer hos ghanesiske institutioner.

Forskningsprojektet har derfor stræbt efter at forstå, hvordan højere uddannelsesinstitutioner i Ghana implementerer LMS til e-læringsformål gennem en beskrivelse og konceptualisering af LMS implementeringsprocesserne for højere uddannelsesinstitutioner i Ghana og en identificering af de faktorer, som har indflydelse på implementeringsprocessen og resultaterne. Undersøgelsen har haft til formål at føre til udviklingen af en forståelsesramme for at guide implementeringstiltag i højere uddannelsesinstitutioner i Ghana.

Forskningen kaster lys over hvor forskelligartet det institutionelle lederskab, ledelsens engagement og støtte, den institutionelle parathed mht. IT-infrastruktur, lærere of studerende, og institutionelle processer og praksisser er mht. introduktion af LMS. En detaljeret overordnet planlægning hvad angår måden at komme til det forventede resultat viste sig at mangle i de institutionelle overvejelser - med mange institutioner, som mangler at overveje de fremtidige implikationer af deres handlinger. Et antal kontekstuelle faktorer viste, hvordan de forskellige motivationsfaktorer fra initieringsstadiet til infusionsstadiet udgjorde grundlaget for de resultater, institutionerne opnåede.

De institutionelle processer peger på en negligering af essentielle overvejelser blandt institutionerne. I særdeleshed viste den strukturationsteoretiske tilgang, at de institutionelle praksisser og processer mht. traditionel undervisning og læring ofte negligeres, hvilket fører til udfordringer mht. brugeraccept og anvendelse.

Med institutioner som forpligter sig til at introducere disse teknologiske innovationer kan en masse fordele høstes ved at undersøge det rammeværktøj for e-læringsimplementering, som kommer fra Kwon og Zmud.

Mandatory Page in PhD Thesis

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This thesis has been submitted for assessment in partial fulfillment of the PhD degree. The thesis is a monograph and not based on the submitted or published scientific papers which are listed above. No parts of the papers have been used directly or indirectly in the thesis. No co-author statements have therefore been made available to the assessment committee or the Faculty as part of the assessment.

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# CHAPTER ONE

## 1.0 INTRODUCTION

### 1.1 Research Summary

This research looks at the implementation of Learning Management Systems (LMS) as a tool for supporting and delivering the teaching and learning processes of higher educational institutions (HEI) in Ghana. Though research into the nature and use of e-learning and in particular LMSs continues to engage the attention of many institutions and researchers around the world (Nichols, 2003; Carliner & Shank, 2008), much is left to be understood about the adoption and use of LMSs by Ghanaian HEIs, and in particular, the institutional approach to the whole implementation process. Given the ever increasing number of qualified applicants seeking admission into HEIs in Ghana, the decreasing quality of higher education with the increasing numbers, and the inadequate resources to accommodate them, it is imperative to look into the implementation of LMSs for delivering e-learning.

The research is motivated largely by the widespread adoption of LMSs by many HEIs for both online and blended/hybrid learning all over the world and the low adoption among Ghanaian HEIs as of 2010 - 2013. Though there is evidence to show e-learning's potential for enhancing teaching and learning (Coates et al., 2005), the adoption, use and integration of LMS into Ghanaian institutions of higher learning is yet to be fully explored and understood (Obuobi et al., 2006; Awidi, 2008). An equally strong motivation is the need to contribute to stronger theoretical underpinnings for LMS implementation (Nichols, 2003; Carver, 2007) using both theoretical and empirical evidences.

The significance of this research lies in its contribution to our insight into the implementation of LMSs by Ghanaian higher education institutions for e-learning purposes (Obuobi et al., 2006; Dewett et al., 2007), and the deepening of our understanding of the information systems (IS) implementation phenomenon in different contexts (education) by looking at the institutional LMS implementation process of HEIs in Ghana from adoption to institutionalization.

To accomplish the research objectives, a qualitative research using multiple case studies was designed. Using this approach, the research examined four cases of LMS implementations in

Ghanaian institutions of higher learning. The case study approach allowed an in-depth exploration and examination of the LMS implementation processes of the four institutions to gain an understanding of the implementation process and the factors that influenced their outcomes (Tornatzky et al., 1982; Dewett et al., 2007).

## 1.2 The Scientific Content of the Study

### 1.2.1 Background of the study

The fundamental problem at the core of this research is addressed by the question: How do higher institutions of learning implement LMSs and what factors influence the implementation process?

From the 1960s to the late 1990s, Ghana's population grew from 3.6 million to a little over 20 million. Over this period, higher educational institutions increased disproportionately from a little over five (5) to sixteen (16). The increase did very little to absorb the large numbers of applicants who year in and out, seek admission into these institutions (Amenyah, 2009; Adu, 2009; Obuobi et al., 2006). As Amenyah (2009) rightly captures in his article, 'there is an imbalance between the numbers of students who apply to attend higher educational institutions and the spaces available for admission into higher education programmes." In 2008, out of a total of 22,865 applicants, the University of Ghana could only absorb a third, 8,774 students (Adu, 2009), a phenomenon prevalent in most of the public universities throughout the country. This has resulted in the stretching of institutional facilities and resources, substituting quality for quantity, and still, leaving substantial needs unmet.

As a result of the inadequate facilities and low capacities, more private universities were established with different attendance options. These provisions however did not solve the problems. Many applicants for instance, refuse to apply to the private institutions because of their high fees (Adu, 2009). Lecturers provide less quality tuition due to part-time opportunities at the private universities; a situation contributing to the poor quality of learning experience (Obuobi et al., 2006). Coupled with a never ending stream of fresh applicants graduating from high schools, these institutions are beginning to realize the need for cost effective alternatives.

### 1.2.2 Introduction to State of the art

#### *1.2.2.1 Learning Management Systems (LMS) Implementation in Higher Education Institutions*

The extant e-learning literature is replete with institutional and individual case studies of the experiences in e-learning introduction, deployment and use (Russell, 2009; Masalela, 2011; Uys, 2010). Although e-learning is broadly considered as instruction delivered via all electronic media including the internet, intranets, extranets, satellite broadcasts, audio/video tapes, interactive TV, CD/DVD (Engelbrecht, 2003), the term has tended to be associated more with the notion of online learning, virtual learning environments, web-based learning, internet-based training etc. (Selim, 2007) in recent times. These terminologies which are often used interchangeably with the term e-learning have been facilitated by the advancements in information and communication technologies (ICT), in particular the internet and web-based learning management systems (LMS). LMSs have become the most common tool for organizing and directing e-learning in many institutions. According to Watson & Watson (2007), an LMS is the infrastructure that delivers and manages instructional content, identifies and assesses individual and organisational learning or training goals, tracks the progress towards meeting those goals, and collects and presents data for supervising the learning process of an organization as a whole (Szabo & Flesher, 2002 cited in Watson & Watson, 2007). He distinguishes between an LMS and a course management system (CMS); explaining that CMSs are chiefly used for online and blended learning, to support placement of course materials online, associate students with courses, track students' performance, store students' assignment submissions, and mediate between students and their instructors. Although there are others who support this assertion (Carliner, 2005) contending that CMSs were developed for the classroom while LMS were designed for organizational learning, many researchers continue to use the term to describe the platforms that not only enable their courses to be delivered anywhere, anytime but also facilitate the management of learning ubiquitously (Tucker & Gentry, 2009; Martin et al., 2008; Machado, 2007; Beatty & Ulasewicz, 2006; Bremer & Bryant, 2005). The strict delineation between LMS and CMS by some writers creates the impression that only 'courses', other than students' 'learning' is managed in CMS. As Watson noted, although some of the functionalities of a CMSs can be found in LMSs but does not necessarily qualify it as an LMS, some researchers still prefer to use the terms interchangeably. For the purpose of this research, an LMS is a web-based application used to facilitate

anytime, anywhere access to learning content and administration (Black et al., 2007). Throughout this research therefore, we interchangeably use the term e-learning and LMS.

Although some progress has been made in research into HEIs implementation of LMSs, the lack of a generally acceptable theoretical framework within which educational institutional LMS implementation research can advance is evidenced by the continuous challenges being experienced by some HEIs in Ghana. Black et al. (2007) categorised LMS research into two: those that focus on the comparison of LMS product features and their strategic uses, and those that should focus on the "other side of LMS"; in other words issues related to the adoption and implementation of the systems. Whelan and Bhartu (2008) lamented the absence of exemplary precedents or formal models of implementation that could highlight how they were to proceed with their LMS implementation, and concluded that it was important for the top-management of HEIs to not only agree on a clear vision for change, but to also agree on specific implementation plans that will concretely deliver that vision. This absence of a theoretical model of LMS implementation could be due to a belief that given the different contexts (geographically and institutionally) of such implementation, a model could be too prescriptive, constraining the efforts of the implementers. There is therefore the need to re-examine institutional LMS implementation for e-learning in Ghana so as to better understand and be able to recommend appropriate interventions for the full benefits of ubiquitous learning to be derived.

Many studies have viewed the introduction and use of an LMS as an innovative approach to delivering education in HEIs (Siritongthaworn et al., 2006). This perception has led to the application of some innovation theories to understand critical factors that influence LMS adoption and implementation for e-learning, their processes and associated institutional changes. Some of these theories e.g. the diffusion of innovation (DoI) by Rogers (1995;2003) and the innovation adoption process (Gallivan, 2001; Tornatzky & Klein, 1982; Damanpour, 1988; Damanpour & Wischnevsky 2006; Klein et al., 2001; Hislop, 2003) have been widely researched in the field of information systems within which this research is situated. Very little attention however has been paid to the implementation process through which the LMS is introduced and integrated into the institution. Understanding this process through the activities and decisions taken at the institutional level can greatly enhance the effectiveness of the implementation. Furthermore, through an understanding of the intentions and outcomes of the activities and decisions, factors influencing the implementation efforts and their interrelation-

ships could be better understood and appreciated, leading to more successful and effective implementation efforts in late adoption countries like Ghana.

The research interest in LMS implementation over the past decade and half appears to centre on the use of the technology, factors affecting adoption, acceptance and intention on the part of students and faculty members, challenges facing their introduction and integration into HEIs (Mapuva, 2009), and the utilization of pedagogically sound principles for effective LMS applications. Although findings from these researches have greatly increased our understanding, their usefulness in driving institutional implementation can only be described as inadequate. Other interests in this area have also reported on the implementation experiences of some HEIs often focusing on the entire institution, a faculty or school within the institution (Čech & Bureš, 2004) or an individual or group of enthusiasts' experience (Holsapple & Lee-Post, 2006; Georgouli et al., 2008). A few researchers have however sought to provide some roadmaps to guide institutional deployment of LMS for teaching and learning. Marshall & Mitchell (2002) for instance proposed a process model that encourages the development of effective educational resources independent of technical platforms, organisational structures and pedagogical frameworks to guide institutions in their deployment and development efforts. Kocur & Košč (2009) also identified the phases of institutional e-learning implementation to consist of rigorous analysis and planning, ensuring management support including corresponding financial support, selection of appropriate technologies and courses, ensuring e-learning acceptance throughout the entire institution, and the evaluation of e-learning contribution. They contended that the performance of these critical steps could lead to successful implementation of e-learning in a university. According to Marshall & Mitchell (2002), there was the need for a process model to guide e-learning improvement and encourage effective educational technology development due to the "…..ad-hoc practices…" inherent in institutional e-learning introduction efforts. Their model, the 'e-learning Maturity Model' which consists of five stages: initial, planned, defined, managed, and optimising, provides a generic framework that does not prescribe a particular solution for the institutional e-learning but rather enables the consideration of appropriate solutions for their particular contexts. Although their model was to fill the gap of providing a road map to guide institutional development, Marshall & Mitchell concluded that the framework did not provide the list of key processes needed for improvements in e-learning efforts but rather outcomes for determining an institution's level of maturity. This is in part evidenced by the call by some researchers and practitioners for roadmaps to guide institutional implementation efforts (Bell & Bell, 2005;

Whelan and Bhartu, 2008). An understanding of the activities and decisions of HEIs and the factors influencing the expected outcome of institution-wide use of the LMS can lead to the development of an institutional implementation framework that could guide institutions to manage their implementation process. The development of a comprehensive framework will enable critical issues that need to be addressed to be identified throughout the implementation process to ensure effective implementation of LMS in HEIs.

Studies aimed at identifying factors that influence e-learning has been split across three major categories: students (Lee, 2006; Selim, 2007), faculty members (Nanayakkara & Whiddett, 2005; Ge et al., 2010) and institutions (Folorunso et al., 2006; White, 2007). A careful inspection of the literature highlights the inadequacies of these findings to guide institution-wide implementation efforts. This is due to the nature of implementation which is essentially a process and not a onetime effort. However these studies are often quantitative in nature, identifying factors at a point in time (period of investigation). As a process however, implementation conditions and efforts are dynamic in nature and as such may change. Both the factors and the acknowledgement of changes in the factors need to be taken into consideration in identifying the critical issues that enable effective institution-wide implementation of LMSs. A holistic understanding of an institution's implementation efforts from initiation until institutionalization and not just some aspects of the implementation process is therefore required to guide institutions in their decisions and activities directed at integrating LMSs into their learning environments.

#### *1.2.2.1 Theoretical framework*

As presented above, the introduction and use of LMSs for e-learning in HEIs can be situated within the field of information systems (IS)/information technology (IT) innovation. It is an innovation in teaching and learning that offers new dimensions to the delivery of teaching and learning in HEIs. Rogers' diffusion of innovation theory (DoI) provides a good theoretical backdrop to begin understanding LMS implementation in a HEI from both an individual and group/unit perspective. The theory of innovation diffusion is the process by which an innovation is communicated through certain communication channels over time among the members of a social system (Rogers, 1983; 2003). An important part of Rogers' theory, attributes of the innovation, is believed to influence the adoption and diffusion of the innovation. These characteristics which include relative advantage, compatibility, complexity,

trialability and observability have been studied in relation to many technological innovations including LMSs (Lee et al., 2011; Sahin, 2006; Dillon, 2001). Another important aspect of this theory is the innovation-decision process which, according to Rogers, an individual or other decision-making unit undergoes in adopting an innovation. The steps in the process include:

- Knowledge – where the innovation and its functions are learnt about,
- Persuasion – where conviction of the value of an innovation is gained,
- Decision – where activities that lead to a choice of adoption or rejection of the innovation is engaged in,
- Implementation – where the new technology is put to use, and

Confirmation – where the innovation is accepted (or rejected) by continued usage based on the confirmation of benefits or drawbacks.

Certain similarities exist between this innovation-decision process and the organisational innovation process also proposed by Rogers (1983; 1995). Rogers' organisational innovation process consists of five stages occurring in a sequential order: Agenda-setting (general organizational problems that may create a perceived need for innovation), Matching (a problem from the organizations' agenda is fitted with an innovation), Redefining/Restructuring (innovation is modified and re-invented to fit the organization and the organizational structures are altered), Clarifying (relationship between the organization and the innovation is defined more clearly), and Routinizing (the innovation becomes an on-going element in the organization' activities, and loses its identity). Rogers, like other proponents of the innovation process e.g. Zaltman et al. (1973), suggested that the innovation process consists of both initiation and implementation stages and needs to be studied in a longitudinal fashion in order to measure its impact on an organization. The initiation stage is the stage where all of the information gathering, conceptualizing, and planning for the adoption of an innovation, leading up to the decision to adopt, is undertaken, while the implementation stage involves all the events, actions, and decisions involved in putting an innovation into use (Rogers, 1983; 1995). As adoption is considered to be a point where decision is made by the individual or organization, and as the activities and decisions preceding this decision can influence subsequent outcomes in the physical introduction, existing frameworks that support this assertion must be examined.

A useful framework proposed by Kwon and Zmud (1987) is the information systems implementation framework. The framework, consisting of six stages (initiation, adoption, adaptation, acceptance, use and incorporation) suggests that organizations go through each of the stages sequentially in their bid to introduce and integrate new IS. This was later modified by Cooper and Zmud (1990) to constitute routinization and infusion as the last two stages of the process. The framework incorporates elements of change that suggests that organizations, according to Lewin (1952) and Schein (cited in Schein, 2002), move from the unfreezing, moving to the refreezing stage. Although Kwon & Zmud (1987) suggested that the stages are sequential, Cooper & Zmud argued that when considered as activities, some of which may occur in parallel, the model can encompass a variety of IT applications and IT implementation processes observed in many organizations. The IS implementation framework suggested by Cooper & Zmud highlights the relevance and need for a holistic understanding of an organization's IS implementation efforts from its initiation until its infusion. This view has also been expressed by other researchers like Ginzberg (1978) and Voss (1986).

To better understand and facilitate IS implementation, numerous researches have been conducted into the characteristics of information systems that make users want to use them as well as the processes often followed by organizations in their introduction and use of new information technologies. Yetton et al. (1999) noted that the theories emerging from these researches could be classified into two categories: innovation characteristics theory and implementation process theory. Davies' (1989) technology acceptance model (TAM) and Rogers' (1995; 2003) diffusion of innovation (DoI) theory have dominated the research conducted into innovation characteristics with several extensions made. Implementation process theories that seek to explain how organizations go about their implementation include the IS implementation framework (Kwon & Zmud, 1987; Cooper & Zmud, 1990) and the life-cycle model of the process of implementation (Voss, 1986).

Both theories are believed to constitute distinct assumptions (Yetton et al., 1999; Fichman, 1992). Innovation characteristics theory has an implicit assumption regarding independent adoption of an innovation by an individual. In other words, the theory suggests that an individual would make the decision to adopt or not to adopt based on an evaluation of the innovation' characteristics (Yetton et al. 1999) and this decision in no way affects other people's use of the innovation. Whatever advantage is experienced is solely enjoyed by the individual and any organisational gains can be said to be the pooled sum of individual gains. An example of

this kind of technological innovation in an organization is Microsoft Excel and word application. Theories of this nature, as suggested by Yetton et al., are developed at the individual level of analysis. On the other hand, implementation process theory has an underlying assumption that a coordinated effort on the part of all users is required due to the interdependent nature of their tasks. The tasks supported by the innovation share interdependencies among a diverse group of users. Due to this interdependency of the tasks to be supported, any implementation would require a coordinated adoption by a critical group of organisational stakeholders. The organization as a whole or any individual within it can therefore not make a gain if adoption by the relevant stakeholders is erratic. Implementation theory therefore is developed at the group level of analysis. It helps to identify and explain the influence of organisational and managerial effort on the innovation's use by the relevant stakeholders.

According to Yetton et al. (1999), implementation process theory examines the influence of managerial action on the end-user's adoption decision. Giddens' (1976, 1979, 1984) work on structuration attempted to articulate a process-oriented theory that treats institutions as both a product of and a constraint on human action. This action by humans can be viewed as a two-way interaction between those who make decisions and allocate resources (managers) and those who interpret these actions and make use of the resources (organizational members). The implementation process is therefore defined as the organizational effort (directed towards getting members of a user community to use an information systems innovation in an expected, goal oriented and consistent way) to diffuse an information system innovation within a user community. The effort here refers to the actions (activities and decisions) taken by organisational actors to introduce and institutionalize the information system. Yetton et al. noted that the organizational effort covered the organisational and managerial resources expended on activities that are designed to encourage expected behaviours among users and to minimize the forces contending against successful implementation. The influence of managerial action in the successful implementation of an information system has been reported in the extant literature. These actions are believed to influence the decisions of users within the organization to either adopt or not to adopt the innovation. Management's interventions through allocating resources tend to support and enable users in their adoption and use of information systems. This clearly distinguishes two kinds of adoption: organizational adoption and individual adoption. We argue therefore that through implementation, the decisions of organizational members can be influenced to either embrace or reject an information system innovation.

A careful consideration of how an information system is introduced into an organization will clearly show that it is not a one-off event. As Furuholt & Orvik (2006) noted, the issue of implementation cannot be understood from a point in time perspective and thus implementation-related phenomena could only be understood as they unfold overtime. Point in time researches characterized by factor researches generate findings and theories that are useful but fail to adequately guide organizational implementation efforts. This partly could account for the apparent difficulties experienced by many organizations in their bid to introduce and integrate information systems.

Though much theory has been developed within the information system/information technology field, many of them are yet to be utilized in explaining observed phenomena in the higher education environment. Particularly dominant in higher education research in relation to technology in general and learning management systems in particular is the positivist factor research that often seeks to determine critical success factors, factors affecting adoption by faculty members or students, as well as factors affecting successful e-learning implementation. The numerous reports of institutional implementation efforts in the literature also fail to provide strong theoretical underpinnings that can guide other institutions, especially those in developing countries in their implementation efforts. It is in the light of all of these issues that this research is being conducted to understand how higher educational institutions implement learning management systems for e-learning purposes to support students' learning.

### 1.2.3 Statement of Project's Objectives

The objective of the research therefore is to understand how HEIs in Ghana implement LMS for e-learning and identify the factors that influence the implementation process. The sub objectives therefore are to:

- Describe and conceptualise the LMS implementation process followed by HEIs to introduce e-learning for the support of students' learning
- Identify the factors that influence the LMS (e-learning) implementation process and their outcomes
- Develop a model of e-learning implementation process by HEIs

## 1.3 Key Research Method

A qualitative approach using a multiple case study method was used to achieve the objectives of the research. Since the objective was to understand LMS implementation in a developing country, a dialectical hermeneutical approach (Myers, 1995) was utilized to understand how HEIs implemented their LMSs. This framework is well suited to developing country contexts as it allows important social and organisational issues critical to successful IS implementation to be understood and addressed within their unique contexts (Myers, 1995).

### 1.3.1 Dialectical Hermeneutic

Dialectical hermeneutics is an interpretive approach that that is concerned with the meaning of texts or text analogues. An object of study (e.g. an organization' implementation efforts) is considered as a text or text-analogue that in some way is unclear or appears to be seemingly contradictory. This approach seeks to make sense of the object of study through an interpretation process involving a movement of understanding from the whole to the parts and back to the whole, a process known as the hermeneutic circle. The hermeneutic circle refers to the dialectic between the understanding of the text as a whole and the interpretation of the parts where descriptions are guided by anticipated explanations (Myers, 1995). According to Myers (1995) there is evidence of the application of hermeneutics to the development and implementation of information systems, even though traditionally, hermeneutics has been concerned with inter-subjective meaning. Where case studies of information systems is concerned, the 'text' is social and political action which usually includes case study notes, interviews and documents that record the views of the actors as well as describing events, etc. Myers (1995) contends that these materials need to be ordered, explained and interpreted to 'make sense' of the case. The ordering is done according to the researcher' theoretical position (Myers, 1995), making comparisons between and among the various texts available. In the process, the understanding of the whole is continuously revised as the parts are reinterpreted.

Dialectical hermeneutics emphasises the historical constitution of social reality. In other words, the object of study is deemed to have elements of 'things' that may have occurred in the past influencing it and hence the self- understandings of participants are not accepted at face value. Rather, attempts are made to consider critically other contextual influences.

### 1.3.2 Justification for the selection of the case study methodology

Although LMS implementation and e-learning are not necessarily new concepts in academic circles, their adoption and use in some parts of the world like Ghana are still new and classifiable under innovation in the Ghanaian higher educational environment. Case studies are useful in exploring new terrains and areas where relatively little is known about a phenomenon, as in LMS implementation by HEIs in Ghana. The case study method was selected to enable an in-depth study of several individual cases to be carried out. This was to enable comparison to be made among the institutions to draw out the similarities and differences, deepening our understanding. Also, due to the dynamic nature of the implementation phenomenon, the case study methodology presents a unique opportunity to understand antecedent decisions and actions contributing to current observable situations of a phenomenon, providing a holistic understanding of the implementation phenomenon (Tornatzky et al, 1982).

### 1.3.3 Description of Study Units

Four Ghanaian HEIs that have implemented the Moodle LMS platform for their institutional e-learning were involved in this study. These institutions are located within the Greater Accra region of Ghana to enable extraneous variables to be isolated. Although the institutions were composed of both public and private institutions, with the public institutions having been in existence for over ten years in comparison with the private institutions, the basis for the selection was not based on these criterions, but on their implementation of an LMS that was open source in nature, e.g. Moodle. Essentially these institutions had the intention of using the LMS to support both on-campus (blended/hybrid) and distant (fully online/off-campus) learning by students.

### 1.3.4 Research questions

Following from the research objectives, the following research questions are posed:

1. *How do higher education institutions implement learning management systems (LMS) to support students' learning?*
2. *What factors influence this process and how are they interrelated?*

### 1.3.5 Data collection

Data was collected using interviews, observations and the examination of available documentations for the institutional implementations. Primarily, the interviews and observations pro-

vided the major sources of data for three of the four institutions studied, as documentation of the institutional processes appeared to be an expensive exercise for all except one institution.

### 1.3.6 Data Analysis

The data collected was first transcribed following Ricoeur's (1981) theory of interpretation which enables themes to be identified, classified and interpreted. After transcription of the interviews, the texts (interview transcripts and other available documents) were explained as suggested by the theory following an initial coding of words, phrases and sentences. This was followed by an interpretation process that involved identifying themes, sub themes and the classification of ideas under them. This was followed by a process of appropriation, a moving back and forth between explanation and interpretation until an in-depth understanding was achieved.

## 1.4 Outline of Thesis Content

The thesis will have the following content:

- The preliminary part of a research made up of: Title and title page, Acknowledgements, Dedication, Table of Contents, Figures and tables, and an Abstract
- Introduction – summaries of the purpose of the research problem, objectives, findings and challenges
- Literature Review – discussion of the theoretical and conceptual frameworks used in the research
- Methodology and Research design – a description of the philosophical considerations, research methodology and method used in the research
- Conceptual framework – presentation of the framework used as a sensitizing framework for the conduction of the research
- Research findings – an analytical presentation of the research findings of each case from a hermeneutical perspective (within-case analysis)
- A process analysis – an analytical presentation of each case using the IS implementation framework (within-case analysis)
- Cross-case analysis – an analysis of the similarities and differences of the cases in the research
- Discussion – a discussion of the research findings from a structuration perspective
- Conclusions
- References

## 1.5 Chapter Summary

This chapter provides the essential background to the current research into LMS implementation by HEIs in Ghana. Although LMS has been in existence for over two decades, its adoption and use by HEIs in Ghana is still in the early stages. Very few institutions currently use LMS to support students' learning and out of this few, much progress by way of institution-wide use has been bogged down by implementation challenges.

# CHAPTER TWO

## 2.0 LITERATURE REVIEW

### 2.1 Introduction

This review examines the literature on Information Systems (IS) which are essentially technological innovations that have revolutionized the way people, organizations and societies interact, and e-learning systems (also perceived as an innovation in education (Duan et. al., 2010)) implementation in higher education institutions (HEIs). As a technological innovation, IS have been widely studied and examined in different contexts – manufacturing, education, health, insurance, governance, etc. In this review, the focus is on its application in higher education contexts through an examination of institutional implementation efforts. Through this review of the IS and e-learning systems literature, an understanding of the institution-wide implementation of Learning Management Systems (LMS) an e-learning platform, in developing countries would be sought through an examination of the processes and context to provide guidelines to the many institutions preparing to roll-out similar systems. The chapter first reviews IS within the contexts of innovation and organisations. This is followed by a review of e-learning implementation in HEIs.

The Information Systems (IS) field of research can be described as an offshoot of the field of innovation studies. Studies in this area often borrow concepts and constructs from the theory of innovation and related studies in adoption and diffusion of innovation. The IS field has also over the years developed along the factor and process perspectives visible in most innovation researches, making any independent development of the IS field challenging. This however is not to say it is inappropriate, as similar observations have been made in terms of identified processes and contextual factors. Many IS scholars have been interested in the development and use of IS. This interest has resulted in the investigation of individuals, organizations and societies and how they adopt, diffuse and implement IS. Although inconsistent findings abound due to variations in construct definitions and applications, since the late 1970s, issues of adoption, diffusion and implementation of IS has continued to attract scholars and practitioners. In the current review, the broader perspective of the concept of implementation as a process is examined in depth to enable an understanding of how higher educational institutions establish e-learning systems.

Till date, the implementation of Information Systems continues to attract the attention of researchers and practitioners despite the large volume of research conducted over the last four decades (Palvia et al., 2007). This is attributable in part to the conflict in findings and the failure to agree on a common overarching framework within which IS implementation research can proceed (Myers, 1995; Kwon & Zmud, 1987). Some IS implementation frameworks tend to focus on some aspect of the implementation phenomenon e.g. the adoption-decision process, the development and deployment, etc., failing to provide the much needed broad perspective (Lai & Mahapatra, 1997). Such broad perspective, as suggested by Ginzberg (1978) would lead to the entire implementation process, from initiation through to evaluation being considered, and provide a better understanding of the nature of the problems that manifest late in a project's development. Kwon and Zmud (1987) presented such a framework. This was later adopted and modified by Cooper & Zmud (1990) to include Zmud & Apple's (1989) stages of routinization and infusion.

As the adoption of information technologies continues to spread among organizations due possibly to the wide applicability of information and communication technologies (ICT) in different organizations and contexts (Duan et. al., 2010; Avgerou & LaRovere, 2003; Jebeile & Reeve, 2003), their inherent potential to increase competitiveness, productivity and profitability, the need to achieve successful and effective implementation through a deeper understanding of not just what factors influence the process, or what paths the implementation process follows (Bremer, 2012), but how these factors and processes are created (emerge) and combine (interact) to determine implementation outcomes, becomes crucial.

In terms of research, the IS literature conceptualizes implementation along two major paths: as a distinct stage in the innovation process, and as a sequence of stages entailing all the stages in the innovation process. Both conceptualizations have their roots in the field of innovation studies. In the following section, we present a brief review of innovation and some important related concepts to provide a background understanding to the developments in the field of IS research.

### 2.1.1 Innovation theory, types and approaches to research

One of the biggest challenges in the innovation field is how to define innovation (Baregheh et al., 2009). This difficulty complicates the comparing of different studies both within and

across fields, as different conceptualizations are used. In this research, a definition and conceptualization of innovation is adopted based on Damanpour's (1991) definition. Different types and classifications of innovations are also identified, along with the nature of research in the field.

#### *2.1.1.1 Definition of Innovation*

The innovation literature is filled with rich conceptual and empirical research into the nature and processes of innovation. Studies in innovation have looked at the innovation process, characteristics, types, etc. These studies are often conducted at the industry, organizational or individual levels (Damanpour, 1996). Innovation is also studied in many disciplines including business and management, technology, economics, innovation and entrepreneurship, science and engineering (Baregheh et al., 2009), and defined from different perspectives (Damanpour & Schneider, 2006). Amabile (1996) defined innovation as the successful implementation of creative ideas within an organization. Van de Ven (1986) defined innovation as the development and implementation of new ideas by people who over time engage in transaction with others within an institutional context, arguing its relevance to the general manager for its applicability to a wide variety of technical, product, process and administrative kinds of innovations. Damanpour (1991) defines innovation as the adoption of an internally generated or purchased device, system, policy, or programme, process, product, or service that is new to the adopting organization. This definition clearly separates innovations meant for the market from innovations to be utilized within an organization. It is sufficiently broad and encompasses different types of innovations that pertain to all parts of organizations and all aspects of their operation (Damanpour, 1991). This definition is adopted in this research. Another useful definition is provided by Baregheh et al., (2009). After a careful and critical analysis of the various definitions of innovation through a content analysis of the innovation literature, they proposed an integrative definition of innovation as, "the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace". This definition clearly emphasizes the important consideration of the process nature of an innovation noting specifically the existence of multiple-stages. As Baregheh et al. (2009) showed, a single definition of innovation has proven to be elusive to many researchers considering the disciplines and differences in constructs and operationalization. Goswami & Mathew (2005) support this assertion as they contend that earlier researches have not been forthcoming with

a widely accepted consensus regarding the definition of innovation. A close look at these definitions shows their focus on organizational innovation which is of particular relevance to this research.

#### *2.1.1.2 Innovation types*

Different types of innovation have been identified in the literature along with different classifications. In a way all these differences have contributed to the complexity existing in the field. Damanpour (1987) identified three types of innovations: technological, administrative and ancillary. Innovations are also classified into radical, incremental, product, process, etc. Innovations have also been typed individual and organizational innovations. All these types and classifications sometimes make clear situation of an innovation research into one of the types or classifications difficult. For instance, technological innovations take place within organizations and so can qualify as organizational innovations. Organizations also can innovate in terms of their products or processes and whichever one it is, it can be radical or incremental. Much has been written about this in the literature about these types and classifications. We however focus on the notion of technological innovation in organizations, a category appropriately suited for understanding IS implementation research.

#### *2.1.1.3 Innovation Research Approaches: Factor and Process*

Two major approaches to innovation research are visible in the literature: factor and process research. The scholars who engage in factor research seek to identify factors affecting innovation development among individuals and organizations. Among some of the most popularly researched areas include characteristics of innovators (individuals and organizations), managerial, organizational, technological etc. factors and their impact on innovations, etc. The findings from these researches have been mixed (Damanpour, 1996: Agarwal & Prasad, 1997). Other scholars have been more interested in the processes of innovations. They seek to identify distinct stages in the innovation process that could help in understanding and predicting innovation development in organizations. More on innovation process is discussed in the next section.

## 2.2 Innovation process

Although there are multiple views on how innovation should be defined (Gopalakrishnan & Damanpour, 1996), one common theme that surfaces in the various definitions is the process

nature of innovations (Baregheh et al., 2009). The notion of innovation as a process has been extensively studied in different disciplines and contexts. The process is identified as consisting of several stages which vary in number. While some scholars theorize these stages to be sequential (unitary sequence model), others view the stages as a complex process with multiple, cumulative and conjunctive progressions of convergent, parallel and divergent activities (multiple sequence model) (Gopalakrishnan & Damanpour, 1996). Many of the empirical studies on the processes of innovation across the various disciplines follow the notion of innovation as occurring in a sequence. The rest of this review focuses on the unitary sequence perspectives of innovation in the extant literature. The unitary sequence perspective suggests elements of rationality and planning in which careful consideration of what intended outcomes are expected vis-à-vis what resources and efforts need to be committed or courses of action to be taken in the event that deviations occur to bring about intended outcomes. The stages in the unitary sequence also maps out clear activities whose outputs can be clearly measured to ascertain whether the intended objectives are being realized. This makes it relatively easy to monitor and evaluate progress made. It is important to note that this perspective is best suited for organisational implementation which in turn influences individual implementation.

As noted by Gopalakrishnan & Damanpour (1996), scholars researching into organizational innovation processes often ended-up with different numbers of stages depending on whether they viewed the organization as a generator or an adopter of innovation. They argued that there were distinct differences between the two conceptualizations, both in terms of phases and the stages contained within. The use of the term ‘phase’ encapsulates a broader category within which the term ‘stage’ as used here is a sub-category. We discuss these two views further in the following sections, as their clarification is of relevance to understanding this research.

### 2.2.1 Generation of innovation

Gopalakrishnan & Damanpour (1996) define generation of innovation in terms of problem-solving and decision-making in the development of new products and practices. They contend that the generation phase is often divided into five stages by researchers: idea generation, project definition, problem-solving, design and development, and marketing or commercialization. They further contended that the first three stages of this phase are typified by ac-

tivities that lead to original solutions through a combination of information about a need or want and the technical means to meet the need. In the case of the last two, they argued that the emphasis is on the development and commercial exploitation of the product or process, after its economic feasibility has been established. They identified the source of the idea generation as a product of basic research from the universities or research units of the companies, and further recognized the problem definition, problem-solving, design and development to occur in certain subunits within the organization. The last stage of the generation of innovation, the marketing and commercialization stages, was identified to involve the management and administrative cores of the organization. Considering how the success of the generation phase was measured, Gopalakrishnan & Damanpour contended that it was often defined in terms of the organization's ability to exploit the innovation for its own performance improvement or the innovation's establishment as an industry standard through its (the innovation's) diffusion. This last measure, they contend, led a subset of generation researchers to focus on the process of dispersion of an innovation (diffusion) throughout a population of organizations (industry), claiming further that these subgroups of researchers in the innovation field view the organization as merely one of the members of a population within which an innovation may take hold.

### 2.2.2 Adoption of innovation

According to Gopalakrishnan & Damanpour (1996), researchers with this perspective view it as a process of organizational change which directly affects the technical and social systems of the organization. They argued that the adoption process consists of two main stages: initiation and implementation (Zaltman et al., 1973). They argue that the initiation stage is characterized by the three sub-stages of awareness of the innovation, formation of an attitude towards the innovation, and its evaluation from the organizational standpoint. They further argued that the decision to adopt the innovation marks the beginning of the implementation stage which consists of two sub-stages: trial implementation and sustained implementation. While the initial sub-stage involves a limited application of the innovation to determine its suitability to the needs of the organization, the final stage, sustained implementation, involves the assimilation of the innovation into the organization. Gopalakrishnan & Damanpour (1996) further contended that the two measures used to evaluate the success of the adoption phase is the extent of the innovation's integration into the organization and its contribution to the organization's conduct and outcome.

Damanpour & Wischnevsky (2006) also distinguished between two types of organizations: innovation-generating and innovation-adopting organizations. Essentially, they argue that there is the need to distinguish between the generation and adoption of innovation when the level of analysis is the organization and the innovation is supplied by one organization and consumed by another.

As the above discussion highlights, organizations involved in the generation and development of new or innovative products, services or processes for consumption by other organizations differ extensively from organizations that consume or adopt these innovations. According to Damanpour & Wischnevsky (2006) whereas the critical innovation issue for organizations that innovate through the generation process is to manage the innovation project in a timely and efficient manner to create a new product, service or technology, the critical innovation issue for organizations that innovate through adoption is to manage the assimilation of the innovation extensively into the organization in order to produce the desired organizational change. In the current research, we take a point of departure by discussing further the innovation adoption processes of organizations. In the next section, we consider two important concepts found in the innovation literature.

## 2.3 Adoption and diffusion processes of innovations

The innovation adoption and diffusion processes are two of the most widely used concepts in the study of innovations. Rogers (1995) defines the adoption process as "the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision."

In their discussion on the generation of innovations, Gopalakrishnan & Damanpour (1996) asserted that a subset of the researchers who follow the innovation generation process focus on the process by which an innovation is dispersed, that is diffused throughout a population of organizations.

The theorization of the innovation adoption process is an attempt by researchers to capture and understand how an innovation is achieved. The process of innovation adoption has been conceptualized as comprising a number of stages. These stages vary in number as is evident

in the innovation literature. Zaltman et al., (1973) divided the innovation adoption process into two major phases of initiation and implementation. This view was also asserted by Glynn (1996). What constitutes an innovation in these studies however has continued to be an issue under contention. While some have argued and operationalized innovation as haven been adopted when a new idea is proposed, or a decision for its adoption made, others consider innovation to have occurred when the idea is implemented (Damanpour, 1987). The innovation adoption process therefore begins with the generation of an idea. Then a decision for its adoption is made. However Damanpour (1987) has argued that the simple generation of an innovative idea, or the decision to adopt that idea is not innovative in itself since, as he argued, the purpose behind organizations adopting innovations is to either maintain or enhance their performance, and this performance can only be influenced by the actual use of the innovation, and not just the idea generation, or adoption decision.

The study of implementation provides a better way of assessing adoption of an innovation since it covers the idea generation, the initial decision to adopt it, its use for the first time and its continued use to achieve given objectives. It has the advantage of being a processual model that captures the role of time, the relevant adaptations known to occur, initial and continued use, and the factors that influence the outcomes.

An implementation perspective of innovation takes into account pre-and post-implementation activities and decisions, and not just the prototypical implementation phase which deals with the physical availability and use of the innovation. An implementation perspective is concerned with the successful introduction of the innovation, use, and achievement of the intent for which the innovation was introduced. An implementation perspective is particularly suitable for organizational innovation studies since it offers the opportunity to understand how the innovation is conceived, developed, adapted, used, and institutionalized. This perspective suggests that innovation is a rational outcome of an organization's effort to change all or some aspects of its entire system. In the extant literature, implementation is often conceptualized as the phase after the initiation phase. Other scholars of innovation have argued that it is the phase immediately following the adoption decision, that is, the decision to use a particular innovation. The implementation phase captures the organization's activities that physically make the innovation available to organization members for actual use. Although this phase typically should mark the end of the innovation, there is sufficient evidence to show that this use may not happen at all, may not happen in the way expected, or may not be continued after

a while. This implementation situation has the potential of preventing the organization from realizing the purpose for which the innovation was introduced. This does not necessarily mean the innovation has failed as is evident in some research findings where the organizations bounced back to realize their purpose. This possibility of not realizing the purpose of an innovation after implementation led some scholars to include a post-implementation phase of evaluation where the implementation is assessed to determine the extent of implementation, address the issues hindering the realization of the innovation's purpose, foster continued use, and eventually realize the innovation's intent. Scholars who argue that the implementation phase is distinct from the other phases and should be studied on its own often fail to see how challenges experienced in this phase often have some deep-rooted causes that have remained unresolved, and whose continued existence renders every effort of the implementation team futile (Lai & Mahapatra, 1997). These scholars also tend not to realize the necessity of addressing those issues responsible for the implementation's status, a factor that may account for why some innovations fail. The implementation perspective recognises that the successful physical introduction of an innovation into an organization or the failure thereof is not the end of the implementation, but rather the beginning of another important stage in the organization's effort to realize that purpose or objective it to realize through the innovation.

The experiences gained by the organization in the implementation phase can guide further efforts of the organization to realize its purpose. The issues encountered during the physical implementation, including the adaptations that ensued offer important lessons for understanding how the innovation was used, or not used, and the various combinations of the two scenarios. What the organization does in this stage of the implementation phase, and in the next stage where the innovation is made available for use, provide important lessons that can guide future implementation of similar and different innovations.

The implementation perspective offers the opportunity to identify what organizations do to realize the benefits of an innovation. As indicated above, since the successful physical adaptation does not guarantee the realization of the innovation's purpose for the organization, the implementation perspective offers the opportunity to follow an organizations effort long after physical adaptation to embed the innovation and realize its potential. Studying implementation in terms of successful technical implementation in an isolated phase can potentially prevent important lessons in the subsequent phases from being gained.

As Kanter (1988) suggested, the innovation process consists of certain major tasks, and although stage models do not always capture the give-and-take of innovation, they provide a good way of understanding the structural and social conditions for innovations. “There are four major innovation tasks, which correspond roughly (but nowhere near exactly) to the logic of the innovation process as it unfolds over time, and to empirical data about the history of specific innovations. These tasks are: (a) *idea generation* and activation of the drivers of the innovation (the “entrepreneurs” or “innovators”); (b) *coalition building* and acquisition of the power necessary to move the idea into reality; (c) *idea realization* and innovation production, turning the idea into a model- a product or plan or prototype that can be used: (d) *transfer* or diffusion, the spreading of the model- the commercialization of the product, the adoption of the idea” (Kanter, 2000).

Williams (1980) also suggested in his book ‘The Implementation Perspective’ the problem with segmenting implementation into a distinct phase, isolated from other stages. He notes: “Implementation cannot be neatly segmented, isolated into a compartment in the policy process, and assigned to some special unit of the organization to be completed. As will be argued, implementation should be a major concern even prior to making a complex decision, by posing obvious, but strangely almost never asked, questions at the point of decision: How hard will it be to implement the various alternatives being considered? Even if thoughts of implementation only springs forth after the decision, the implementation problem is with the organization almost immediately and stays until the often arduous task is finished of moving from a decision to operations. And if the decision to be implemented is a complex new social service delivery project or program, the implementation stage is not completed when the doors open but rather runs through that terrible, and sometimes seemingly undeterminable, period of start-up in which Murphy’s Law predominates.”

According to Williams (1980) therefore, those engaged in implementation should be concerned with how the alternatives being determined will be implemented even prior to a final decision to adopt being made. This clearly suggests that the decision made on a particular course of action on an innovation impacts directly on the implementation. He contends that, “the implementation issue most straightforwardly concerns how to bring together communications, commitment, and capacity so as to carry a decision to action” and argues further that the more complex the innovation, the more incomplete the innovation is, transcending be-

yond roll-out. This suggests the necessity of considering implementation prior to physical implementation and even after.

We argue in this review the usefulness of conceptualizing organizational innovations as an implementation phenomenon, where implementation is considered much more broadly Conceptualizing implementation as consisting of three phases with each phase made up of several stages, allows for a more complete understanding of the complex innovation processes that organizations experience. Scheirer (1983) shared this view when he suggested that implementation should be viewed as a distinct and separate phase from both innovation adoption and evaluation of outcomes. The process however is not the only phenomenon that has attracted the attention of researchers over the years. Factors that influence the innovation adoption have been studied to try to understand what factors are important. The implementation process is therefore believed to be influenced by factors that eventually determine implementation outcomes.

## 2.4 Implementation of innovation

Scholars of innovation have been concerned over how to measure the implementation success of innovations for decades (Scheirer, 1983; Linton, 2002). Although there is a growing body of knowledge on implementation processes, distinguishing among various meanings and measures of the term is still under dispute. The innovation literature on implementation can be broadly classified under: a distinct and separate phase in the innovation process, or as the entire transfer process. Among the different measures that have been proposed is the degree of implementation which Scheirer (1983) argued is a logical dependent variable in the study of implementation processes.

In a review of implementation studies, Scheirer (1983) observed that: (a) there was a lack of common terminology to promote comparability of findings across studies, (b) operationally defined measures were often absent from individual studies, and (c) research reports failed to provide clear description of the innovations being studied. He argued that with these methodological flaws, the implementation field has failed to accumulate the required useful body of knowledge, hence making it difficult or researchers to capitalize on prior experience when designing new implementation studies. This raises serious questions in determining the success of an innovation's implementation. Should success be measured in terms of the system

being in place and made available for use? Or should it be assessed based on its use? or upon the realization of the purpose for which the innovation was introduced? As Scheirer argued, although an innovation's outcome is heavily dependent on the assumption that it was implemented, an assumption of adequate implementation requires a careful analysis of empirical evidence as there is evidence to show that the level of implementation, as per measured, is often found to be low to non-existent (Scheirer, 1983).

Scheirer (1983) was of the view that a study of implementation should be developed with "much more analytical separation than it has been accorded in the bulk of previous research on innovation processes." Although this approach may be useful for understanding what may have transpired in the implementation phase in the innovation process of an organization, it loses sight of important considerations that potentially influenced the implementation. In addition, given that implementation involves an adaptation of the innovation and the environment, the original intent may vary as there is evidence to show that implementation is not a straight forward activity. Thus developing any solution on the basis of a single phase's activity may totally ignore important considerations which may have been overlooked overtime.

Scheirer's (1983) call for the separation of the adoption phase from the implementation phase is a weak one. He argued that the adoption phase, a sequence of activities that culminate in a decision to use an innovation, involves receiving information about the innovation, assessing its applicability and or value to the potential adopting unit and frequently generating interest and support among those influential in the adoption decision, requires an official decision to adopt from a body with the authority to commit the organization's resources to the innovation. He further contended that the implementation processes within the organization occur after the adoption decision and involves all the activities concerned with assembling the necessary resources, assigning and training staff to use the innovation, and securing sufficient change in organizational routines and support systems to foster integration into the organization. He further suggested that the study of adoption and implementation requires different analytical techniques, arguing that diffusion and adoption studies often emphasize issues as rates of adoption, political and communication processes resulting in adoption decisions, etc while implementation appears to be more concerned with the extent to which the innovation was utilized or delivered, factors which facilitate or hinder the extent of implementation, and or experiments hypothesized to influence implementation. He concluded that studies to examine questions concerning adoption do not provide answers about implementation and vice

versa. A critical consideration of Scheirer's (1983) submission shows a conscious attempt to isolate the implementation phenomenon as a unique event in the innovation process, which although possible and acceptable, fails to completely explain how a specific innovation took place, or desired change occurred. Again though Scheirer (1983) sees adoption and implementation as separate and requiring different techniques for analysis, in an organizational context, one common theme that runs through the two phases is the 'organizational effort' to innovate, seen here as activities (actions) and decisions directed towards the realization of the innovation. These actions can be identified at the adoption and implementation phases and can be linked to the same innovation. And although one could separate the parts for critical study, a total understanding can only be gained by reconstituting the parts into the whole, for the part can be best understood as part of the whole. A study into how organizations innovate is essentially a study of the organization's innovation process. Also, a study into how organizations adopt an innovation is also an investigation into the process. Innovation implementation is also conceived as a process and has been variously conceptualized. Although similarities exist in the constructs utilized in most of these studies on innovation, we contend that conceptualizing an innovation process as a process of implementation where there is a preparation stage, an actual physical/ construction/ deployment stage, and a continuation stage enables researchers to focus on the actions (activities and decisions) of the organization directed at the innovation. The following section now addresses information systems as technological innovations.

## 2.5 Information Systems (IS) Research: Approaches, areas and philosophical perspectives

Information systems are technological innovations, a type of innovations whose application by an organization has the potential to provide competitive advantage (Swanson, 1994). According to Allen (2000) IS are technology-based innovations that are created and used by individuals, organizations and societies in organizations. Compared with the large literature on innovations, IS innovation research constitutes a small portion. In this section, we briefly review the basic concepts and theories which also have their origin in the broader innovation literature.

IS are uniquely diverse and have been applied in different context e.g. manufacturing (Voss, 1986), enterprise resource planning (ERP) (Yu, 2005), decision support systems (Alavi & Joachimsthaler, 1992). Swanson (1994) defined an IS innovation as, 'innovation in an organ-

ization's application of digital computer and communication technology." Essentially, an information system is an organizational innovation, as argued by Swanson (1994), "….whether it is analysed from the vantage point of the entire organization, or from a lower level, that of one or more of the organization's adopting units, or even at the individual level among a subunit's secondary adopters". IS innovations could be directly associated with the work of an organization's information system's department (ISD). As Swanson (1994) observed, the success of an IS innovation is a shared responsibility between the ISD and other subunits served by the department. In some cases, certain external parties also play important roles in the success of an IS.

Swanson's (1994) assessment of a selection of IS innovation literature showed a variety of studies ranging from issues in IS work practices such as use of innovative development tools and techniques to user-oriented industry specific IS technologies such as electronic scanners for supermarkets. He observed that few innovations had been the subject of more than one study, and most studies usually focused on a single innovation.

Swanson further noted that how innovation adoption and diffusion should, or should not, differ across such a wide variety of IS innovations had been ignored. He contended that only Zmud (1982, 1984) contrasted administrative with technical innovations, hypothesizing that there were differences in the effects of centralization and formalization among the different phases of an innovation.

Swanson further contended that while Zmud's (1982, 1984) work applied the distinction between technical and administrative innovation to the IS context, it was limited to the innovation within the IS department, and largely ignored consideration within the larger organizational context. He argued that an IS innovation is of importance not only to the particular unit of generation, but also to other units within the organization.

IS researchers have been for a long time interested in what factors such as organizational size, functional differentiation, etc affect innovation adoption and diffusion. As noted by Swanson (1994), the absence of several researches in IS that examine similar technologies and apply same measurement constructs, make proper comparison and the development of theory difficult. Other challenges have to do with the type of IS innovation and the level of analysis – industry, firm, or individual. Swanson' (1994) analysis of IS innovation showed a focus by

researchers on industry-wide adoption and diffusion issues over within organizational adoption and diffusion. He notes in particular that these results confirm the importance of firm level effects on the adoption and diffusion of IS innovation: “Moch and Morse (1977 cited in Swanson, 1994) attribute adoption of administrative EDP among hospitals to organizational size and functional differentiation……..Ball et al. (1987/88 cited in Swanson, 1994) report that…..DBMS is more likely to be acquired by firms seen to be innovative more generally.” And is of the opinion that in their study, only Lind and Zmud (1991 cited in Swanson, 1994) examined IS innovation in terms of the interaction between the IS department and user departments.

Swanson (1994) again was of the view that some studies of innovation diffusion that focused on the penetration of an IS innovation within a business often presumed that the organization had already adopted the innovation, and that the issue under research is the subsequent spread of the innovation among individual secondary adopters. He further noted that such researches often identified significant organizational-level implications. For instance he noted that Leonard-Barton and Deschamps (1988) in their exploration of the role of managerial influence in the secondary adoption of an expert system by the sales personnel of a firm identified influence to be perceived differently among the personnel. Again he noted that Burkhardt and Brass (1990) found earlier adopters to increase their power and centrality relative to later users within an organization, when the system introduced significant discontinuity and uncertainty into the agency’s core task when they investigated the secondary adoption of a general purpose computing system among members of a federal agency. Another research by Brancheau and Wetherbe (1990) into the adoption of spread sheet software among finance and accounting professionals, Swanson noted, found diffusion to be a user led experience. He further argued that a major problem with these researches was that they do not clearly indicate how the process may be dependent on whether the organization is an early adopter of the innovation or not.

The existing research on IS innovation is still fragmented and limited (Mihailescu et al., 2013; McMaster et al., 2007; Benbasat & Weber, 1996; Swanson, 1994; Kwon & Zmud, 1987). The obvious application of organizational innovation theory has seen little expansion and elaboration. Swanson (1994) argued that no IS innovation theory in its description is distinguishable from organizational innovation theory in general. He further argued that no IS innovation is viewed in the larger organizational context in which innovation takes place. An

important observation in Swanson's (1994) work is that information systems pervade both technical and administrative cores of an organization. In particular, he notes that when an IS innovation involves a new product or service that impacts directly upon an organization's basic business or product, it has the potential of influencing the organization directly.

Establishing the IS field as a unique field of study has been surrounded by numerous discussions ranging from having its own theory to the appropriate philosophical perspectives that underpin IS research. Theories used in IS are essentially theories from other fields of study due to the nature of IS. Information systems have been construed as artefacts that are created by social interaction of people. This perspective of IS as socially constructed is important in understanding information systems in organizations, how it should be studied, and the philosophical perspectives that underpin it.

### 2.5.1 Categorization of IS research: Factor and Process

The study into IS can be broadly categorized under factor and process research. While the former has been predominantly concerned with the identification and measurement of factors (independent variables) that influence some identified outcome (dependent variable), the latter has been concerned with the processes that capture how a given outcome occurs overtime, e.g. system use, decision-making performance, decision-making time, user satisfaction, user attitudes, etc. (Alavi & Joachimsthaler, 1992). The principal argument that divides the two approaches is whether and how a one-point in time measurement (factor research) of a phenomenon can adequately explain a given outcome. As Markus and Robey (1988) noted, "Variance theories, then, differ from process theories in their assumptions about the relationship between antecedents and outcomes". While a factor research provides a snapshot view of the phenomenon at a point in time, the process views offers the opportunity to view the phenomenon as an emergent one caused by the interaction of certain factors which in themselves are not static. This discussion has its origins in earlier discussions of the use of positivist approaches in the investigation of IS as compared to interpretive perspectives.

Markus and Robey (1988) provide a good discussion of the important differences between factor and process theories. They suggested that process theories could provide the accumulation and consolidation of findings that explain the relationship between information technology and organizational change.

## 2.6 Information Systems Adoption and Diffusion

The adoption and diffusion of IS has occupied the attention of many scholars since early 1980s. Adoption studies often focused on the determination of factors influencing individual and organizational adoption and use of information systems. Several theories were developed to measure users' intention to use IS. One of the most popular in this area of research is the Technology Acceptance Model by Davies (1989). This model has been extensively used to measure users' intention to use a technology through the operationalization of two constructs: perceived usefulness and perceived ease of use. Over the years this model has been extended to include other constructs, and though it has made immense contribution to our understanding of what factors influence people's use of technology, its ability to explain how organizations implement technological innovations is limited. The model was subsequently extended to TAM 2 (Venkatesh and Davies, 2000) and TAM 3 (Venkatesh & Bala, 2008). In TAM 3, Venkatesh & Bala (2008) sought to identify institutional interventions that affect the independent variables in the model so as to be able to better explain institutional efforts at introducing and integrating technologies.

Another area that has preoccupied scholars in the IS field is the diffusion of technology in organizations. Rogers' (1983; 1995; 2003) models of diffusion of innovation has been extensively used to study technological factors, communication channels and the adoption decision processes. According to Rogers, diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. Many IS scholars have investigated the influence of a technology on its users using Rogers' five characteristics of a technological innovation: relative advantage, compatibility, complexity, trialability, and observability. Rogers' model not only highlights the important decision stages involved in an individual or decision making unit's adoption decision process, but also emphasizes the complex myriad of contextual influences surrounding the adoption process: e.g. its depiction of important communication channels – mass media and opinion leaders, the relevance of time as well as the importance of the social context within which the innovation occurs. In addition, the model's recognition of prevailing conditions prior to the adoption is very significant and in comparison to the technology acceptance model (Davies, 1989) highlights the importance of historical antecedents. Again, its capture of the possibilities of individuals or organizations to reject and later accept, or accept and later reject a technology is significant as it reflects what happens in real life. Unlike TAM 3 (Venkatesh and Bala, 2008),

the model does not provide any insight into the specific activities (interventions) engaged in by the organizations to get the innovation institutionalized.

Although much has been contributed by these areas of research to our understanding, a more complete picture of implementation was still not portrayed. In the next section we take a look at IS research into implementation to get an insight into what could help.

## 2.7 Information Systems (IS) implementation

IS implementation research has developed along the paths of the innovation process and the diffusion of innovation. Whereas an innovation process leads to the development of an innovation and the diffusion process sees to the spread of the innovation among targeted users, the adoption process addresses how an individual or organization comes to use the information system. Voss (1986) asserted that the study of implementation might be more precisely described as the study of the process of adoption of innovations.

### 2.7.1 Definition of implementation: Two perspectives

Two major perspectives on implementation are identifiable in the IS literature based on their conceptualizations: a broad perspective that covers pre and post implementation activities (Ginzberg, 1978; Voss, 1986; Kwon & Zmud, 1987; Chan & Swatman, 1998) and a narrow, physical action perspective encompassing a single stage (Lai & Mahapatra, 1997; Kwon & Zmud, 1987). Voss (1986) defined implementation as,

> "the user process that leads to the successful adoption of an innovation of new technology."

Cooper & Zmud (1990) defined IT implementation from a technological diffusion perspective as,

> "an organizational effort directed toward diffusing appropriate information technology within a user community."

Klein & Sorra (1996) from an innovation perspective, defined implementation within an organisation as,

> "The process of gaining targeted employees' appropriate and committed use of an innovation."

Voss (1986) definition does not lend itself to a clear understanding of what implementation is or should be. Emphasizing on user process, it is not clear whether it's from an organizational perspective or user effort perspective. Its identification of "process" leading to successful adoption of the innovation is however very useful as it aligns with the broader perspective of implementation when adoption is not considered as a point in time activity. Cooper & Zmud's (1990) definition from a diffusion perspective identifies implementation to be an organizational effort, which may entail decisions and activities that are directed, whether intentionally or otherwise, towards spreading the knowledge and use of a technology among users. This definition is useful in several ways. It highlights the fact that within an organizational context, specific actions need to be conducted to make a technology available and used for organization purposes. It also views implementation as a responsibility of the organization, not something to be left to chance if the technology's use is to be successful. It also highlights the fact that implementation involves more than just making the technology available within the user environment, and contends, although implicitly, that the active involvement of the organization is essential to technology implementation. Klein & Sorra's (1996) view of implementation is similar to that of Cooper & Zmud (1990) as it views the critical role of the organization in ensuring that the right and committed use of members of the organization is not left to chance.

Implementation has also been variedly conceived in the literature. Gottschalk (1999) identified 19 stages of implementation completion as addressed by scholars in the literature (see table below). Although the stages identified in the table highlights a broad perspective of implementation, it totally ignores pre-implementation activities or stages. The table highlights the stages where many scholars place their emphasis on implementation. While some believe implementation to be complete after installation, others contend it is complete when change occurs, or benefits are realized.

Table 1: Stages of implementation completion

| Stage | Implementation completed when |
|---|---|
| 1 | System is installed |
| 2 | System is put to use |
| 3 | Programmes are adopted |
| 4 | Organization acts on new priorities |
| 5 | Changes are installed |

| Stage | Implementation completed when |
|---|---|
| 6 | Not abandoned or expensively overhauled |
| 7 | Adoption has occurred |
| 8 | Innovation is adopted and used |
| 9 | Systems are installed and used |
| 10 | Change is accepted |
| 11 | Systems are accepted |
| 12 | Innovation is accepted and used |
| 13 | Systems are accepted and used |
| 14 | Control rests with users |
| 15 | Change process completed |
| 16 | Committed use occurs |
| 17 | Post-application phase is consolidated |
| 18 | Satisfaction with system is achieved |
| 19 | Intended benefits are realized |

Source: Adapted from Gottschalk (1999)

As evident in the above table, an important observation of research in IS implementation is that findings have been inconsistent, and no coherent theoretical frameworks exist to guide future researches (Markus & Robey, 1988; Orlikowski & Robey, 1991; Alavi & Joachimsthaler, 1992; Myers, 1994). Researchers in the IS field have been divided over how IS should be studied. While some argue for its investigation as a distinct phase, separate from adoption and post-implementation phases (Lai & Mahapatra, 1997), others have argued for its consideration as a process (Cooper & Zmud, 1990; Kwon & Zmud, 1987). Of central importance is the issue of implementation effectiveness. Those who call for research into implementation as a distinct phase seek for ways of measuring implementation efforts. However scholars who advocate a broader investigation perspective seek understanding (Chan & Swatman, 1998). This broader understanding recognises the effects of actions and decisions prior to and after physical deployment as essential components of the implementation process. Lai & Mahapatra (1997) rightly asserted that although much was known about the strategic importance of information technology, very little was known about how it could be implemented effectively in order to achieve general organizational goals. They note that research into IT implementation can be grouped into four groups: individual, group, organizational, and inter-organizational, arguing that the complexity and factors affecting implemen-

tation will vary based on the level of adoption being considered. Lai & Mahapatra (1997) also identified a reduction in the individual IT implementation research, with organizational IT implementation receiving the greatest attention among implementation researchers.

A large number of IS implementation studies have tried to identify factors that are related to IS implementation success in general (Sharma & Yetton, 2007). These researches use independent control variables which are statistically associated with dependent variables, i.e. the project outcomes. The value of these researches is that they use cause-effect patterns to investigate IS implementation difficulties that have provided some valuable insights into the nature of IS problems (Bingi et al., 1999).

Some researchers however have noted that despite the prevalence of such studies, factor models have little practical utility in coping with IS problems due to their lack of understanding of the nature of the implementation process (Newman & Zhao, 2008; Newman & Robey, 1992; Markus & Robey, 1988). In other words, they emphasize what factors are associated with outcomes not how they shape those outcomes (Robey, 1994). Processes are largely ignored and are considered black boxes. A useful model should therefore not only emphasize or focus on change management but rather highlight those activities that are critical to the achievement of implementation objectives. As such, models that only seek to identify associations with outcomes excluding the important role played by the process involved can only provide a partial understanding of an IS implementation using a learning management system. Moreover, cultural factors are often treated uncritically in the literature just like another set of variables, and these, like other factors, do not reveal how the processes unfold over time.

Process modelling sees IS implementation as a sequence of events and seeks to explain how and why outcomes unfold over time (Sabherwal & Robey, 1995). One of the premises of process research is that outcomes can only be interpreted in the light of the process (Newman & Zhu, 2007). According to Kwon & Zmud (1987) information systems development (ISD) can be represented as a socio-technical change process. Therefore a process approach which focuses on the dynamics of social change can help researchers to analyse IS implementation practically. Process models typically examine critical events in sequence, linking antecedent conditions with outcomes. But as pointed out by Newman & Robey (1992), process and factor models can complement each other, providing a more comprehensive explanation of IS implementation issues (Newman & Zhao, 2008).

The often unpredictable nature of implementation outcomes necessitated the development of a framework that could explain, guide and capture the essential processes, practices, contextual factors and activities identified by implementation researchers to influence implementation efforts in order to synthesize the fragmented findings into a coherent whole. The IS implementation framework was developed through an integration of organisational innovation process concepts, technology diffusion theories and IS implementation theories. The framework provides a unifying platform for synthesizing research findings on IS implementation that will enable unanswered issues to be identified.

The study of IS implementation can be situated within the organisational innovation context. Organisations have for decades been concerned with the implementation of innovations among which technological innovation features prominently. The organisational innovation is often viewed as a three-phase process: initiation, adoption, and implementation. Kwon & Zmud (1987) argued that this model of the innovation process is both representative of the literature and conceptually economic. The initiation stage is traditionally associated with the identification of the need for change which can emanate from a need-pull or technology-push forces. Through the exchange of the relevant information and ideas, needs and appropriate technological solutions can be identified for introduction and use within the organisation. The next phase adoption, involves decisions taken to commit resources necessary to accommodate the desired change. The third phase, implementation, has been traditionally associated with the actual development, installation and maintenance of the technology. This model of organisational innovation aims at facilitating innovation on the assumption that the outcomes of the innovation would turn out as expected. Not all IS (innovation) implementation ends up being successful. Attempts to understand the reasons behind IS implementation failures and successes started as far back as the mid-1960s (Kwon & Zmud, 1987). These researches cover not only the processes followed, but also factors affecting outcomes including user characteristics, management support, power influences (political), etc. Kwon & Zmud classified these researches under five streams: factor research, mutual understanding research, process research, political research and prescriptive research.

Kwon & Zmud (1987) suggested the inclusion of four assessment measures which establish a base for implementation success into the innovation process model: acceptance, usage, performance, and satisfaction. They argued that these measures provide an indication of the innovation's appropriateness or inappropriateness. They submitted that no clear precedence

exists among the concepts, contending however that 'acceptance' could precede them in two situations: where use is voluntary, and where performance is dependent on committed, rather than lackadaisical use. This led to the inclusion of two post-adoption assessment processes: 'acceptance' and 'use-performance-satisfaction' to the innovation process model. They further argued that a complete diffusion throughout an organisation's tasks, people, and structure will not necessarily occur unless a variety of other technical, motivational, social, and political issues are resolved. They therefore added 'incorporation' as the final implementation process, arguing it occurs when the innovation becomes embedded within an organisation's routine and when the innovation is being applied to its full potential within an organisation. This resulted in the inclusion of three stages beyond the prototypical terminal IS implementation, i.e. adaptation (development/installation), stage, resulting in a six-phase model of IS implementation process (see figure 1 below).

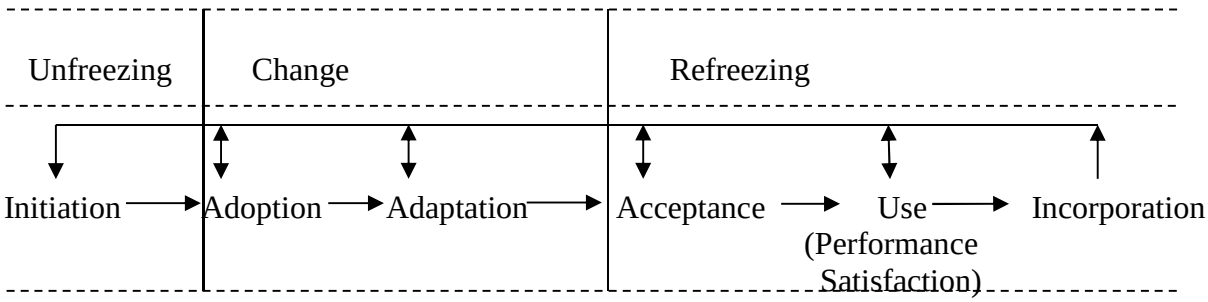



Figure 1: IS implementation framework

Source: Kwon & Zmud, (1987)

As shown in the framework, each phase can be associated with a particular stage in Lewin's (1952) model of change. Lewin's change model comprises three phases: unfreezing, change, and refreezing, and has been argued to be applicable to planned change in organisations. As also indicated by the direction of the arrows, the framework contains feedback loops, which may positively or negatively affect implementation.

Cooper and Zmud (1990) later modified the framework, by replacing the fifth phase, 'use-performance-satisfaction' with an expansion of the incorporation phase to comprise 'routinization' and 'infusion'. The table below describes the phases and their outcomes. Figure 2 below shows the resulting framework from Cooper and Zmud's (1990) work.

Table 2: Description & Outcomes of the phases in the IS implementation processes

| S/n | Implementation Process/Phase | Description | Product/Outcome |
|---|---|---|---|
| 1 | Initiation | The active and/or passive scanning of organisational problems/opportunities and IT solutions either from a need-pull or technology-push force or both. | A match between an IT solution and its application in the organisation is identified. |
| 2 | Adoption | Rational and political negotiations ensue to get organisational backing for implementation of the IT application | A decision is reached to invest resources necessary to accommodate the implementation effort |
| 3 | Adaptation | IT application is developed, installed and maintained. Organisational procedures are revised and developed. Organisational members are trained both in new procedures and IT application | The IT application is available for use in the organisation. |
| 4 | Acceptance | Inducement of organisational members to commit to IT application usage. | Application of the IT in organisational work |
| 5 | Routinization | Usage of the IT application is encouraged as a normal activity. | Adjustment of the organisation's governance systems to account for the IT application. No longer perceived as out of the ordinary. |
| 6 | Infusion | Increased organisational effectiveness obtained through use of the IT application in a more comprehensive and integrated manner to support higher level aspects of organisational work. | Use of It to its fullest potential. |

Source: Adapted from Cooper & Zmud (1990)

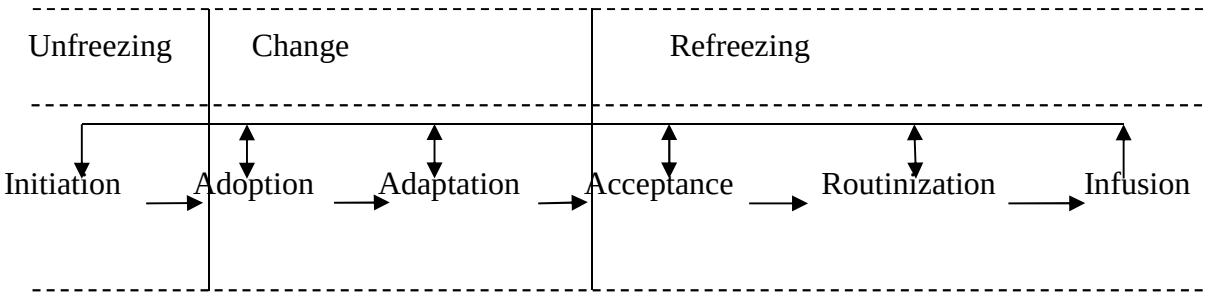



Figure 2: Modified IS implementation framework
Source: Cooper & Zmud (1990)

The above model incorporates two post-adoption behaviours developed by Zmud & Apple (1989). They identified clear distinctions between the two: The purpose of this research is to apply this framework in understanding the processes followed by HEIs in implementing e-

learning and the factors influencing the outcome of the implementation through an empirical study examining their e-learning implementation activities.

## 2.8 Process studies and Stage Models

Studying IS implementation as a process has been highly recommended due to the dynamic nature of implementation. Comprehensive frameworks that capture all the salient issues involved are however lacking. For instance, Markus & Robey (1988) recommend adopting emergent rather than deterministic models of causal agency, using the logic of process theory rather than an exclusive dependence on variance formulations, and linking multiple levels of analysis. Such a framework therefore needs to capture the context, factors as well as processes followed in other to understand the technology's implementation.

Two variations of process studies can be identified in the literature: one, where the phenomenon is studied over a period of time to enable the identification of important events and activities to be identified in explaining the phenomenon; and two, the use of stage models to understudy the influence of specific factors. An example of the first instance is building and extension of a framework by Orlikowski & Robey (1991) based on the central tenets of structuration theory, focusing on information technology and how it is created, used, and institutionalized within organizations. They posited that information technology is both the product of human action and a medium for human action. Also, an example of the stage model is Cooper and Zmud's (1990) framework used to study the influence of certain factors on two of the stages.

Process studies in information systems in organizations generally seek to understand, explain and sometimes predict possible outcomes. Underlying process studies of information system is the assumption that the object of investigation is influenced over time by different factors within a social environment or a given context. This suggests that the object of interest in such investigations exist in a dynamic environment whose state is unpredictable due to the presence of different factors operating within the given context. Such studies therefore seek to understand and explain how outcomes are achieved by showing the activities, events and their sequences, as well as the factors that influenced them. This has led to the development of stage models that identify specific stages that seek to explain how certain outcomes are achieved. These models are often times conceived as sequential and linear in nature, an asser-

tion may scholars disagree with. Such scholars contend that sequential stages do not accurately reflect real life situations, and as such should be used with caution. A critical review of such models shows that they are often based on the sequence of events that occur, and the observable patterns among such events (Van de Ven, 2007). There are some researchers however who view processes as emergent (Orlikowski, 1996).

Stage models have been described as both useful and constraining. Saren (1984) reviewed the models of innovation processes and classified them into five types: (a) Departmental-stage models, (b) Activity-stage models, (c) Decision-stage models, (d) Conversion process models, and (e) Response models. Through a discussion of their advantages and disadvantages, she concluded that more research was needed on the nature of the innovation process within the organization. Whereas departmental models of innovation depicted the departments involved in the innovation process, activity models identified specific activities performed by the organizations in the innovation process. Decision-stage models identify decision points in the innovation process, an issue often neglected by most stage models, at the intersection of the stages. Saren contended that most activity and decision models often ignored this important aspect. She argued the need to make this point explicit, as most models failed to explicitly identify decisions made at the end of each activity in the model. Saren also contended that stage models were too rational and ordered and in practice, innovation process hardly assumed such rigidity. Conversion process models treated the innovation as a black box, receiving inputs and churning out outputs, more like 'systems'. This of course would reveal very little about what activities, decisions etc. the organization engages in. Saren however opined that this conception of the innovation process provided the opportunity for other aspects of an innovation like the rate and direction, costs, factors, etc. to be studied. Lastly, the response models depict innovation as an organization's response to some kind of internal or external stimulus. The stages in such models therefore depict the organization's response to the stimulus.

According to Quaddus (1995), the conceptual models of IT diffusion process can be classified as stage models due to their implicit dependence on time. He classified IT diffusion models into implicit time dependent models and explicit time dependent dynamic models. The explicit time dependent models were further categorized into two: pure diffusion and bi-level substitution models and multi-level substitution models.

In a study of stage models of innovation diffusion, Quaddus (1995) identified thirteen models (presented below) that can be explained along Rogers' (1983) framework of initiation, adoption decision, and implementation. This framework suggests that an organizational innovation can be initiated by internal or external forces when needs are identified for a technology or external pressures exist to adopt a new technology. Thereafter, a critical decision needs to be taken on whether or not to adopt and as argued by Quaddus (1995), this is normally performed by a group championing the technology in collaboration with the end users. The technology is then implemented in the organization, possibly after several adaptations. Quaddus (1995) notes that all the thirteen stage models of innovation diffusion could be roughly grouped under the three main stages identified by Rogers (1983). In particular, he contended that two of the most widely used stage models in IT/IS are Rogers (1983) organizational innovation process and Nolan's (1973) stages of growth model. We illustrate with a description of Rogers' (1983) five-stage organizational innovation model in the rest of this section.

According to Rogers (1983), an organization's innovation process consists of five stages: Agenda-setting, matching, redefining/restructuring, clarifying, and routinizing. According to Rogers, the ***agenda-setting*** stage involves the identification of a problem or need within the organization, followed by an environmental scan to find solutions to the problem. While the identification of the problem can be attributed to one person (Quaddus, 1995), the search for a solution is necessarily undertaken by a decision making unit or group within the organization in collaboration with the technological gatekeepers (Quaddus, 1995). In the ***matching*** stage, the identified solutions are evaluated to determine which provides the best solution that solves the organizations problems. This stage provides the necessary justification for the selection of a particular innovation to which the organization commits its scarce resources, and precedes the decision to adopt or reject which, as noted by Quaddus (1995), is made by a decision making unit. The ***redefining/restructuring*** stage involves the adaptation of the innovation to the organization for use. It may involve the re-invention of the innovation to fit the organization's needs or a restructuring of the organization's structures to fit the innovation's needs or both. Quaddus (1995) notes that this stage may be the most important in the diffusion of innovations in organizations. Following this stage is the ***clarifying*** stage. This stage involves the resolution of identified issues with the innovation in order to justify its use. In the final stage of ***routinizing***, the technology becomes integrated into the organization. It becomes part of the day to day activities performed by the members of the organization.

Quaddus (1995) noted that embedded in the stage models is an element of time sequence and feedback. For instance he notes that the matching phase will only follow after some time is spent identifying problems/needs within the organization and identifying possible solutions. Also, he maintained that instead of moving from the matching stage to the redefining/restructuring stage, inability to find solutions might require further activities to clearly define the problem and identify the right solutions, necessitating some kind of feedback loops between and among the various stages.

Stage models can also be classified into adoption, implementation and institutionalization at a very high level of abstraction (Quaddus, 1995). In the adoption stage, we have all the activities leading to the decision to adopt a specific technology and the commitment of scarce organizational resources to the realization of that objective. This phase is similar to Voss' (1986) phase of pre-installation (diagram below). The implementation stage involves the physical deployment and use of the technology, and is similar to Voss' (1986) stage of installation and commissioning. The final stage of institutionalization involves activities aimed at routinizing the use of the technology among organizational members. This stage is similar to Voss' (1986) stage of post-commissioning.

Quaddus (1995) argued that in the past, most of the researches concentrated on two main diffusion stages: initiation to adoption, and adoption to implementation. He contended however that these were broad, and that there was the need to find more detailed stages. These finer stages were in other words supposed to provide more clarity and understanding in the diffusion of innovations in organization, but as was noted by Quaddus (1995), scholars have been more interested in measuring the relationship of certain factors to identified stages.

### 2.8.1 Feedback-loops in stage models

Of particular usefulness in understanding how an innovation is implemented is the examination of its activities and decisions. The actions of the members of an organization, construed here as their decisions and activities in an implementation effort, can reveal much about how the system is introduced and integrated. When other contextual factors are considered alongside these activities and decisions, a lot could be understood about the outcomes of these implementations. We posit such a view in this research.

## 2.9 Philosophical perspectives in IS research: Positivism and Interpretivism

While researchers who adopt the positivist paradigm argue that reality is objective and can be measured separately and distinct from perception, the interpretive school of thought argue a socially constructed reality. There has been on-going debate on what reality is in the field of IS and how it can be acquired, ontology and epistemology. In other words, in the IS research field what should researchers regard as truth and how should this truth be verified. Should it follow the belief that the objects of the research interest already exist aside the environment of study or should research in this field proceed with the belief that these objects of study are the result of the environment' activities. Many of the scholars in the IS field adopt positivist approaches to their investigation, according to a research finding by Orlikowski & Baroudi (1991). Such researches assume an objective reality that can be measured on its own. Such perceptions in the IS field are believed to have been adopted from the natural sciences. To scholars in that field, reality is objective. The objects of study therefore have an existence of their own apart from their context of occurrence and so can be known without association to their contexts. Not too long ago however, scholars from the interpretive philosophical perspective have argued the inadequacy and inappropriateness of positivistic view of social reality. They contend quite strongly that reality is subjective since people interpret reality differently (Walsham, 1995; Walsham, 2006; Myers, 1995; 1994).

Considering the special case of information systems, there has been a number of critiques of the strict separation of research into objective and subjective, positivist and interpretive, etc. Many of these discussions contend that information systems or information technology is a socially constructed artefact. Its shape and meaning is given by the people who develop it and in turn used by these same people, or other people. Technology therefore is seen to possess physical properties which can be seen and interacted with, while at the same time, it is considered a creation by people. This perspective is commonly referred to as the duality of technology. We discuss this in the next section.

### 2.9.1 The duality of technology

Although applicable in other contexts, we consider technology's duality from the perspective of an organization. Research into organizations have shown how people come together to establish them to achieve specific goals and objectives. Through the interactions of the members of the organization in decision making and other activities, the organization is able to

convert inputs into outputs beneficial to the existence of the organization. Such interactions often lead to the creation or development of technologies which essentially are tools needed in the conversion process. These technological tools could be internally created by a special unit of the organization or acquired from external sources, as there exist organizations whose goals are to develop technologies for others other than themselves. In both ways, the technologies are the results of human efforts and therefore embody the meaning and purpose given it by the people. It is therefore possible to conceive a technology as a creation of people, and therefore subjective in nature, and also construe it in an objective sense where it also conditions the interaction of people with it. Both conceptions however allow both subjective and objective realities to be assumed, and therefore one is not necessarily superior to the other. Orlikowski and Robey (1991) provide a good description of how technology can help structure organizations using Giddens' structuration theory. We argue the usefulness of such a conceptualization later in this review.

Consequently, this holds important implications for research into IS. In other words, when an information system is strictly considered as having a reality of its own and as such independent of people' interpretation of it, important information can be overlooked due to the failure to acknowledge the influence of people's interpretation of it through interaction with it. In a similar way, strict conceptualization of technology as a creation of the subjective interpretation and interaction of people also fails to recognize the possible influence of the technological artefact. These two are not separate. In other words, they do not occur at separate times but rather at the same time. It is important therefore for researchers to be aware of the presence of these two aspects of a technology, especially in an organizational context.

We argue therefore that in as much as the IS is created by people, it also determines how people interact with it. However, the technology's ability to influence how people within an organization interact with it is also influenced by the organization's recognition of what the technology can offer through the organization's decision makers. So in as much as people's interpretation and interaction shapes and develops an IS in an organization context, this interaction and interpretation is shaped by the existing organization's structures.

In the next section, we discuss an important conceptualization of information system using Giddens' theory of structuration. Perceiving IS as an artefact that is both developed by people

and in turn influences people within well-defined structures like organizations provides excellent lenses for understand IS and its implementation.

### 2.9.2 The nature of social reality and the theory of structuration

#### *2.9.2.1 Social reality as subjective and objective*

Orlikowski & Robey (1991) argued that social scientists can be broadly classified into two opposing traditions depending on their ontological assumptions about social reality: as subjective or as objective. They contended that two traditions in the social sciences support this view: the Weber perspective that posits the social systems as the result of meaningful social behaviour, justifying the subjective nature of social reality; and those based on the Durkheim, focusing on the institutional aspect of social systems, seen as independent of and constraining human action, and hence the objective nature of social reality.

#### *2.9.2.2 Giddens' structuration theory*

Giddens' structuration theory views both subjective and objective perspective to be equally important and as such both should inform the theorizing of social reality and empirical investigations. Although Giddens' structuration theory has been used to study and analyse organizational processes, its influence in information technology studies is limited (Orlikowski & Robey, 1991). They argued its relevance in studying the relationship among information technology, human action, and social structure since the exploration of the ontological assumptions of the field of information technology was woefully inadequate. This they contend has led to the free adaptation of information technology to different theoretical positions.

There is therefore a lack of reflection on the nature of information technology which creates the impression that like other perspectives in the social sciences, it can take sides with either one of the dominant subjective or objective perspectives. Like Orlikowski & Robey (1991) noted, "This lack of reflection on the nature of information technology assumes it is unproblematic, and renders research vulnerable to the simplifying assumptions of subjectivism".

#### *2.9.2.3 Subjective vs. Objective investigation of information technology*

Scholars advocating support for the subjective investigation of social phenomena such as information technology assume a "social action" perspective (Orlikowski & Robey, 1991). The contention here as argued by Orlikowski & Robey (1991) is that since the phenomenon is influenced by people's interpretation, any form of prediction would serve no value and

rather obtaining an understanding of the humanistic-interpretive process within which those engaged with the technology enact various consequences would be more useful.

Orlikowski & Robey (1991) also argue that the stance of subjective researchers on the possibility of systems having objective properties is incomplete. Citing Iacono & Kling (1988), they highlight how studies on institutionalization point out that technology actually escapes human control, becoming formalized, institutionalized, and reified. Findings from the field of ergonomics and medical technology have shown that the computer-mediated workplace is not entirely a social construction, and more importantly, material characteristics may seriously affect use and alter social relationships.

Comparing the objectivist approach to technology in information systems with the subjective approach, Orlikowski & Robey (1991) noted its commonality but not necessarily being more accurate. They contended that studies into the impact of technology on social systems like organizations treat both technology and the organization structures as objects. They suggested that the metaphor of impact implied objective assumptions where computers are treated as discrete objects capable of causing impacts. This, they submit, will lead researchers to find such impacts. They argue that the objectivist approach overstates the importance of technology's material characteristics and ignores the social interpretations and actions that may modify these technologies. They concluded by suggesting the examination of information technology as part of a more general theory of social structure and action, arguing that Giddens' structuration theory provides the basis for such a theory.

#### *2.9.2.4 Integrating subjective and Objective assumptions based on Giddens' theory of structuration*

In Giddens' (1984) theory, he argues for the removal of the opposition inherent in the assumption of mutual exclusiveness in the constitution of social reality by suggesting that both subjective human actors and institutional properties are equally relevant. According to Orlikowski & Robey (1991), it is improper to conceive of a social system merely as the product of either a deliberate human action or of institutional forces.

The duality of structure, proposed by Giddens refers to the notion that the structure or institutional properties of a social system are created by human action, and then serve to shape fu-

ture human action. In other words, the actions of people can be seen to constitute the institutional properties of social systems, and at the same time be constituted by the institutional properties. For instance Roberts & Scapens (1985) cited in Orlikowski & Robey (1991) observed this when they stated that, "through being drawn on by people, structure shape and pattern (i.e. structure) interaction. This implies clearly that it is only through interaction that structures in themselves can be reproduced. The duality here therefore shows that structures are both the medium and the outcome of interaction (Orlikowski & Robey, 1991). Orlikowski & Robey (1991) therefore suggested that explanations of social phenomena should refer to both the role of human action and the effects of existing institutional properties.

As Giddens' theory suggests, structure is an abstract property of social system, and not something concrete, situated in time and space, and lacks material characteristics. It can be reasonably concluded therefore that structure cannot exist apart from the human actors who enact it and interpret its dimensions (Orlikowski & Robey, 1991). It is arguable therefore that organizational structure has only a virtual existence. But as Orlikowski & Robey (1991) noted, "people readily allow their actions to be constrained by these shared abstractions of social structure." They conclude that the ability of organizational structures to elicit compliance and conformity in the absence of material constraints is evidence of the power of socially constructed abstractions.

Orlikowski & Robey (1991) noted the following about Giddens' theory of structuration: "Giddens (1976, pp. 118-119) offers a useful analogy to clarify the nature of social structures. He notes that structure is like language, an abstract property of a community of speakers that is sustained through use by human actors in speech. While speech acts are situated temporally and contextually and always involve dialogue between humans, language exists outside of space and time. Language is a condition for the achievement of dialogue, and language is sustained through ongoing production of speech acts (Giddens 1976, p. 127). So too, social actions are situated temporally and contextually and they always involve interaction between humans. Social structure conditions these social practices by providing the contextual rules and resources that allow human actors to make sense of their own acts and those of other people".

Orlikowski & Robey (1991) argue that social systems should be considered in the light of exhibiting structural properties that are produced and reproduced through the interaction of

human actors. They contended further that individuals do not enact structures in a vacuum, but rather call on the structural properties that were enacted in the past by prior human action (their own or that of others). Through this, the structural properties established by prior human action come to define and shape the individuals' interaction, which in turn recreates the structural properties anew. Orlikowski & Robey (1991) consider the conception of structure in this way as acknowledging its subjective and objective features. They claimed that structure does not merely emerge out of subjective human actions but that it has an objective part in that it provides the conditions for human action to occur. So what does it mean for the implementation of a new technology? For one thing, it suggests that people's interaction with the technology, even its idea, will lead to the creation of it, shaping of it, and institutionalizing it. For another thing, this ability to shape it will be through the already existing structure of the organization, and the new structure being introduced by the technology. If it is developed within the institution from scratch, it's one thing, but if it's already developed and must be customized, what will be the implication of the theory for innovation and change, and what specifically can we learn from e-learning implementation?

In other words, innovations or change in organizations, and in particular technological innovation, is considered by Giddens' structuration theory to be caused by man's activities, and in turn influences man. As noted by Giddens (1982, p.21 cited in Orlikowski & Robey, 1991): "….man actively shapes the world he lives in at the same time as it shapes him" Orlikowski & Robey (1991) observed that there is a dialectical interplay between the objective and subjective dimensions of the social world that essentially eliminates the need to select one over the other.

Another important usefulness of the structuration theory is its removal of "artificial partitioning" of research attention between macro and micro levels of analysis (Orlikowski & Robey, 1991). The structuration process allows operation at multiple levels at all levels of analysis – individual, groups, and social system (Orlikowski & Robey, 1991). They observed that through the demonstration of how individual action and interaction constitute shared definitions of the social structure, the theory is able to transcend the unit of analysis problem, providing concepts for effectively bridging the levels of analysis and thereby providing a more complete social theory.

#### *2.9.2.5 Using Giddens' modalities of structuration*

There are three modalities linking action and social structure in Giddens' structuration theory. These are interpretive schemes, resources and norms. Interpretive schemes represent the standardized, shared stocks of knowledge that people draw on to interpret behaviour and events, and thus are able to achieve meaningful interaction. The resources are the means through which intentions are realized, goals are achieved and power exercised. Norms are the rules governing sanctioned or appropriate conduct, and they define the legitimacy of interaction within a setting's moral order. As observed by Orlikowski & Robey (1991), these three modalities determine how the institutional properties of a social system mediate deliberate human action and how human action constitutes social structure. They contend that it is this link between the spheres of social structure and human action that is referred to as "process of structuration" (Giddens 1979 cited in Orlikowski & Robey, 1991). The operations of these modalities were described in detail by Giddens (1984) showing the interaction of the subjective and objective elements. Orlikowski & Robey (1991) provided a summary description of Giddens' (1984) idea of the nature of the interaction between human actions and the mediation by social structure. We present a brief description of these below.

##### 2.9.2.5.1 Interpretive schemes

From the subjective point of view, human interaction involves the communication of meaning, and this is achieved via interpretive schemes, which are stocks of knowledge that humans draw on in the production and reproduction of interaction. Interpretive schemes "… form the core of mutual knowledge whereby an accountable universe of meaning is sustained through and in the process of interaction" (Giddens 1979, p.83). The interpretive schemes, however, do more than merely enable shared meanings and hence mediate communication. Interpretive schemes also serve as conduits for the imposition of structural constraints. From an institutional point of view, interpretive schemes comprise structures of signification which represent the social rules that enable, inform, and inhibit the communication process. Thus in any interaction, shared knowledge is not merely background but an integral part of the communicative encounter, in part organizing it, and in part being shaped by the interaction itself.

##### 2.9.2.5.2 Resources

From the subjective perspective, power enters into human interaction by providing organizational capabilities for humans to accomplish outcomes. The power is here understood as transformative capacity, that is, the power of human action to transform the social and mate-

rial world. Its use in organizations is mediated via the organizational resources that participants mobilize within interaction (Giddens 1979, pp. 92-93). While these resources comprise the media through which power is exercised, from an institutional view, resources are structural elements that constitute organizational structures of domination. All social systems are marked by an asymmetry of resources, and the existing structure of domination is reaffirmed through the use of resources. It is only when the existing asymmetry of resources is explicitly challenged or countered, that the existing structure of domination may be modified.

2.9.2.5.3 Norms

From a subjective perspective, norms are organizational rules or conventions governing legitimate or appropriate conduct. Codes for legitimate conduct are created out of the continuous use of sanctions by individuals as they interact. “Normative components of interaction always centre upon relations between the rights and obligations expected of those participating in a range of interaction contexts” (Giddens 1984, p.30). Norms thus play an active role in the shaping of institutional notions of legitimate behaviour. Simultaneously, human action is guided by the cultural notions of legitimacy, as reflected in these norms. From an institutional view therefore, norms articulate and sustain established structures of legitimization. They reinforce the normative order through tradition, rituals, and practices of socialization.

Orlikowski & Robey (1991) note that technology provides a particularly interesting and possibly unprecedented opportunity for the redistribution of knowledge, resources and conventions in organizations, and hence shifts in the relative capacities individuals have for strategic human action. In particular, they observed that although technology was not an explicit component of the structuration theory, it had been used by organization theorists to address the longstanding question of technology’s relationship to organization structure. In the next section, we present and discuss Orlikowski & Robey (1991) conception of information technology and structuration.

### *2.9.2.6 Applying Giddens’ theory in the structuration of Information technology*

Orlikowski & Robey (1991) presented a framework on the role technology in structuration by placing information technology centrally within the structuration process. In other words, the system is already in a process of structuring itself through interpretation, resources and norms, and then an information technology is introduced, if it is just being developed, that’s

one thing, but if it is already developed, then it's another. Given that it has a functionality of its own, people would have to interpret it, ask for resources to fulfil it, and operate within acceptable culture. This culture has to do with the institutional beliefs and values that have come to be accepted as the norm. Members' actions are therefore judged on the basis of their conformity or deviation from that norm. But when a new culture is required, due to the introduction of the system, there can be some conflicts. In other words, the outcome can be highly unpredictable.

The duality of technology here suggests that the technological artefact would influence the social system, and in turn would be influenced by humans within the system. This interpretation is subject to the human's interpretation of what is required of them by the decision makers who introduce the system through instructions and resources made available for the work within established cultural system. So if there are changes in the cultural system brought about by the technology, unavailable resources for the new system, and poor communication of intent, then institutionalizing the technology would be problematic. So the organizational members must have the right interpretation of what is required through their communications and actions, they must have the resources, and there must be very little conflict with existing practices. As Orlikowski & Robey (1991) noted, the duality of information technology is constituted in its nature – as a social product of the subjective human action within specific structural and cultural contexts, and its constitutive role – as an objective set of rules and resources involved in mediating (facilitating and constraining) human action and hence contributing to the creation, recreation, and transforming these contexts).

Orlikowski & Robey (1991) considered information technology as a deployment within an organization to accomplish some tasks. They focused on organizationally sanctioned development and use of the technology. Below is a reproduction and discussion of their framework.

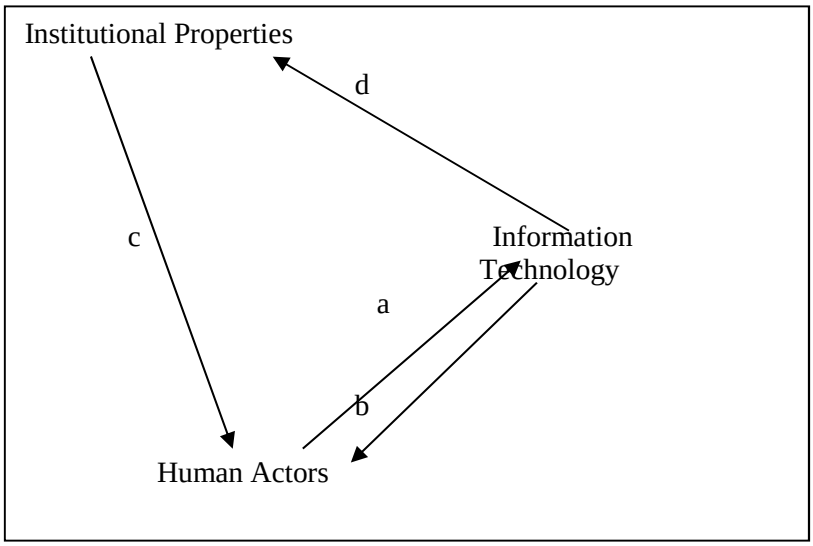



Figure 3: IT Structuration framework

Source: Orlikowski & Robey (1991)

Table 3: IT Structuration framework key

| Arrow | Type of Influence | Nature of Influence |
|---|---|---|
| A | Information technology as a product of human action | Information technology is an outcome of such human action as design and development, appropriation and modification |
| B | Information technology as a medium of human action | Information technology facilitates and constrains human action through the provision of interpretive schemes, facilities and norms |
| C | Conditions of interaction with information technology | Institutional properties influence humans in their interaction with information technology such as intentions, design standards, professional norms, state of the art in materials and knowledge, and available resources (time, money, skills) |
| D | Consequences of interaction with information technology | Interaction with information technology influences the institutional properties of an organization, through reinforcing or transforming the system of signification, domination and legitimization |

Source: Description of the arrows (Orlikowski & Robey, 1991)

How things are can be explained in terms of the existing structure of things. Giddens structuration provides a good way of understanding and describing how the implementation of technology brings about either a change or confirmation of an existing structure. Orlikowski & Robey (1991) contended that information technology constitutes a central part in the structuration process. A discussion of their argument is presented below.

#### *2.9.2.7 Giddens' interpreting schemes and Information technology*

According to Orlikowski & Robey (1991), through their set of concepts and symbols used to represent reality, information technologies provide us with a set of interpretive schemes used by users in structuring and understanding their world. They contend further that information technology is a medium for constructing social reality. In a similar vein, they contend that the stocks of knowledge (interpretive schemes) by formalizing and encoding them, make them standardized, shared and taken for granted. They assert that information technology contributes to the signification order by objectifying and reifying human actors' knowledge and assumptions, reinforcing them over time (Orlikowski & Baroudi, 1991). Using software for an illustration, they suggest that it provides an interpretive scheme for translating human action into routines. They studied an organization's proceduralized practices constituting a particular knowledge domain being supported, e.g. marketing, being encoded into the technology, with modification to it recreating structures of meaning that alter users' worldviews, priorities and protocols for interacting. In their conclusion, they contend that certain social practices are conditioned by the software technology, and by using the technology, the meanings embodied in it are reinforced or changed overtime.

##### 2.9.2.7.1 Giddens' Resources and Information technology

Viewing information as a resource, its use can facilitate work execution and decision making in organizations (Orlikowski & Baroudi, 1991). When information technology is used to formalize the processing of information in organizations, it facilitates the accomplishment of the users' information processing needs. Orlikowski & Baroudi (1991) contend that designing and deploying information technology with its implications for information resources and enforcing rules, constitute a system of domination. They explain further that the pattern of resource allocations reinforces an institutional order of authority that creates a differential distribution of power all through the organization. They note the potential of information technology to spawn power struggles, as it represents a significant arena for organizational conflict, challenge, and change (Orlikowski & Baroudi, 1991). Illustrating with a decision-maker within an organization with access to a decision-support tool and data about competitors, they argue, such an individual will possess greater power than other decision makers because of the access to the tools and information. Information technology is therefore seen to institutionalize a structure of domination as it facilitates differential access to information, seen as a source of power. They contended further that information technology creates a structure of domination through the imposition of certain ways of seeing and thinking that

influences the way people act, through specific data models and procedures enshrined in the software (Orlikowski & Baroudi, 1991). Resources therefore are seen to be distributed based on established patterns reinforced by the information technology through domination.

2.9.2.7.2 Giddens' Norms and Information technology

Orlikowski & Baroudi (1991) observed, through Giddens' structuration lenses, that an institution's moral order can be created and institutionalized by means of information technology's implementation. They argue that the codification of institutional norms facilitates the control of behaviour. The information technology ensures that users act in conventionally acceptable ways. Orlikowski & Baroudi (1991) suggest that although the goals and ideologies of organizations are somewhat conflicting, the eventual information technology will tend to reflect the combined goals and ideologies that built and deployed it. They pointed out that the emergent information technology will embody the shared meanings, values and goals of the coalition by internalizing and reinforcing the dominant ideology and culture of that organization. As Orlikowski & Baroudi (1991) clearly asserted, "…..the information technology can be seen to convey a set of norms that indicate the accepted actions, interests and practices in the workplace. The norms embodied in the information technology constitute a moral order, a system of legitimization that directs actions and thinking along prescribed paths and encourages appropriate responses, shared meanings, and common interaction protocols."

It is important to note that when a technology is applied to tasks within an organization, the rules, assumptions, and values embedded in the information technology act as a moral imperative that includes the elements in the organization's legitimation system (Orlikowski & Baroudi, 1991). The implementation of an information technology to support or perform an organization's task suggests that the information technology is an appropriate means for executing the task and using it is the approved way of action in the workplace. Orlikowski & Baroudi (1991) further note that the routines enshrined in an information technology also incorporate certain norms about the appropriate criteria and priorities for conducting organizational tasks, as well as how the tasks are to be executed. They suggest that the deployment of a technology within an organization is representative of a normative sanction.

A very important observation by Orlikowski & Baroudi (1991) is the context within which these identified modalities of structuration occurs. According to them, "The modalities of structuration do not operate in a vacuum, but are embedded within historical and organiza-

tional contexts. These contexts influence how technology is developed, deployed, used and institutionalized, and need to be understood within the structuration framework."

#### *2.9.2.8 Information technology and contexts of use*

Orlikowski & Baroudi (1991) assert that although the central role of technology in the structuration process is important, an equally essential ingredient is the social context and social processes surrounding the use of the technology. This, they contended is captured within the structuration framework they propose. In their view, there are the social processes engaged in by actors (managers, system developers, and users) who develop or use rules and deploy resources to achieve their goals on the one hand; and on the other hand, there are social processes surrounding the information technology that exist at the institutional level (Orlikowski & Baroudi, 1991). Orlikowski & Baroudi (1991) note, "….the interaction of users and systems developers can be seen to rely on a shared system of signification that provides the common vocabulary through which the activities of both groups are coordinated and assessed." ….and also…."…the authorization of project teams and the allocation of resources to it draw on and reproduce the system of domination, through which managers have the authority to requisition projects, appoint team members and deploy resources. Likewise system developers have the authority (on the basis of their expertise and experience) to dictate the features of the information system and the execution of development work. Nonetheless there are opportunities for human actors to modify the existing structure of domination……..if users get very involved in a project, they could usurp the system developers' authority, and start to play a central role in tailoring the system to meet their interests."

Orlikowski & Baroudi (1991) also suggest that structures of legitimation support the normative regulation of interaction. They claim that when subordinates comply with directives from their managers, by performing their roles as systems developers and users, they reinforce the development of the information technology as a solution to organizational problems. They suggest that the compliance by the subordinates also confirms the existence of division of labour between the systems developers and users, which effectively legitimizes the existing normative order. They claim however that users can challenge the existing roles of system developers, destabilizing the existing orthodoxy in the process, and eventually resulting in the creation of new norms for interaction. Again in some cases, users may create new norms for interaction among themselves when they choose to use the technology in unintended ways.

In the course of structuration, introducing and institutionalizing an innovation/change, Orlikowski & Baroudi (1991) state that there is usually a tension between the knowledgeable action of people and the more conservative, structural force of institutionalized practices. They contend that the dialectic is played out each day in the interactions amongst the people, causing every context to be punctuated with a certain indeterminacy (understanding a context is therefore more important since we cannot predict with certainty the outcomes of a particular technological implementation). This indeterminacy is a common characteristic of process theories about social phenomena, suggesting that people's actions in organizations are never totally predictable. In other words, the expectations of system designers or implementers will not always be realized. As noted by Orlikowski & Baroudi (1991), "information technology does not simply determine behaviour, but is actively invoked and appropriated by human actors. Social practices surrounding the development and use of information technology will therefore result in both intended and unintended consequences, and depend on anticipated and unanticipated conditions."

Most importantly, the information technology structuration framework proposed by Orlikowski & Baroudi (1991) enables us to address important issues in the systems development, use and outcome process, which previously were treated separately. They suggest that structuration is both valuable for interpreting completed research and also provides a useful guide to new research.

Orlikowski & Baroudi (1991) noted that little research on systems development methodologies focuses consciously on the modalities used in the constitution of new technologies. They claimed that fairly little was known about the way in which action produces information systems, as the topic remained essentially unexplored.

Studying the actions of the members of an organization, and the decisions that cause those actions to take place can greatly enlighten our understanding of how information systems are implemented in organizations.

### 2.9.3 Justification for studying information systems implementation from its initiation

An important observation by Orlikowski & Baroudi (1991) provides strong justification for a broader perspective of implementation studies of IS. They observed that technology is creat-

ed by the activities and interaction of people within a given context. In particular they noted that, "because technology is a social product, designed and constructed through human action, considering the 'impacts' of technology without considering its development is incomplete. They contended that it would be more informative to tie the development and use of technology together into a single, albeit more ambitious research program." An approach of this nature will enable the reasons and conditions surrounding the introduction and use of an information technology to be connected to outcomes (Orlikowski & Baroudi, 1991). This view was espoused by Ginzberg (1978) when he proposed studying the implementation of management science models and management information systems (M.I.S) as a process. Arguing in favour of a process approach to implementation, Ginzberg notes that, "….it leads us to consider the entire implementation process – from initial planning and feasibility testing through installation and evaluation – rather than only the 'action' stage, which has traditionally been viewed as synonymous with implementation. Many of the problems which manifest themselves late in a project's development actually have their roots in an earlier stage. Looking at the entire process should help us develop fuller understanding of the nature of these problems." Ginzberg argues that often times, implementation studies are narrowly defined, constraining such research to that phase where the system is physically introduced into the organization, and that this view of implementation inadequately captures the holistic understanding required to address implementation challenges.

The review of the IS field above highlights important developments and concepts that provide some level of understanding the different contexts of application of IS. We explore the implementation of e-learning in Higher Education Institutions in the next section.

## 2.10 A review of e-learning implementation in Higher Education Institutions

### 2.10.1 The electronic learning (e-learning) Field

The e-learning field is an emerging area of study that focuses on the application and integration of digital technology into traditional educational processes. A technological artefact, considered useful for extending access, providing flexibility, improving and enhancing teaching and learning, e-learning is perceived to be a technological innovation in the educational terrain, offering opportunities to institutions and individuals to pursue their core goals and ambitions. E-learning's applicability cuts across basic, secondary, higher and continuing education to profit making organizations. Noting the broad applicability of e-learning, we

acknowledge the significance of indicating the scope of the review to enable readers contextualize the research. The following review therefore considers e-learning in higher education institutions (HEIs) with a focus on its implementation. In the next section a definition of e-learning is presented.

### 2.10.2 E-learning defined

E-learning is an emerging educational approach that facilitates and enhances learning experiences by integrating computers with other digital multimedia and network technologies. Learning electronically does not necessarily mean learning at a distance. Therefore defining e-learning in terms of distance is restricting the term to a context where its meaning connotes distance learning/education. In a similar consideration, learning electronically does not necessarily mean learning via the internet or some other network. There are other electronic media via which learning can be facilitated, necessitating the need for clarity.

A general definition for 'e-learning' is difficult to achieve as the terminology itself has several variants: online learning, web-based learning, internet-based training, advanced distributed learning, web-based instruction, computer-based training, and virtual learning environment (Selim, 2007; Alenezi, 2010), all of which connote the idea of using information and communication technology in teaching and learning (Wagner et al., 2008). Again the search for a single, common, acceptable, all embracing definition among members of the academia, researchers, governments, institutions and practitioners has proven elusive since the e-learning community has failed to reach a consensus. In order to understand and describe the process of e-learning implementation by HEIs, it is important to base the research on a commonly accepted definition of the concept. A relatively broadly used definition is suggested by Engelbrecht (2003) as, 'instruction delivered via all electronic media including the internet, intranets, extranets, satellite broadcasts, audio/videotape, interactive TV and CD-Rom' (Selim, 2007). Kahiigi et al. (2008) defined e-learning as, 'a learning method that uses ICTs to transform and support teaching and learning processes ubiquitously'. Wagner et al., (2008) also shared this broad definition. Alenezi et al. (2010), referred to e-learning as, 'the learning methods which use electronic channels to deliver the instructional content'. Omwenga et al. (2004) described e-learning as '…the online delivery of information, communication, education, and training providing a new set of tools that can add value to all the traditional learning modes – classroom experiences, textbook study, CD-ROM, and traditional computer based

training". Barajas & Owen (2000) also presented a definition for virtual learning environments (VLEs) as, 'any combination of distance and face-to-face interaction, where some kind of time and space virtuality is present'.

Pirani (2004) defined e-learning as the use of technology in education. These varied definitions make it difficult to compare findings across different contexts, contributing to the difficulty in the development of the e-learning field, and making researchers conclude that certain terms are synonymous to e-learning. A critical examination of the definitions shows a general acceptance of information technology, referred to variedly as electronic media, ICT, electronic channels, online delivery, as the medium facilitating the teaching and learning process. Although the available definitions address the issues of instruction delivery or learning process, they also appear to emphasize the unique opportunities created by the technologies for flexible learning, self-learning, continuous learning, ubiquity, communication between instructors and students, as well as among students.

Arguably, many of the definitions emphasize the 'e', acknowledged as representing electronic devices and digital signal transmission via those media (Lin et al., 2011), over instruction and learning, implied by the 'learning' aspect. The learning bit of the definition still requires some clarification as to whether it is formal or informal learning, or embraces both notions, although issues of whether the form of learning is asynchronous or synchronous has been largely addressed. The current understanding of the 'learning' component has more to do with ubiquity of learning than the structure of the learning engagement. Learning can also be informal or formal. In the first instance, an individual chooses to search for and utilize information made available via technological mediums, unstructured, unsupervised and undirected towards any specified learning objectives. In the second instance the learning is structured, supervised and directed towards clearly specified learning objectives, using the technological mediums in pedagogically acceptable ways of instruction. Recent developments in the field have however narrowed the definition to the transmission and delivery of educational content via online channels. Although this definition appears to be narrow, it is important to note that all the other forms of electronic media used in communication can be facilitated by the online medium.

It is important to state at this point that e-learning is not distant learning or distant education as many writers would have us believe. The fact that the proper application of technology can enable the unreached to be reached should not amount to the term 'e-learning' being substi-

tuted for distance education and learning. Another important thing to note is that e-learning is not a term unique to ‘online-learning’ or ‘online-education’ although many writers restrict their use of the term to that context. This is an important consideration since there are other electronic mediums that can be used in the learning process e.g. radio, TV, computers, etc. The use of the term e-learning can therefore not be only restricted to ‘web-enabled’, ‘web-based’, ‘internet-based’, or ‘internet-enabled’ mediums although this appears to be the most widely used medium for e-learning.

From the foregoing discussion, e-learning can broadly be categorized into three categories: Category 1: internet and web-enabled; Category 2: radio, TV, CD/DVD; Category 3: satellite. Category 1 e-learning is used to offer online learning services which can be offered using different approaches: blended/hybrid and fully online. Category 2 is used to deliver one-way learning services involving the listening to or watching of instructional materials, interacting with a packaged learning content on a CD/DVD using a computer, with the learner having no means of communicating with the source of the instruction. Category 3 involves the delivery of instruction via a video conference which enables participants to communicate in a one-way pattern. In Category 1, learning resources could be provided using static web pages or dynamic applications like the learning management system (LMS)/learning content management systems (LCMS) or course management systems (CMS) using the blended/hybrid or fully online approaches. For each of these two approaches, the learning process could be either ‘real-time’ mode (synchronous) or ‘flex-time’ mode (asynchronous) application of the e-learning. Below is a diagram depicting this categorisation.

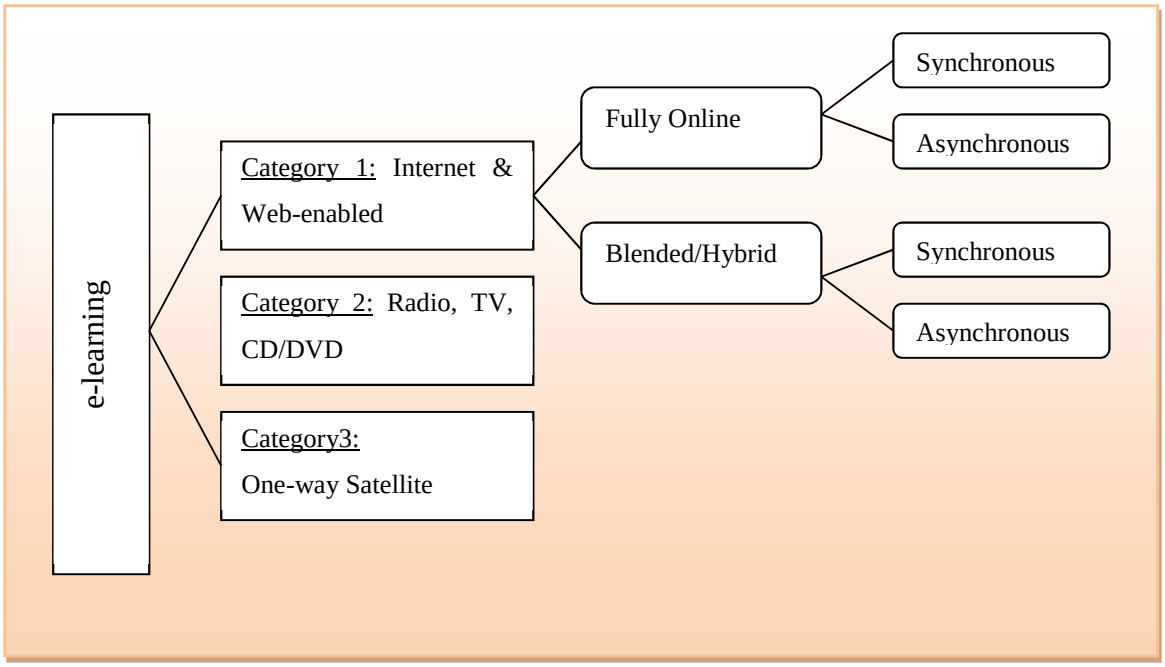



Figure 4: E-learning categorization

Of the three categories described above, Category 1 is the most widely used in higher education institutions (HEI) the world over. E-learning delivery via the internet started from static web pages displaying information about courses and their contents, and gradually developed into web-enabled applications that manage the development, delivery and management/administration of learning related services. Many higher education institutions swathe opportunities offered by these developments in information and communication technologies to establish virtual presence in a much hyped global education in the 90s. Unfortunately, most of the hype was geared towards fully online application of e-learning to increase their reach to large numbers of students whilst catering for the cuts in budgets. Fully online e-learning application was hyped as potentially eliminating the need for and presence of instructors, a claim which fundamentally may have been responsible for the resistance by faculty members. Several challenges were experienced with this form of e-learning application, evidenced by the huge dropout rates of students due to dissatisfaction and a host of other factors.

E-learning in this research is defined as the use of information technology to develop and deliver pedagogically considered content in a ubiquitous, engaging and interactive learner-centred approach for blended and fully online purposes. This definition embraces the use of Learning Management Systems (LMS). Although there are many e-learning media, the LMS has come to be recognised as a major e-learning platform for creating, delivering, managing and supporting the learning processes of students (Kim & Leet, 2008). In the following sec-

tion we discuss LMS as an e-learning system and subsequently allude to LMS wherever the expression e-learning is used in the rest of this research. The term e-learning is being used in this research in a generic sense to refer to IT-supported learning that is web-enabled, rather than similar terms such as online learning, web-based learning, distributed learning, technology mediated learning and virtual learning.

### 2.10.3 Learning Management Systems (LMS): A review

Current conceptions about e-learning among practitioners and researchers reveal their predisposition towards ubiquity. The affordances provided by information technology, especially web-enabled technologies, have resulted in a stretching of learning environments beyond the typical classroom. Basically, an LMS can be described as web-based software for managing the learning process and needs of learners (Machado & Tao, 2007). The description suggests certain capabilities of an LMS: content provision and management, assessment of learning progress and achievement, possible communication with instructors and students, some kind of guide, administration and management of the learning process. It also suggests the availability and accessibility of this kind of learning outside of the brick-and-mortar classroom environment through a medium that can allow for synchronous and asynchronous communication like an internet, intranet or extranet. LMS are also referred to as virtual learning environments (VLE) (Falvo & Johnson, 2007) due to their ability to replicate learning environments and processes ubiquitously. Learning Management Systems are therefore integrated solutions for creating content, administering learning services and managing the learning processes of learners.

Several definitions have been offered in the extant literature. Coates et al. (2005) defined LMS as “enterprise-wide and internet-based systems, such as web course tools (WebCT) and Blackboard that integrate a wide range of pedagogical and course administration tools”. They suggest that LMSs have the capacity to create virtual learning environments for campus based students, and are being used to develop fully online virtual universities. In what could be said to be a critical analysis of what LMSs are, Ellis (2009) describes it as, ‘..the framework that handles all aspects of the learning process…..the infrastructure that delivers and manages instructional content, identifies and assesses individual and organisational learning or training goals, tracks the progress towards meeting those goals, and collects and presents data for supervising the learning process of organisation as a whole’. According to Machado

& Tao (2007), an LMS is a software application designed with the specific intent of assisting instructors in meeting their pedagogical goals of delivering learning content to students. Lyddon (2010) has described it as a software application that automates the administration, tracking and reporting of training events. Avgeriou et al., (2003) also defined LMS as software systems that synthesize the functionality of computer-mediated communications software (e-mail, bulletin boards, newsgroups etc) and on-line methods of delivering courseware. They held that LMS have been established as the basic infrastructure for supporting the technology-based, open and distance-learning process in an easy to use, pedagogically correct and efficient manner. They further contended that their use in education and training is not as a result of their 'state-of-the-art' capabilities to facilitate learning, but rather because they have substantial benefits to offer. Watson & Watson (2007) also contended that LMSs held great potentials and important concepts but were often misunderstood and the term misused. Black et al. (2007) were in agreement with these views suggesting that LMS held great potentials for learners although getting them to work could be time consuming, frustrating and expensive.

The lack of consistency in the definitions highlights the possibilities offered by the systems and the variety of uses to which they could be put. Watson & Watson (2007) contended that most of the veritable soup of terms and acronyms related to computers in education that had found their way into the literature, were non-standardised. This failure may also account for the research communities' challenges in developing standards for measuring the impact of LMS use on teaching and learning especially in HE. LMSs have also been defined as web-based systems allowing instructors and/or students to share materials, submit and return assignments, and communicate online (Lonn & Teasley, 2009; Lonn et al., 2011). This view of an LMS is adopted in this research to reflect their two-way usefulness for supporting teaching and learning in HEIs.

The existing definitions provide a picture of the underlying assumptions of an LMS and the functions they are required to provide. In particular, such systems are essentially web-enabled, provide pedagogical and course administration tools, and should also enable management of the learning process (Coates et al., 2005; Ellis, 2009; Machado & Tao, 2007; Lyddon, 2010; Avgeriou et al., 2003; Lonn & Teasley, 2009; Lonn et al., 2011). There are some who believe that LMS stress the role of the instructors while others believe it empha-

sizes the management of the learning process over and above the actual needs of the learners in a restrictive way.

#### *2.10.3.1 Categories of LMS users: Educational Institutions and Business organizations*

Two main categories of LMS users have been identified in the literature: educational institutions (universities, polytechnics, secondary schools) and organisations in general (profit and non-profit) (Kim & Leet, 2007). The educational institutions use LMS to provide a wide variety of learning opportunities from fully online (virtual universities) to supporting campus-based learning (blended/hybrid) learning. Business organisations are noted for using LMS for training and development of their staff. These are usually hosted and implemented by the human resource department of the organisation or special services provided by a university to the organisation. Examples of LMS used by educational institutions include: WebCT, Blackboard, Angel, Moodle and e-College AU (Lewis et al., 2005). Some examples of LMS used by organisations include: NetDimensions EKP, Saba and SumTotal Systems, Lotus, Oracle iLearning, and Cornerstone OnDemand (Watson & Watson, 2007).

Watson & Watson (2007) have called for the need to clarify the appropriate meaning and usage of the LMS term. They argue that the most common inappropriate use of the LMS in the literature is in connection with computer applications known as Course Management Systems (CMS). Such systems they contend are used primarily for online or blended learning, supporting the placement of course materials online, associating students with courses, tracking student performance, storing students' submissions and mediating communications between the students as well as their instructors. In their view, the presence of some of these functionalities in an LMS still does not qualify CMS as LMS. This assertion is however arguable since the functionality provided by many of the systems used in educational institutions seek to manage the learning processes of students.

#### *2.10.3.2 Features of LMS*

LMSs have been acknowledged as one of the major innovative e-learning ideas of the 21st century due to the functionalities they provide for supporting the learning process (McGill & Klobas, 2009). The platform has not only provided the opportunity for traditional classroom scenarios to be created virtually but has also enabled other forms of computer assisted learning such as self-directed learning resources on CDs and DVDs to be available through online

streaming. Lewis et al. (2005) in a study evaluating nine (9) LMSs identified ten (10) main components of LMS: content development, bulletin boards/discussion area, group participation, calendar, chat/whiteboard/e-mail, student study tools, audio/video, monitoring student participation and progress, navigation and interface, and site administration. Each of these main components had some features which were possessed by all 9 types of LMS with other features possessed by some but not all of the LMSs. The table below shows the LMS components and their features. For instance, all 9 LMSs studied had the 'multiple bulletin boards or discussion area per course' feature under the bulletin board/discussion area component but only 3 LMSs possess the instructor's ability to move messages from one area to another feature in the same component.

Table 4: LMS components

| S/n | Components | Features |
|---|---|---|
| 1 | Content development | Selection of different course components |
| | | Creation of copies of existing courses |
| | | Hide work in progress |
| | | Upload files from desktop to server |
| | | Upload multiple files at once (zipped files in one file) |
| | | Edit uploaded text online |
| | | Release content based on student viewing prerequisite materials |
| | | Release content based on chronological criteria |
| | | Release content pages based on student quiz performance |
| | | Release feedback within quizzes |
| | | Release content to specified groups of students |
| | | Release content based on custom designed criteria, such as number of bulletin board posting, names starting with 'M' |
| | | Attach learning goals to content pages |
| | | Attach review questions to content pages |
| | | Create references |
| | | Use automated tool to build glossary |
| | | Use automated tool to build content index |
| | | Use automated tool to build searchable image database |
| | | Integrate online course with CD-ROM |

| S/n | Components | Features |
|---|---|---|
| 2 | Bulletin boards/discussion area | Multiple bulletin boards or discussion areas per course |
| | | Private bulletin board/discussion for each group |
| | | Instructors can allow anonymous postings |
| | | Instructors can move messages from one area to another |
| | | Instructors can delete messages |
| | | Users can mark messages read/unread |
| | | Users can view messages based on read/unread status |
| | | Users can view messages as threaded or unthreaded |
| | | Users can compile a self-selected set of postings from bulletin board for their own notes |
| | | Users receive announcements on login page re: new postings |
| | | Users can e-mail posting authors directly from the bulletin board |
| 3 | Group participation | Instructors can create groups manually |
| | | Instructors can have program create groups and assign members randomly |
| | | Users can e-mail members of a group |
| | | Group members can share files |
| | | Group members can have a private chat area |
| | | Group members can have private bulletin boards |
| | | Group members can have web content presentation area |
| 4 | Calendar | Calendar on login page displays events from all courses |
| | | Announcements from all courses display on login page |
| | | Instructor can upload multiple events from a file |
| | | Instructor can add links to calendar entries |
| | | Student can add entries to the course calendar (at instructor's discretion |
| 5 | Chat/whiteboard/e-mail | External e-mail (access through regular e-mail client) |
| | | Internal e-mail (with forwarding capabilities) |
| | | Chat transcript logs |
| | | Multiple chat rooms in a single course |
| | | Restricted access to group chat rooms |
| | | Private messaging in chat |
| | | Ring in chat (to notify another user you want to chat with them) |
| | | Alert in chat (receive notification when someone enters the chat room) |
| | | Whiteboard facility |
| | | Assess whiteboard through chat only |

| S/n | Components | Features |
|---|---|---|
| | | Save whiteboard images into course content |
| | | Export whiteboard images |
| 6 | Student study tools | Create study guide |
| | | Resume reading content at previous stopping point |
| | | Add notes on course content web page |
| | | Take notes in an internal notepad |
| | | Compile a set of e-mail messages |
| | | Compile a set of bulletin-board postings |
| | | Take self-tests created by the instructor |
| | | Search course material |
| | | Create original content on own web pages |
| 7 | Audio/video | Embed RealPlayer in pages |
| | | Embed MP3 in pages |
| | | Embed Quick Time player in pages |
| | | Add audio and video content that is stored within the courseware product |
| | | Add streaming PowerPoint presentations created with RealVideo, RealPresenter, Windows Media Encoder |
| 8 | Monitoring student participation and progress | Instructors can analyse the class by combinations of information such as students who logged in after a certain day and have posted a certain number of articles |
| | | Instructors can view how many bulletin board articles a student has read |
| | | Instructors can view how many bulletin board articles a student has posted |
| | | Instructors can view a transcript of course chat room activity/discussion |
| | | Student can view own grades |
| | | Student can compare own grade to class summary data |
| | | Instructors can view number of hits per page |
| | | Instructors can view date and time of each student's first and last login |
| | | Instructors can view a complete history of each student's time spent online in the entire course |
| | | Instructors can view a graphic breakdown of the percent of total time online each student has spent on each page of the content |
| | | Instructors can view a graphic breakdown of the percent of total time online each student has spent on content areas |

| S/n | Components | Features |
|---|---|---|
| 9 | Navigation and interface | Gateway page allows users to view all courses in which they are enrolled |
| | | Instructor can change page design globally during course design |
| | | Courseware product defaults to graphic interface |
| | | Courseware product automatically generates header and footer on new pages |
| | | Courseware product provides multiple icon and button styles |
| | | Instructor can substitute buttons or icons of own design |
| | | Instructor can specify a customised course banner |
| | | Instructor a custom background colour or graphic |
| | | Courseware product can display components of the interface in a language other than English (in student-view only) |
| | | Users can view course map |
| | | Users can search course content |
| 10 | Site administration | Users log in with password and login |
| | | Administrators and instructors can assign multiple instructors to a course |
| | | Administrators can create system-wide accounts (for e.g. within multiple course) |
| | | Instructors can automatically upload class roster files |
| | | Instructor can create groups |
| | | Course controls are on a separate page |
| | | Course controls are integrated with student view |
| | | Users can navigate with a consistent, logical user interface |
| | | Navigational trail shows the path taken to a particular screen |
| | | Instructors can create an unlimited amount of course content |
| | | Instructors can upload and create folders and upload files into a file manager |
| | | Instructors can back-up a course content |
| | | Users can search the online manual |
| | | On-line help is context sensitive |
| | | Users can print versions of the manuals |
| | | Users can log out without exiting their browser |

Source: Lewis et al., (2005)

Clearly, the differences in the LMSs have to do with how many of the essential features are provided by a particular LMS and whether or not such features can easily be added. Most

LMS can be said to include the core components as suggested by Cavus (2011) and are constantly innovating to include essential features required by users. Black et al. (2007) referred to the core components as "fairly generic" tools including: quiz/test options, forums, a scheduling tool, collaborative work space, and grading mechanisms. The focus of educational institutions in terms of required LMS functionality however differs from that of organisations. There equally exist some differences between requirements of HEIs and high schools. These differences are usually dependent on the objectives defined for the system and the functions provided by the LMS. Baileys (cited in Watson & Watson, 2007) presented the following characteristics of an LMS:

- Instructional objectives are tied to individual lessons
- Lessons are incorporated into the standardized curriculum
- Courseware extends several grade levels in a consistent manner
- A management system collects the results of student performance
- Lessons are provided based on the individual student's learning progress

Lonn & Teasley (2009) also indicated the following features of an LMS were available to an instructor for use: announcements, assignments, chat, content sharing, discussion, schedule, syllabus, Wiki and e-mail. Malikowski et al. (2006) reported content files, grade book, asynchronous discussions, drop box, and type of quiz questions to be the most used features of an LMS. Cavus (2011) contended that the general features of an LMS consist of pedagogical factors (course objectives, activities), learner environment (communication between learner-instructor, learner-learner through chat, video conference and whiteboard, discussion forums, file sharing, internal e-mail, search and calendar), instructor tools (quiz editor, course organisation editor and grade distribution), course and curriculum design (curriculum management, online grading, customized look and feel, automated glossary, automated testing, course templates), administrator tools (authentication, course and web back-up, course authorisation, registration, course creation/duplication/deletion, statistics, transcripts), and technical specifications (technical support – instructors and learners, help desk, multi-language support, database requirements, costs). Garbin et al., (2012) also described LMS as providing the following features for students to share knowledge, collaborate, interact and develop skills: forum, email, blog, wall (asynchronous communication), chat (synchronous communication), wikis, glossaries, texts, and surveys (collective construction and interactive tools), educational activ-

ities, books, videos, (educational tools), profile, registration, groups databases, frequency control and daily class (administrative tools). Coates et al. (2005) also recognized the following tools provided by LMS for course administration and pedagogical functions:

- Asynchronous and synchronous communication (announcement areas, e-mail, chat, list servers, instant messaging and discussion forums)
- Content development and delivery (learning resources, development of learning object repositories and links to internet resources)
- Formative and summative assessment (submissions, multiple choice testing, collaborative work and feedback) and
- Class and user management (registering, enrolling, displaying timetables, managing student activities and electronic office hours)

They opined that these functionalities of an LMS were offered in differing levels of sophistication and potentials among the different LMSs.

#### *2.10.3.3 Use of LMS in Higher Education Institutions*

HEIs implementing LMS use it in a distant or blended/hybrid mode (Lonn & Teasley, 2009). Distant application of the LMS provides a fully online integrated learning environment to enable learners who are unable to participate in the traditional campus based learning access and utilize educational resources. Several researches have been conducted in this domain of LMS usage. More recently many of the HEIs are using these systems in a blended/hybrid mode where typical classroom activities are supported various ways. Dutton et al. (cited in Lonn & Teasley, 2009) reported that the interactivity, distribution, management and course retrieval functionality of LMS provided opportunities for enabling institutional innovations in learning and education. The use of LMS to support or supplement traditional classroom activities has been reported as a useful way of understanding their features and uses prior to using them in a fully online mode. Some of the reports in the extant literature have often been vague on the actual nature of use of the LMS, either fully online or blended, subsequently confusing the application of the findings. Clearly, a blended approach potentially solves most of the problems encountered with the distant mode, especially physical contact and interaction with instructors and colleagues while still offering all the benefits of a technology mediated learning experience. Coates et al. (2005) were of the view that among others, the drivers

behind LMS adoption included increase in the efficiency of teaching, enrichment of student learning, expectations from students, competition among universities, response to massive and increasing demands for greater access to higher education, and a shifting culture of teaching and learning in HE. A major issue that has been identified in LMS is the extent of use of the features provided as well as the nature of usage.

Two broad types of LMS used in higher education institutions are proprietary LMS (Blackboard, WebCT) and open source LMS (Moodle). The proprietary systems come with stability, increased functionality, support but higher cost. Such systems cannot easily interoperate with other systems due to the strict requirements of the owners. Open source systems on the other hand like Moodle have a worldwide community of supporters, are free, have appreciable functionality and can interoperate with a wide range of systems. Both types of LMS have their associated strengths and weaknesses and require careful consideration before selection.

#### *2.10.3.4 Trends and Issues in LMS implementation research in HE*

Recently there has been renewed focus on measuring the effects of the use of LMS on learning and teaching in HEIs (Coates et al., 2005). There have also been renewed calls for research into institutional adoption and implementation of such systems shifting focus from the overindulged comparison of different LMS functionalities, selection evaluation considerations, and personal reports of LMS use in courses. Other researches have attempted to compare usage of open source LMS (e.g. Moodle) with proprietary LMS (e.g. Blackboard) (Machado & Tao, 2007). A number of investigations have also sought users' perception about LMS use (Lonn & Teasley, 2009) with a generally positive response usually relating to specific features of the LMS.

Attention has however been drawn to the increasing challenges experienced by institutions attempting to introduce and integrate LMS into their traditional environment, either to enhance learning and teaching, or to take advantage of the increasing demand for higher education. These challenges have caused many institutions to abandon their initial ideas of harnessing information technology's potential in education, often resulting in huge costs, time wasting, disappointments and disinterest in technology enhanced education. It is important to recognise that a lot of the research that sought to describe, analyse and compare the features and

functionality of LMSs often failed to show exactly how these platforms assisted learners and the learning process which varies from learner to learner.

Till the present moment, many faculties do not understand the usefulness and contributions an LMS can make to teaching and learning. In the same direction, some institutional managers do not comprehend the need to adopt such technologies in their traditional environments. Most unfortunate are those institutions that understand and embark on the journey of integration only for the efforts to fail. The seemingly straightforward but apparently challenging process of integrating technology into traditional higher educational institutions have called for new research agenda to understand not only the process of implementation that leads to appropriate integration but also the important factors and how they influence implementation.

Given that implementation is a process, spanning a period of time, the current research findings appear to be lacking in explanatory power as they often project a one-point in time assessment. The implementation process has in the past been studied from the point where decisions leave the planning table to the point where physical evidence of those decisions can be seen. However important lessons from the change and innovation literature point to a process with clearly identifiable stages, outputs and outcomes which influence the final outcomes of an innovation. Any attempt therefore to understand LMS implementation without holistically considering the decisions and activities that preceded its physical manifestation would only leave gaps in our knowledge.

#### *2.10.3.5 Impacts of LMS on teaching and learning*

There have been several calls by researchers (Coates et al., 2005) for LMS impact on students and instructors to be conducted. Many institutions and their faculty are still sceptical about the potentials of such technological artefacts in education. Hard evidence is required about the pedagogical usefulness of LMS in order to encourage faculty and institutional adoption and integration. Already, many institutions are using it in both blended and distant modes with very little empirical evidence provided about their effects on instructors' pedagogical approaches. Many researchers still feel it is important to be able to measure the changes in an instructor's pedagogy as a result of using an LMS and the effect it has on learners. The current level of acceptance among faculty in many HEI points to LMS use as information tools. Many of the functions they embed are seldom used to their full capacity, either as a result of

lack of the know-how or simply as a result of disinterest. An assessment of the impact on teaching under such circumstances therefore would fail to yield any useful information. Careful consideration about the goals of a particular instruction, the best pedagogical approach for achieving such goals and the available tools provided by an LMS would be required to determine the impact on instruction. Much is also left to be known about LMS impact on learning. Traditionally, a measure that has been used to assess students' learning is examinations. There is however yet to be provided empirical evidence of the impact of the use of LMS on students' learning. A much better indicator may be control they have over their learning and satisfaction they enjoy as a result of using the LMS to learn.

### 2.10.4 State of the art in e-learning – A brief history from the 1990s

In the early 1990s, the efforts of many HEIs in e-learning were directed towards the provision of fully online learning experiences. The hype about the revolutionary potential of e-learning in education, which was taking the world of higher education by storm, especially in the developed world, promised great savings in cost of higher education delivery and even predicted the replacement of lecturers (Lyddon, 2010) by technology in the not too distant future. This claim saw many faculties taking an instant dislike to e-learning implementation by institutions. On the other hand, the management of many higher education institutions saw e-learning as an opportunity to cut down on costs whilst increasing returns on investments through the offering of online education. Also, the management of these institutions saw e-learning as an opportunity to take advantage of the opportunities offered by globalization. This led to huge spending by many of these institutions in their attempts to implement online education. Many of these projects however failed.

Several factors were identified to be responsible for these failures. Notable among them was high student drop-out rates, faculties' resistance due to dislike and mistrust, and possibly insufficient knowledge about the technology and its application in teaching and learning. However, as an innovation in teaching and learning, very little appears to have been conducted to understand its development.

From the late 90s, institutions began to use these e-learning technologies to support students' learning on traditional campuses. Currently, institutions use e-learning to support students'

learning on campuses while providing fully online education to geographically dispersed students.

Getting the most out of institutional e-learning efforts can best be described as a tricky business. Researchers and practitioners over the years have been interested in identifying the critical success factors influencing e-learning implementation with very little attention paid to the institutional processes leading to successful and effective implementation of such innovations.

A number of these researches have considered the factors affecting e-learning adoption by faculty members and students. These researches implicitly seek to understand how e-learning can be embedded within an institution, arguing that an understanding of what factors are perceived to affect users adoption or acceptance can explain, and somehow show how this embedding can be achieved. These researches, conducted at specific points in time, fail to capture the essential, often time-bound and dynamic implementation efforts of institutions that lead to successful and effective implementation of e-learning.

Among the numerous factors that have been investigated to determine their possible influence on e-learning implementation are institutional policies and their relevance to e-learning implementation success (Welle-Strand & Thune, 2003; Pittard, 2004; De Freitas & Oliver, 2005). Other factors identified to influence e-learning implementation include technological, environmental (James-Gorden et al., 2003), pedagogical, as well as individual. In addition, several empirical e-learning implementations have been reported in the literature. Such reports describe the experiences of these institutions with respect to e-learning implementation. For instance, in the area of institutional implementation, Zuvic-Butorac et al. (2011) described a three-year long process of e-learning implementation of an LMS, with no underlying theoretical basis. Uys (2010) also reported on the institutional implementation and mainstreaming of an open source LMS and lessons learnt. Whelan & Bhartu (2007) described how an LMS was introduced into a university with the aim of improving teaching and learning. Barajas & Gannaway (2007) also investigated a higher educational institution in Europe with a long history of e-learning implementation. Bell and Bell (2005) explored how lessons learnt from the implementation of an e-learning system, was applied to a matching implementation at a local further education college. In the context of a departmental (school/faculty) implementation, Cech & Bures (2004) reported on the processes and experiences of e-learning im-

plementation by a faculty (department) within a university. Smith & Hardaker (2000) investigated the implementation of an e-learning system in one of the schools of a university. Stricker at al. (2011) examined the use of a VLE in an undergraduate course in psychology. Clearly much has been investigated about e-learning in higher education institutions.

### 2.10.5 Critical Success Factors in e-learning Implementation

Critical success factors have been defined as, "…those handful of things that within someone's job must go right for the organisation to flourish" (Robson cited in McPherson & Nunes, 2006). The e-learning literature is replete with reports on factors considered to be critical to e-learning implementation in HEIs. The critical factors that have been reported have usually differed based on the unit of analysis (Hogarth & Dawson, 2008). Nonetheless, certain similarities have also been identified among the different researches. The units of analysis often included in these researches are students, instructors, organisations, technologies and the environment. A few of these researches and the unit of analysis from which they were considered are presented below.

Table 5: Unit of Analysis of CSFs

| S/n | Authors | Factors | Unit of Analysis |
|---|---|---|---|
| 1 | Selim (2007) | 1. Instructor<br>2. Student<br>3. Information Technology<br>4. University Support | Student |
| 2 | McPherson & Nunes (2006) | 1. Leadership, structural and cultural issues<br>2. Design issues<br>3. Technological issues<br>4. Delivery issues organisational perspective | Organisation |
| 3 | Ely (1990; 1999);<br>Ensminger & Surrey (2008) | 1. Dissatisfaction with the status quo<br>2. Adequate resources<br>3. Rewards and incentives<br>4. Knowledge and skills<br>5. Adequate time<br>6. Participation<br>7. Commitment<br>8. Leadership | Occupational workers (mixed) |
| 4 | White (2007) | 1. Strategy<br>2. Policy<br>3. Processes<br>4. Tactics | Organisation |
| 5 | Fresen (2007) | 1. Institutional<br>2. Technology<br>3. Lecturer<br>4. Student<br>5. Instructional design<br>6. Pedagogical | Instructors |

| S/n | Authors | Factors | Unit of Analysis |
|---|---|---|---|
| 6 | Volery & Lord (2000) | 1. Technology<br>2. Instructor<br>3. Students | Students (single course) measured against teaching effectiveness |
| 7 | Lin et al., (2011) | 1. Organisational<br>2. Technological<br>3. E-learning content related<br>4. General | Organisation |
| 8 | Soong et al. (2001)o | 1. Instructors<br>2. Technical competency of instructors and students<br>3. Constructivist mind-set of instructors and students<br>4. High level of collaboration<br>5. User-friendly and sufficiently support-ed technical infrastructure | Module (technology? Perception?) |
| 9 | Nichols, M. (2007) | 1. Centres of power<br>2. Strategic ownership and acceptance for e-learning<br>3. Readiness for e-learning<br>4. Alignment of policy and systems with e-learning activity<br>5. Professional development<br>6. Size of institution | Organisation |
| 10 | Sun et al., (2008) | 1. Learner computer anxiety<br>2. Instructor attitude toward e-learning<br>3. E-learning course flexibility<br>4. E-learning course quality<br>5. Perceived usefulness<br>6. Perceived ease of use<br>7. Diversity in assessment | Student |
| 11 | Masrom et al. (2008) | 1. Technology<br>2. Organisational support | Students |
| 12 | Salmeron, J.L (2009) | 1. Asynchronous communication tools<br>2. Synchronous communication tools<br>3. Usability<br>4. Content structure<br>5. Standards compliance<br>6. LMS cost<br>7. Easy maintenance<br>8. Student attitude<br>9. Assignments<br>10. Multimedia | Information Technology |

To better understand these critical success factors we discuss them in detail under four headings: Student, Instructor, Information Technology (IT) and Institutional Support (IS).

### *2.10.5.1 Student*

Volery & Lord (2000) conducted a survey among students enrolled in one online management course at an Australian university where they identified three critical success factors in online delivery. Below are the factors and their characteristics considered.

Table 6: CSF in online delivery

| S/n | Critical Success Factor | Characteristics |
|---|---|---|
| 1 | Student | a. Programme of study<br>b. Internet access at home<br>c. Previous use of WebCT<br>d. Gender<br>e. Electronic commerce: students vs. others<br>f. Country of origin |
| 2 | Instructor | a. Instructor's enthusiasm about teaching the class<br>b. Instructor's style of presentation<br>c. Instructor's friendliness towards students<br>d. Instructor's genuine interest in students<br>e. Students felt welcomed in seeking advice/help<br>f. Instructor's encouragement of student interaction<br>g. Instructor's efficient handling of the Web technology<br>h. Instructor's explanation of how to use the Web site<br>i. Instructor's keenness for students to use the Web site<br>j. Instructor invited students to ask questions/receive answers<br>k. Instructor encouraged students to participate in class<br>l. The intensive seminars were useful |
| 3 | Technology | a. Ease of access to the website<br>b. Experience of problems during browsing<br>c. Browsing speed was satisfactory<br>d. Overall ease of use of website<br>e. Ease of Website navigation<br>f. Structure/presentation of information<br>g. Pleasantness of screen design<br>h. Useful features on Website<br>i. Direct/timely feedback from Web site<br>j. Interaction with classmates through Web site<br>k. Easy contact with Instructor |

Source: Volery & Lord (2000)

Velory & Lord (2000) found 'ease of access and navigation' the first five variables of technology to be significant. The 'interface' which comprised four variables of the technology and related to the visual structure and design of the Internet course was also found to be significant. 'Interaction', the last three variables of technology relates to the interactive abilities of the WebCT course between students and the instructor was also found to be significant. The first five variables of instructor characteristics, 'attitudes towards students', were also captured as significant. The 'instructor technical competence' was captured as four variables of the instructor characteristics and relate to the instructor's ability to use and promote the internet technology effectively. 'Classroom Interaction' was captured as three variables under the instructor characteristics. It relates to the instructor's ability to the encourage students to interact and participate in class and through the internet. While a significant relationship was found between teaching effectiveness and technology, and between teaching effectiveness and instructor, the relationships between the various variables relating to students and teaching effectiveness showed different results. While the previous use of WebCT influenced

teaching effectiveness, country of origin, gender, type of programme being undertaken, and access to the internet at home were not influencing variables.

Selim (2007) identified four categories and eight sub categories of factors influencing e-learning acceptance and success as perceived by students in a university. Below is a table showing the factors and their measures.

Table 7: Factors influencing e-learning acceptance and success

| S/n | Critical Sussess Factor | Characteristics |
|---|---|---|
| 1 | Student characteristics | 1. Instructor's enthusiasm about teaching the class<br>2. Instructor's presentation style<br>3. Instructor friendliness towards individual students<br>4. Instructor's genuine interest in students<br>5. Instructor made students' feel welcome in seeking advice/help<br>6. Instructor encouraged student interaction<br>7. Instructor's effective handling of e-learning units<br>8. Instructor explains how to use e-learning components<br>9. Instructor is keen on students' use of e-learning based units<br>10. Instructor invites students to ask questions/receive answers<br>11. Instructor encouraged students to participate in class<br>12. Instructor encourages and motivates students to use e-learning<br>13. Instructor is active in teaching students the course via e-learning |
| 2 | Instructor characteristics | 1. E-learning encourages the search for more facts than traditional methods<br>2. E-learning encourages more active participation the discussion than traditional methods<br>3. Enjoy use of personal computers<br>4. Usage of personal computers for work and play<br>5. Comfortable using PC and software prior to undertaking e-learning course<br>6. Previous experience in using PC and software helped in e-learning based courses<br>7. Absence of intimidation in the use of e-learning based courses<br>8. Learn best by absorption (sit still and concentrate)<br>9. Learn best by construction (participation & contribution)<br>10. Learn better by construction than absorption<br>11. Only read messages in the discussion group<br>12. Read and participate in discussion group<br>13. Instructor initiates most of the discussion<br>14. Students initiate most of the discussion<br>15. Instructor participated actively in the discussion<br>16. Instructions on the use of the e-learning components were sufficiently clear<br>17. Course content was sufficient and related to the subject<br>18. Structure of the e-learning components was easy to understand<br>19. Navigation through the course web/Blackboard was easy<br>20. E-learning components was available all the time<br>21. Course materials were placed online in a timely manner<br>22. Design of e-learning components were perceived to be good |
| 3 | Technology | 1. Easy on-campus access to the Internet<br>2. Did not experience problems while browsing<br>3. Browsing speed was satisfactory<br>4. Overall the Website was easy to use<br>5. Information was well structured/presented<br>6. Screen design was pleasant<br>7. Interaction with classmates was possible through the web<br>8. Instructor was easily contactable<br>9. Any PC at the campus can be used to access the website using same account and password<br>10. Computer labs can be used for practising |

| S/n | Critical Sussess Factor | Characteristics |
|---|---|---|
| | | 11. Computer network can be relied upon<br>12. Courses could be registered online<br>13. Overall IT infrastructure is efficient |
| 4 | Support | 1. Central library website can be accessed and materials searched for<br>2. Technical support can be obtained from technicians<br>3. Institutional e-learning support is good<br>4. There are sufficient computers to use and practice<br>5. Assignments and materials can be printed easily |

Source: Selim (2007)

The entire instructor characteristics construct in Selim's (2007) work showed high validity and moderate fit of the model. Factors 7 and 8 were the most valid indicators of the instructor's control over e-learning technologies and tools. 10 and 13 also came up as the most valid indicators of the instructor's teaching style and attitude towards adopting e-learning. The student characteristics factor however had a poor fit. This led to the constructs being divided into three. The first consisted of the first ten constructs indicating students' motivation for using e-learning, students' computing competency and students' mind-set about e-learning, as all the fit measures surpassed the acceptable levels, and indicated a high fit. Construct 6 which measured students' prior knowledge in using computers showed to be the most critical measure among the 10 indicators. This was followed by construct 9 which measured students' learning approach through construction (participation and contribution). The second which consisted of the constructs 11 – 15 represented the students' interactive collaboration abilities. All constructs showed a good fit indicating that the more interactions students get exposed to, the more opportunities they had to learn. Construct 14 had the highest validity coefficient indicating that the ability of students to initialize discussions is the most critical factor in measuring the student collaboration abilities. The third consisted of the last 7 constructs from 16 – 22 and also showed a good fit. Navigating course website, 19, showed the maximum validity coefficient indicating criticality.

In the technology CSF category, Selim (2007) found that the measures suggested a moderate fit of the measurement model. The initial model was then split into two. The first one comprised indicators relating to technology access, navigation, and interface, from 1 to 6. It yielded a good fit, with construct 4 showing high validity. The second comprised of constructs 7 to 13, was related to information technology infrastructure reliability and effectiveness, and showed good fit. Construct 10 was the most valid coefficient and indicated the criticality of computer labs availability to students.

The Support factor was measured using five construct and they all indicated good fit. Particularly, the 4 construct showed the most criticality and indicated the availability of computers for practice.

Selim's (2007) analysis resulted in eight CSF for e-learning being developed. These included:

- Instructor's attitude towards and control of technology
- Instructor's teaching style
- Student motivation and technical competency
- Student interactive collaboration
- E-learning course content and structure
- Ease of on-campus internet access
- Effectiveness of information technology infrastructure
- University support of e-learning activities

Selim (2007) concluded that e-earning will be adopted by many HEIs and as such there was the need to carefully evaluate CSFs before, during and after adoption. He emphasized the complexity of the e-learning technology adoption process, requesting for further research to be conducted.

Masrom et al. (2008) utilized two CSFs from Selim (2007) to examine CSFs in a university e-learning implementation from students' perspectives. The constructs of the two CSFs are indicated below:

Table 8: CSF of e-learning implementation

| S/n | Critical Success Factor | Characteristics |
|---|---|---|
| 1 | **Technology** | 1. Easy on-campus access to the Internet<br>2. Did not experience problems while browsing<br>3. Browsing speed was satisfactory<br>4. Overall the Website was easy to use<br>5. Information was well structured/presented<br>6. Screen design was pleasant<br>7. Interaction with classmates was possible through the web<br>8. Instructor was easily contactable<br>9. Any PC at the campus can be used to access the website using same account and password<br>10. Computer labs can be used for practising<br>11. Computer network can be relied upon<br>12. Courses could be registered online<br>13. Overall IT infrastructure is efficient |
| 2 | **Support** | 1. Central library website can be accessed and materials searched for<br>2. Technical support can be obtained from technicians<br>3. Institutional e-learning support is good<br>4. There are sufficient computers to use and practice<br>5. Assignments and materials can be printed easily |

Source: Masrom et al. (2008)

The Masrom et al. (2008) analysis of the proposed CSFs, Technology and Support, resulted in the technology factor being split into two parts as in Selim's (2007) case. The variables indicated were related to technology access (1), navigation (2, 3, 4) and interface efficiency (5, 6). The model showed good fit with constructs 3 and 4 (browsing speed and course website ease of use) showing criticality for measuring the first factor. The second technology factor also measured IT infrastructure reliability and effectiveness. The confirmatory factor model (CFM) yielded good fit with construct 11 indicating to be the most critical in the second technology factor.

In the support factor, aside finding a good fit for the measures, Masrom et al. (2008) also found construct 2 to be the most critical indicator among the five indicators. This showed that the availability of technical support or help desk is the most critical success factor in measuring a university support to e-learning initiatives. In conclusion, Masrom et al. (2008) suggested that it was necessary for university administrators and faculty to be cognisant of technological and support factors that affect the success in e-learning based on students' perspectives when they want to adopt such programs.

In Sun et al. (2008) empirical investigation on critical factors influencing learner satisfaction, seven out of thirteen factors grouped under six dimensions were identified to be significant. The six dimensions consisting of learners, instructors, courses, technology, design and environment, had seven factors: learner computer anxiety, instructor attitude towards e-learning, e-learning course flexibility, e-learning course quality, perceived usefulness, perceived ease of use and diversity in assessment were significant in determining the satisfaction of learners whereas learner attitude toward computers, learner internet self-efficacy, instructor response timeliness, technology quality, internet quality and learner perceived interaction with others were identified to be insignificant.

#### *2.10.5.2 Discussion*

Studies on the student/learner in an e-learning environment are most often concerned with understanding their attitudes towards and perceptions about the e-learning, their satisfaction with and acceptance of the e-learning experience, as well as effectiveness and success of the e-learning. Such studies have often been factor based, seeking to understand how certain independent factors affect a dependent factor. Although useful in identifying potential relation-

ships between significant factors and some expected outcome, and also enabling some predictions to be made, it is very difficult to determine exactly whether these factors are emergent or pre-existent and whether they are prevalent throughout the implementation of the e-learning technology or they fade out at some point and resurface. What is important here is to understand what factors are in existence prior to implementation and how they influence the implementation as well as what factors emerge in the implementation process and how they in turn influence implementation outcomes. It is believed such information would enable institutions introducing and integrating e-learning to understand the influential factors, what causes them and their behaviour during the implementation process.

It is also worth noting that the different researches sometimes fail to clearly distinguish whether the e-learning activity is entirely online, in a blended/hybrid mode, or whether an entire programme or a single course is being studied, or whether an entire institutional implementation is under focus or the e-learning was being implemented by an enthusiastic instructor or department. Such holistic investigations are largely missing from the literature on e-learning and necessary for understanding e-learning implementation from an institutional point of view.

#### *2.10.5.3 Instructor*

Fresen (2007) developed a conceptual taxonomy of CSFs which contribute to improving the quality (effectiveness) of web-supported learning in blended learning mode. After a literature review to identify factors promoting quality web-supported learning, meetings were held with 'critical colleagues' to further corroborate and refine the findings. Below are the final factors and their indicators.

Table 9: An extended taxonomy of critical success factors identified from existing literature

| S/n | Factor | Indicators |
|---|---|---|
| 1 | Institutional | Technology plan<br>Infrastructure<br>Student consultation<br>Institutional programme evaluation<br>Change management<br>Student selection and entry into courses<br>Standardisation of information design and dissemination |
| 2 | Technology | Appropriate use<br>Reliability<br>Availability 24/7<br>Accessibility<br>System training for clients<br>IT support for clients<br>Appropriate bandwidth and download demands<br>Management of student data |
| 3 | Lecturer (Instructor) | Interaction with students<br>Frequent Feedback<br>Evaluation of teaching competence<br>Academic background<br>Community and empathy |
| 4 | Student | Communication<br>Time management<br>Self-directed learning<br>Critical thinking<br>Problem solving |
| 5 | Instructional design | **Usability:**<br>- Modular chunks<br>- Use of media<br>- Use of images, graphics, animation<br>- Layout and presentation<br>- Standards<br>- Accessibility<br>**Learning principles:**<br>- Collaborative learning<br>- Engagement<br>- Higher cognitive levels<br>- Interactivity |
| 6 | Pedagogical | Learning outcome goals, expectations<br>Flexible learning package<br>Assessment strategies<br>Learning style<br>Learner-centred learning environment<br>Content and learning resources: relevance, accuracy, currency<br>Adaptable, sustainable, scalable, reusable<br>Self reflection |

Source: Fresen (2007)

The quality of the web-supported learning envisaged by Fresen (2007) was hugely dependent on the existence of some underlying assumptions and exogenous factors. He argued that any thought of quality in the delivery of web-supported learning would be undermined by the absence or inadequacy of any of the assumptions and exogenous factors. Fresen (2007) how-

ever fell short of clarifying what the acceptable standards of the exogenous factors were. Below are these assumptions and exogenous factors.

Table 10: Assumptions and exogenous factors underlying web-supported learning

| S/n | Factors | Indicators |
|---|---|---|
| 1 | Underlying assumptions | ICT infrastructure<br>Information literacy of clients<br>Basic computer literacy of clients<br>Positive attitude of lecturers (instructors)<br>Commitment and motivation of clients<br>Sound advice, support and consultation to lecturers with respect to instructional design and educational practice<br>Sound instructional design practice<br>Sound teaching and learning practice<br>Commitment to continuous improvement |
| 2 | Exogenous factors | Quality of institutional learning management system<br>Stability of national telecommunications infrastructure<br>Class size<br>Work load of clients<br>Recognition and incentives for lecturers |

Source: Fresen (2007)

Although the taxonomy is untested, it reveals critical factors and their indicators that potentially influence the quality of a web-supported learning in a HEI. Of importance are the instructional design and pedagogical factors which have been shown elsewhere to impact on e-learning implementation (Govindasamy, 2002).

#### *2.10.5.4 Technology*

Salmeron (2009) identified ten critical success factors for LMS using an expert panel: Asynchronous communication tools, synchronous communication tools, usability, content structure, standards compliance, LMS cost, easy maintenance, student attitude, assignments and multimedia. He suggested that these categories can aid decision makers to effectively and efficiently select e-learning technologies such as an LMS system was a complicated process of developing an integrated information technology system. Nine of the CSFs identified relate with the e-learning technology while one, student attitude relates with the student. Using an augmented cognitive fuzzy-maps approach, he showed potential relationships that could exist among the CSFs.

Soong et al. (2001) considered critical success factors for online course resource (VLE) successful usage in a higher education institution from the perspectives of students and instructors. The study identified five CSFs influencing the usage of online resources: human factors

(instructors), technical competency (students & Instructors), mind-set about learning (students & instructors), level of collaboration in the course, and the level of perceived IT infrastructure and technical support.

## 2.11 E-learning Implementation Research

E-learning systems are technological innovations (Hogarth and Dowson, 2008). The institutional implementations of e-learning have been shown to be complex engagements by educational institutions the outcome of which cannot be predicted with any level of accuracy. Although the field has attracted much research, the impact in terms of practice has been very limited as unsatisfactory implementation outcomes continue to be experienced by institutions (Hogarth & Dowson, 2008). Marshall & Mitchell (2005) also noted that most of the analysis of e-learning implementation focuses on the outcomes of individual initiatives in isolation rather than a deeper analysis of the contributions of the institutional context. They emphasized the need for a more holistic approach to investigating e-learning implementation with a focus on best systems rather than on individual practices. They argued further that detailed understanding of the organizational aspects of e-learning was needed for institutions to be able to improve their overall e-learning capability (Laurillard 1997 cited in Marshall & Mitchell, 2005).

Research on the institutional implementation of e-learning implementation, focusing on the processes is at best scanty. Research in this area often focuses on the determination of the effects/relationship of identified factors (independent variables) on certain outcomes (dependent variable(s)). Clearly, process research on e-learning implementation by higher education institutions, aimed at building theories and frameworks that provide understanding and guide future implementation efforts by educational institutions, appears inadequate, or even unavailable, especially in a developing country context. Guri-Rosenblit & Gros (2011) noted that many studies in e-learning represent short term evaluations on the impact of e-learning. Specifically they noted that most of the questions often attempt to address issues such as the effect of 'X' on learning in a specific case. They noted again that e-learning is complex and multi-dimensional, covering topical areas from technological infrastructure to socio-cultural issues. They note, quite importantly, that most e-learning research is sporadic in nature and scattered, often yielding contradictory findings. As a technological innovation in education, much could be learnt from the extensive research in the fields of innovation, organizational

theory and information systems, broadly classified into factor and process research. However, assuming much to be known about the process of e-learning innovation, a lot of the research sadly pursue factor research. Taking it from an innovation, adoption, and diffusion perspective, comparatively little work has been concerned with describing the innovation processes followed by higher education institutions in their bid to introduce e-learning. Much understanding of how certain factors affect institutional efforts to introduce e-learning could be gained if the process is known and well understood.

A careful scrutiny of the e-learning literature would seem to suggest that scholars deliberately avoid investigating the institutional process of introducing and embedding e-learning. It is almost as if e-learning scholars and practitioners are 'afraid' to commit themselves to specifying the processes through which an institution implements e-learning. Barajas & Owen (2000) demonstrated this when they articulated the following:

> "Throughout the analysis into the 'how' […VLEs can be implemented into traditional higher and continuing education..], it was observed that it was fairly difficult, and to a large extent undesirable, to engage in a prescription of the procedural steps to follow when implementing VLEs. This is primarily due to the fact that VLEs are defined within a very specific learning context (in terms of technology, learning paradigm, target audience, type of institution embedding the VLE, etc) and hence, procedures cannot be generalized over different conditions. Therefore, rather than providing vague procedural prescriptions, the 'How' question deals with important issues to be taken into account when implementing VLEs"

Their investigation into how e-learning is implemented by higher education institutions showed a lack of agreement and consensus on how it is done. This however appears to be unfortunate as much patterns could have been identified in the different institutional experiences to develop empirically grounded frameworks that could guide institutions in their implementation efforts. This withdrawal from specifying steps (stages) to be followed in institutional implementation seems to dominate research into the institutional implementation of e-learning systems in higher education as most have tended to highlight factors and issues over processes. This is not however to say one is preferable over the other but rather to highlight a gap in e-learning implementation research that can complement existing research. Educational institutions are often left on their own to find their way out with very little guidance on how to proceed after the idea is conceived, even though huge examples of lessons and theo-

ries from the broader field of information systems (IS) exist to provide guidance. There is evidence to suggest that many institutional implementations of e-learning have not been guided by frameworks grounded in theory. For instance, Whelan & Bhartu (2008) observe in their institutional deployment of an LMS, "Once again though, no formal or detailed model for Moodle deployment was used. Rather, the process was reactive, trial and error, and constrained by the need to adapt to existing working practices."

e-learning systems or platforms (Learning Management Systems (LMSs) or Virtual learning Environments (VLEs)) are essentially information systems applied in the context of education and so can be understood and explained from the large stream of research that have been conducted in the field of Information Systems, both in terms of theories and methodological approaches. Keller (2005) investigated the relevance and applicability of three implementation perspectives from the field of IS implementation research and organization theory to the implementation of virtual learning environments. Seeking to provide a broader perspective on the implementation of VLEs other than the pedagogical perspective on which a number of research have been based, she identifies IS implementation models that view VLEs as information systems and the university (higher education institution) as an organization. The three perspectives include: implementation as technology acceptance, implementation as diffusion of innovation and implementation as a learning process.

E-learning implementation has been studied both at the corporate university (Homan & Macpherson, 2005) and educational institution levels (Wang & Wang, 2009). At the educational institution level, the research focus has often centred on individual, departmental (or school/faculty), and institutional levels. Findings from e-learning implementation research are scattered and inconsistent with a majority located within factor research following the positivist perspective.

The rest of this chapter presents a review of the literature on e-learning implementation, highlighting findings from empirical institutional implementation experiences, critical success factors (CSF) in e-learning implementation, and research approaches in e-learning.

### 2.11.1 e-learning implementation in HEIs

In two separate research studies conducted by Zawacki-Richter (2009) and Zawacki-Richter et al. (2009) into the field of distance education where technology was a core component, they classified researches into micro, meso and macro levels. The micro-level constituted research related with actual teaching and learning, while the meso-level included all researches into the management, organization and technology at the institutional level. The macro-level contained researches conducted at a conceptual level into the distance education theories and systems. Their research revealed that the majority of the research concentrated on the micro-level, with the meso and macro-levels attracting very few researches which were descriptive in nature. This phenomenon appears not to be too different from the results of an investigation into e-learning implementation in higher education using a LMS. A description of the investigation using an adaptation of Zawacki-Richter (2009) and Zawacki-Richter et al. (2009) classifications and results is presented in the next section.

This particular review of the nature and focus of e-learning implementation research in higher education by researchers and practitioners had several objectives. Firstly, it sought to identify where the focus of these researches were directed using Zawacki-Richter (2009) classifications of micro, meso and macro levels. Secondly, it sought to identify the nature of the study by identifying the methodology used and classifying them into positivist, interpretive or mixed. Thirdly, the review sought to identify research publications into e-learning implementation focused on developing countries and in particular Ghana. Fourthly, it sought to identify the researches that had utilized process approaches in their investigation. Fifthly, it sought to identify the concerns of researchers and practitioners in institutional implementation of e-learning. Following is a description of the methodological approach.

### 2.11.2 Methodology

An online search of different journals made available through online database services and search engines was employed in searching for relevant publications related to the subject matter of e-learning implementation in higher education. The search engines and databases used include Google Scholar, Google, Emerald Insight, ERIC, ScienceDirect, SpringerLink, Taylor and Francis, etc. The period of interest covered from 1990 – 2010 representing the period online learning gained immense attention and much hype. A search was undertaken using the following terms: e-learning implementation, e-learning implementation in higher

education, e-learning implementation in universities, e-learning implementation in developing countries, e-learning implementation in Ghana, e-learning implementation in Africa implementation of learning management systems (LMS), implementation of LMS in higher education, implementation of LMS in universities, LMS implementation in developing countries, LMS implementation in Ghana, LMS implementation in Africa, e-learning adoption, e-learning diffusion, e-learning adoption in higher education, e-learning diffusion in higher education, e-learning/LMS adoption in universities, e-learning/LMS diffusion in universities, e-learning/LMS adoption in developing countries/Africa/Ghana, e-learning/LMS diffusion in developing countries/Africa/Ghana.

The results of the searches were then examined by reading the abstracts to determine their relevance and usefulness for describing the nature and focus of research on e-learning implementation in higher education institutions. The following criteria were used in selecting relevant publications: focused on e-learning (LMS/VLE), centred on higher educational institutions (Universities), addressed issues such as success factors, challenges, etc of implementation, addressed adoption, diffusion, etc, specific institutions in specific countries/developing countries, addressed students, faculty or institutional concerns, and focused on factor or process studies. Careful scrutiny led to the following results presented below.

In the following section, we discuss some empirical reports on institutional e-learning implementation efforts and their findings.

### 2.11.3 Empirical evidences from institutional implementation efforts

The attempt to find a holistic and systematic approach to the institutional implementation of electronic learning to support students' learning has proven interestingly elusive. The literature reveals a bias towards quantitative, factor based research and understanding of e-learning implementation rather than a qualitative, process based approach to understanding the phenomenon. This is in sharp contrast to the observed outcomes of institutional implementation of e-learning which highlight the dynamic nature of implementation as it is often influenced by contextual factors. It is worth noting here that a lot of the factors that influence the successful outcomes of e-learning initiatives are influenced by the implementation activities of the institution. We argue therefore in this review that an underlying implementation framework is essential for a holistic understanding of how institutions introduce and embed e-

learning into their traditional teaching and learning environments. The suggestions by researchers and practitioners on factors that need to be controlled to ensure success attest to this developments. It is interesting to note however the almost conspicuous absence of institutional e-learning implementation process studies. Available studies highlight institutional efforts undertaken to achieve current levels of success, giving cues of what institutions may need to consider but falling short of describing how the institution systematically arrived at their current levels of success. This systematic approach connotes not only a theory but also a process of how educational institutions introduce and integrate technological innovations into their traditional teaching and learning environments. Aside external influences which are often beyond the control of the institutions, but can be managed, all other factors are caused and influenced by the institutions' implementation activities, even the individual preconceived notions and experiences.

Empirical reports of institutions engaged in e-learning implementation highlights certain important stages which can be modelled to help understand how institutions introduce and embed e-learning. A critical examination of these reports shows that three levels of e-learning implementation have attracted the attention of researchers and practitioners: institution-wide level, department level, and classroom (course) level. Any successful implementation must address needs of the different levels with a focus on supporting students' learning. An institutional approach will ensure consistency in development of e-learning across all the relevant teaching and student support units, an optimal use of resources for the benefit of all, as well as facilitating the achievement of overall institutional goals.

The integration of technology into the traditional teaching and learning (T&L) of HEIs has often been underpinned by multiple objectives such as gaining control of institutional processes, facilitating monitoring and evaluation, introducing change, complying with national directives, taking advantage of on-going projects, enhancing T&L, etc. Jones et al. (2011) highlighted three underlying objectives that accounted for their institution's motivation to integrate technology into their traditional T&L environment: as a marketing effort to attract more students, to support students' experience, and to take advantage of the experience and expertise gained through external collaboration in an EU project. Zuvic-Butorac et al. (2011) indicated that the institutional strategically planned implementation of e-learning was underpinned by the need to transform the university structure, processes, programmes according to the Bologna reform, in addition to improving the quality of T&L. Whelan & Bhartu (2007)

also stated that the aim of introducing a new LMS into the university of South Pacific was to improve teaching and learning. The multiplicity of possibilities suggested by these objectives not only highlights the different uses an e-learning implementation could be put to, but also the complex and dynamic nature of the technology involved. As argued by Jones et al., (2011), "…technology is a dynamic and nebulous entity…..but acts as a catalyst for change..." There is therefore a need for an implementation framework that ensures an understanding of the e-learning system's capabilities, how it can be systematically rolled out and integrated into the institution, and used to support students' learning.

As indicated above, e-learning practitioners and researchers have been interested in identifying factors that influence the successful implementation of e-learning in HEIs. The critical success factors (CSF) in e-learning implementation that have been identified have enabled some progress to be made in institutional implementation efforts. Although these factors indicate what institutions need to take into consideration and address in their e-learning implementation effort if expected goals are to be realized, they fail to clearly highlight the institutional processes and activities, constrained by contextual factors that eventually facilitate or constrain institutional implementation efforts. Some of these processes and activities are reported in empirical reports of institutional e-learning implementation efforts (Zuvic-Butorac et al., 2011) that highlight what the institutions did to arrive at their current level but also fail to provide clear guidance on how to initiate and proceed with the institutional agenda.

These institutional reports have as their main objective a recounting of the institutions' experiences in their journey towards the integration of e-learning into their traditional T&L activities. This has resulted in a gap in our understanding of how HEIs introduce and integrate e-learning into their traditional T&L environments to support students' learning through implementation. More importantly, the unfolding of the processes through the activities undertaken by the institution lacks the much needed framework within which 'sense-making' of institutional implementation can be captured. This in no small way has the potential of providing useful guidance to institutions planning to undertake such journeys.

### 2.11.4 Institutional implementation models and frameworks

Current discussions in e-learning domain show no evidence of a ready model or framework for institutionalizing e-learning from an institutional perspective. Whelan and Bhartu (2007)

were emphatic that no formal model of institution-wide LMS deployment was explicitly used to support the work of the LMS coordination team. The outcomes of such implementations are therefore highly unpredictable. Oliver and Dempster (2003, pp. 144) conclude "there appears to be no ready model – no single, clearly successful path – that ensures e-learning will be embedded" within the institution. Evidence from both empirical and theoretical discussions on institutional implementation of e-learning have often highlighted important themes such as the need for knowledge and awareness among stakeholders, development of expertise in staff, provision of institutional infrastructure, addressing the pedagogical concerns of faculty, and the often silent administrative changes that need to be addressed at different levels. The narrative accounts of these institutional stories often highlight preparations made by the institution through to the physical implementation and use of the system. These descriptions give an indication of the processes often followed by institutions in their bid to introduce and embed e-learning. Although seemingly obvious, few attempts have been made to understand and conceptualize this process.

An understanding of these processes and their conceptualization is essential to assisting higher education institutions introduce and embed e-learning into their practices to support students' learning. Fundamentally e-learning has been perceived as an innovation in T&L with far reaching implications for the way HEIs conduct their businesses traditionally. These implications connote change, and with it, potential resistance to that change. What is crucial here is how the institutions go about bringing about that change. In other words, implementation here is not construed in the prototypical sense of the word, but in terms of the activities that the institutions engage in to realize their goal. The institutions carry out these activities with the belief that they would translate into the realization of their goals regarding e-learning. It is argued that what an institution does from the very beginning shapes and influences how e-learning becomes embedded within the institution. A planned and systematic approach to institutional e-learning therefore can guarantee e-learning embedding within the institution.

### 2.11.5 Empirical Implementation activities

As indicated earlier, empirical evidence on institutional e-learning implementation often highlight activities focused on creating awareness among institutional members, developing faculty's technical competencies in the use of the system, addressing the pedagogical needs

introduced by the system, providing the infrastructural developments and the administrative processes affected by the system. Drawing on Rogers' adoption decision-making process and institutional innovation process, institutions need to engage in activities that create the much needed awareness about the need for and potential offered by the system to enable the stakeholders acquire sufficient knowledge to make informed decision to use the system in a sustained way. This would create the conducive environment for physically making the system available for use within the institution, drawing on Lewin-Schein's model of planned change, and the post-implementation (post-adoption) evaluative activities that seek to ensure that the system is institutionalized. For instance, Zuvic_Butorac et al. (2011) describe an institution-wide implementation of e-learning where the process was divided into two phases: phase one had the objectives of increasing the awareness and understanding of e-learning as well as building ICT competencies at the University while the phase two on the other hand had as its objective the establishment of the organisational and functional setup of the e-learning system.

The first phase highlights the institutional recognition for the need to create an awareness and understanding of e-learning. This is not only important for faculty, but also for support staff (administration and IT) and students. Awareness creation draws the attention of stakeholders to the need for and potential solutions offered by the system to achieve the institution's goals. It offers an opportunity for stakeholders to see and understand how the system relates to their current tasks within the institution and to begin to acquire knowledge about the system's usefulness and risks. The institutional initiatives for achieving this awareness and understanding also signals top management's support and commitment to the e-learning process and allows individual stakeholders to begin to form perceptions about the system's relevance to the institution' purpose. How often this awareness drive is undertaken is important to the embedding of e-learning within the institution's environment. An institution may have to undertake different levels and kinds of awareness creation to embed the desired e-learning practices. Jones et al. (2011) noted that to embed the assessment policy as part of the institutional strategy for embedding blended learning throughout the institution, there was the need to undertake promotion and raising of awareness of online submission and assessment, long after the system was in place. Activities in this area included short seminars where they invited guest lecturers and were tailored to specific group of faculties. Zuvic-Butorac et al. (2011) pointed out that these seminars enabled the academics to gain insight into the possibilities and advantages of online collaboration with students through LMS use.

The first phase was also marked by a drive to build ICT competencies at the university. Experience in the use of information and communication technologies like the computer and the internet is important for any meaningful accomplishment in effective e-learning implementation for faculty, support staff and students. As assessment of ICT competency levels of staff and students can prove very useful to the institutional efforts. Some activities undertaken by the institution in this direction included the setting up of a variety of educational programmes for ICT including general ICT skills and literacy, graphical design skills and specialized programmes for IT professionals offered throughout the year to the academic community.

This phase also saw the development of an institutional strategy for e-learning implementation for approval by management and the highest council of the university. This strategic document was crucial for any further development of e-learning within the institution as it showed what had to be done and enabled resources and planning to be made.
The phase two focused on the establishment of the organisational and functional systems that would ensure the sustainability of any e-learning implementation effort by the institution. Activities engaged in included setting up new university bodies e.g. faculty e-learning teams and the university committee for e-learning, offering new educational programmes on e-learning use for teaching staff, and the establishment of a university e-learning centre as a central point for e-learning support.

Although institutional processes vary, this variation can be explained by the constraints imposed consciously or unconsciously by contextual factors. The knowledge of what these factors are and how they emerge and influence e-learning implementation can enhance institutions' efforts at embedding e-learning systems and practices. In the following section, a critical exploration of some identified processes is undertaken.

Considering how quickly technology develops and relatively slow educational institutions are to embrace change related to technology, HEIs appear caught in an intricate web of Information and Communication Technological advancements, often woven around business organizational needs and solutions, with an almost afterthought consideration for their actual application in core educational contexts. The application of these technological solutions from the world of business therefore into educational settings has traditionally pursued technology-led approaches, rather than pedagogy-led approaches. Pedagogy-led approaches to the introduction and application of technology in educational settings have teaching & learning

as the focus of the implementation. In other words how to use the technologies to support students' learning. Although information and communication technologies have been applied in educational settings with success and benefits, this has not been so in all cases. Some institutions are still struggling to even start using these technologies after more than three years when a decision was taken to adopt them. Others are struggling to embed these technologies while some successful implementations are yet to see any impact on students' learning through the provision of a support structure (system) using technology (Nichols, 2008). The development of a framework often sounds like trying to fit institutions into a kind of jacket and so many researchers and practitioners have steered clear of developing an institutional frameworks that can guide and provide the needed understanding in all kinds of contexts. This has led to many ad hoc approaches to implementation with often no clear idea of what activity needs to be performed, where, when, for what purpose, for how long and for which stakeholders. Of great importance to both researchers and practitioners is how these activities, part of a bigger process, shape the expected outcomes, and are in turn affected by contextual factors. Bell & Bell (2005) note that many of the issues they had to overcome in their implementation of e-learning within their university also emerged in the institution they were assisting along with new ones. These observed similarities can be explained from the activity-process point of view which can increase our understanding of what institutions do by way of implementation, and guide future implementation efforts. How higher education institutions go about introducing and embedding e-learning, in other words implement e-learning, can provide insightful lessons for the development of an institutional implementation framework that can guide and provide understanding of the process.

Institutions vary in terms of their experience and involvement when it comes to e-learning implementation. While some start from scratch, ground zero (Zuvic-Butorac et al., 2011), others have experience with different platforms prior to an institutional decision to adopt a single one (Bell & Bell, 2005; Whelan & Bhartu, 2007). Some institutions also focus on embedding e-learning as part of ongoing institutional efforts to integrate the technology into the traditional environment (Jones et al., 2011). The level of infrastructural readiness can also vary in terms of IT and HR availability and adequacy prior to an institutional decision to introduce e-learning. This raises the issue of prevailing contextual situations prior to starting the initiative (Zuvic-Butorac et al., 2011). Past research also suggests that inherent in the introduction of a technological innovation into the traditional environment of a HEI is change. Bell & Bell (2005) highlighted several cultural changes that occurred in their institutional

implementation of e-learning. These changes occur at different levels within the institution (Bell & Bell, 2005) – teaching and learning, administrative processes and organizational support. Evidence exists however to show that these changes have been often resisted and not supported by those who were to facilitate and use them, and may continue to exist long after the system has been fully implemented (Zuvic-Butorac et al., 2011). We discuss the following five main processes identified in empirical e-learning implementation by HEIs: awareness creation, staff development, pedagogical development, IT infrastructure development, organizational and administrative processes.

### 2.11.6 Institutional Implementation Processes

#### *2.11.6.1 Awareness creation process:*

Institutions have often reported about their awareness creation activities often aimed at creating the needed sensitization, awareness and knowledge among stakeholders. The intention is often to prepare stakeholders for the innovation to be introduced. The opportunity is taken to draw attention to or remind stakeholders of the need for solutions to identified institutional challenges as well as about the technology and opportunity offered by the technology for meeting the needs. Information about the technology is presented and aligned with the tasks to be supported within the institution. Different activities have been used to sensitize stakeholders. Some institutions have used seminars where they invite experienced e-learning users to talk about their experiences (Zuvic-Butorac et al., 2011), product demonstrations, hands-on workshops, etc. How long this takes can vary from institution to institution depending on resource availability, institutional timeframe for implementation, and the planned strategy.

#### *2.11.6.2 Staff development process:*

Staff development involves the equipping of staff with the requisite skills and competencies needed for effective e-learning implementation. Institutions take their staff through training in general ICT skills, e-learning system functions as well as more advanced technical skills in multimedia and graphics development, network basics and even hardware troubleshooting (Zuvic-Butorac et al., 2011). Such trainings are traditionally provided to the faculty members and in some institutions are offered throughout the year through different means. Of equal importance is the development of other categories of staff including IT staff, administrative and other support staff. Bell & Bell (2005) argued that failure to adopt a holistic approach to developing all staff in the institution can put the success of the implementation in jeopardy.

They contended that this approach would enable engagement of the entire programme teams, highlight problems that could be addressed through an institutional response, and assist in the identification and dissemination of good practice. Several administrative roles within the institution have direct and indirect linkages with actual teaching and learning necessitating their critical developmental involvement for the overall success of the implementation. For instance, the admissions, registration, examination, accounts, and records units play roles in the effectiveness of the e-learning implementation. Involving them in the staff development process will therefore offer them the opportunity to acquire the skills needed to support the innovation effectively.

Different strategies exist to providing staff development. This is necessary considering the limitations on staff time for other activities. Among some popular approaches are formal class sessions, one-on-one, bookable sessions, 'house calls' (personal calls) by the development team (Bell & Bell, 2005), online training sessions, etc.

An important category of 'staff' that also require training for maximum effectiveness of the implementation efforts are students. Many researchers have argued the importance of equipping students with the knowledge of appropriate use of the e-learning system, and practical skills in the use of the electronic resources. Neglecting to do this can result in a limited use of the system, leading to the full benefits not being experienced.

#### *2.11.6.3 Pedagogical development process:*

The use of technology in teaching and learning comes with an associated need to reconsider the pedagogical issues involved. Failure to implement from a pedagogical viewpoint can result in technology-led implementation where the e-learning system use will be based on what the technology has to offer rather than how the technology can be used to achieve the objectives of the teaching and learning efforts. Absence of clear pedagogical models can also result in the technology being used to perpetuate existing instructional practices which may require change. The objective is not to replace the teacher or his work with the technology but rather to enhance the teacher's work with the technology and subsequently enhance and enrich students' learning through the provision of opportunities previously unavailable. Equipping both faculty and students with the knowledge and skill of effectively using the e-learning system in teaching and learning cannot be overemphasized (Whelan & Bhartu, 2007). Govindasamy

(2002) argued that pedagogy is an often neglected aspect in many efforts to implement e-learning. He further noted the lack of guidelines to design, develop, deliver and manage pedagogically sound e-learning materials. The failure to consider and develop pedagogical models for use can lead to a limited use of the available features of an e-learning system or their use will be in a way detrimental to pedagogical principles which can also become an impediment to learning.

Pedagogical development involves the equipment of faculty with the pedagogical knowledge and skill and their application in an e-learning environment. Salaberry (2000) noted that there is an often conflicting purpose in using computer mediated communication (CMC) for communicating and for learning that can be adequately addressed if the design of pedagogical activities is analyzed from the perspective of a pedagogical framework. The efficiency of technological innovation in achieving a given objective does not necessarily mean that there will be an increase in the effectiveness of instruction delivered using it. Salaberry (2000) argued that the popularly held belief that the easy access to the target language data in a variety of formats (e.g., image, audio, and video stored in a CD-ROM) will lead to substantial gains in learning over that obtained through traditional methods of instruction (e.g. textbooks, audiotapes or videotapes) is an argument in favour of the efficiency with which the delivery of information is brought about by computer assisted language learning (CALL) applications but may not necessarily be so. Appropriate pedagogical frameworks based on sound instructional design principles driven by learning theories and models are therefore required to effectively support students' learning in higher education (HE).

Although the e-learning technology as an innovative teaching and learning tool possesses functionalities that are far more efficient than current classroom delivery, pedagogical frameworks appear to be the only medium through which these efficiencies can be effectively tapped. Pedagogical theories provide the organizing environment for effectively designing instruction and learning for achieving educational objectives. Using pedagogical frameworks to design teaching and learning activities in technology-mediated environment therefore can guarantee the delivery of the necessary support required for effective students' studies.
Institutional decisions on e-learning should centre on how the technology could be used to facilitate and enhance students' learning. Although many research have been conducted in that regard, institutional implementation have failed to highlight a conscious inclusion of this consideration. Most institutional implementation have focused on factors like increased ac-

cess, reduction of costs, etc. more than on supporting effective teaching and learning. Most implementations focus on use of the technology (technology-led) more than on support of instruction with the technology (pedagogy-led). Where the focus is not on the students' learning, very little by way of effectiveness can be achieved. The technology may be successfully installed, but the results anticipated would not be realized.

#### *2.11.6.4 Information Technology Infrastructure development process:*

Institutional infrastructural development entails the provision of information technology (IT) infrastructure (*networks – wireless and LANs, internet, servers, computers, software, hardware, etc)* and physical infrastructure (*buildings – computer labs)*. Institutions need to make conscious decisions about these infrastructures based on an assessment of the current infrastructure and requirement for the proposed e-learning system. Some important considerations under infrastructure include accessibility, reliability, availability, and security (*backup, corruption of data, etc.).* An equally important aspect of the IT infrastructure is the e-learning system (software) and its functionality. Evidence exists to show that stakeholders' perception of the adequacy, accessibility and reliability of the infrastructure plays an important role in successfully implementing institution-wide e-learning project.

#### *2.11.6.5 Organisational and Administrative process:*

The organisational and administrative processes involves the institutional measures, actions and decisions put in place to provide the supportive and enabling environment needed to encourage and drive commitment and sustainability of the e-learning initiative. This includes the setting up of a technical and user support unit, policies, e-learning units, committees, rewards, and a restructuring of the institutional administrative support structures essential for the sustainability and embedding of the e-learning system institution-wide.

Providing technical and user support typically occurs at two levels: *IT and user support*, and the *e-learning system support*. Support in IT and user support usually revolves around difficulties in access, both within and outside campus. These are often technical in nature and require the support unit to provide timely assistance to users. User groups could be classified into core and peripheral user groups. The core includes instructors and students, while the peripheral includes e-learning administrators (providing faculty and student support) and other institutional e-learning process support individuals, groups, committees, etc.

#### 2.11.6.5.1 Instructor user groups

Instructors use the e-learning system to deliver their instructions and manage students learning. They traditionally design their instruction using the system as a tool. Access to the system therefore is crucial to the performance of their teaching functions. Any difficulty encountered in accessing the e-learning system either for uploading and designing learning content, or accessing and supporting students' activities can potentially *create poor perception of the system's ease of use* among instructors, even for those with previous experience, leading to negative attitudes and subsequent resistance to use. In addition, where instructors lack the necessary expertise to design online teaching and learning experience using the system (both system function and pedagogically), and fail to be given adequate support in this area, it can lead to the development of wrong perceptions about the system's usefulness and ease of use (in addressing the needs of the instructors, and students).

#### 2.11.6.5.2 Student user group

Students access the e-learning system from within and outside of the main campuses and therefore need the system to be accessible, reliable, and have confident instructors directing and managing their learning. Any form of difficulty in accessing the system due to login problems, system challenges (other technical problems) can impact negatively on students' learning. Again students should be taught how to interact with the system in order to maximise the potentials it offers for achieving learning objectives. There are some who have argued that future development of e-learning in institutions would be driven by students. It can then be argued then that if students are shown how to effectively utilize the e-learning system, their demand for some functionalities of the system could potentially drive instructors to consider their use.

#### 2.11.6.5.3 Administrators

Departments within the institution like the admissions, registration, student records, human resource, examination, library, e-learning unit and accounts play important roles in supporting instructors and students in the performance of their duties. These roles equally feature prominently in the functioning of an e-learning system. Students' admission and enrolment are intricately woven into the e-learning system. Institutions have different policies on how this is done and whether it is done by the student filling manual documents which are then fed into an institutional system or done by the students directly online. Access to the system's

functionalities and resources can also be tied to the students account subject to payment of required fees. Examination (student assessment) results and questions are directly linked to the different types of formative and summative assessments provided by instructors through students' engagement with the e-learning system. These results are eventually stored in the students' record system (or with the unit) depending on if there is an IS or manual system. The human resource unit also stores information about faculty members who are then linked to courses in course allocations, programmes and departments. Although the library system can stand on its own, it is sometimes linked with the e-learning system. This enables access to recommended texts from instructors to be accessed directly from the e-learning system, making it possible for instructors to add links to the materials from within the e-learning platform.

e-learning committees, e-learning quality assurance groups, academic boards approving e-learning programmes, instructional and educational technologists associated with e-learning developments need support to access and ensure compliance with institutionally required standards to ensure quality e-learning delivery.

The administrative processes within the institution can be categorised into two: centralised support provided to instructors and students, and specific departmental administrative support services usually provided at different levels. The centralized support services encompass those services like admission and registration (enrolment), examination, student accounts and student records. These central support services provide administrative services to the entire institution including Schools, Departments, as well as individual faculty members and students. At the School and Department levels, there are often representatives and units that perform some of the functions of these central support service units. For example, a School will have an Examination Officer who coordinates all exam activities in the School by dealing with Exam Officers in the various Departments. Another example is the recruitment of students for a particular programme offered in a particular department. The admission unit will facilitate this recruitment and subsequently liaise with the involved School and Department to enrol the students. The determination of the unit that performs this function is important to the implementation of an e-learning system. Several options are available to the institutions: (a) the admissions department could still be in charge of registration, (b) the students could be made to register themselves online, (c) the department could be made responsible, and (d) in some cases the IT department could be tasked with the responsibility. The e-learning system therefore introduces changes which if not taken into initial considerations, can result in delays

and conflicts. Here the business processes of the institution plays a critical role as failure to consider this in advance can hinder the smooth implementation of the e-learning system.

From the foregoing, three critical support structures can be identified to be crucial to e-learning implementation: the IT support, the e-learning system support, and the administrative services support. The organization of these support units vary from institution, just as their composition. However, it is clear that successful institution-wide e-learning implementation requires a systemic consideration of the interrelationships between these units.

### 2.11.7 e-learning Unit (Centre)

Closely associated with the e-learning system support is the establishment of an e-learning unit responsible for the setting up of the e-learning platform and its maintenance. Although the e-learning platform is an information system and can be easily managed as another institutional information system by the IT unit, a specialized team is required to setup and manage the e-learning system. This team is a dedicated team mandated to be available 24-7 to provide the needed support of e-learning system users. This unit is expected to work hand in hand with the IT unit that house or manages the IT infrastructure (both internal and external) supporting the e-learning system. The unit also works closely with a teaching and learning unit (pedagogy) or has such responsibilities as part of its mandate to deliver. The e-learning unit is often comprised of such expertise as an instructional technologist, educational technologist, multimedia and graphics specialists, etc.

### 2.11.8 e-learning Committee

The establishment of an e-learning committee has also been identified to be a relevant institutional establishment for the successful implementation of institutional e-learning visions. The committee, or a similar unit, coordinates all the activities and decisions associated with the e-learning implementation at all levels of the institution. The unit is charged with the development of the institution's e-learning policy, e-learning strategy and mediates between top management and other stakeholders. The composition of the committee varies from institution to institution but will be made-up of IT managers, representatives from various departments, e-learning experts, representatives from student support services and top management. With the appropriate mandate, the e-learning committee drives the institutional e-learning

initiative, ensuring that the objectives of the institution's leaders are pursued to its latter conclusion.

### 2.11.9 e-learning Communities of Practice

Another useful institutional establishment is an e-learning community of practice. The institution of such a community has been shown to build and strengthen an e-learning community through the sharing of experiences and provision of a platform for discussing challenges and solutions faced by users in the institution. Members of this community frequently hold meetings where usually an internal user shares new knowledge and insights on effective uses of the e-learning system. At other times, external resource persons are invited to share new insights with the community members, helping to strengthen and deepen the practice. Most importantly however, the community acts as a platform for involving stakeholders in the implementation by affording them the opportunity to voice out their concerns and recommend solutions for consideration. The platform is equally useful for top management as it enables them explain their decisions and approaches to institutional members to avoid potential misunderstanding and subsequent resistance to potential change. The opportunities offered by the community of practice for effectively implementing and integrating e-learning is immense and can be tapped into by institutions to successfully introduce and embed their e-learning systems.

### 2.11.10 E-learning Champions

Also reported in the empirical literature is the appointment of e-learning representatives at the School and department levels. These representatives act as the link between the core users (instructors and students) and the e-learning decision making body of the institution (e-learning committee, unit, etc). They act as initial source of assistance to instructors and students in their use of the e-learning system and represent the concerns of the department at meetings. In some institutions, complete and well-resourced units are established at the School and department level, depending on the institutional structure and the e-learning strategy.

There have been reports in some cases, about individual School and department uptake of e-learning either independently or as part of the broader institutional adoption (Cech & Bures, 2004; Rhema & Miliszewska, 2011). These empirical evidence highlight the important differences in how different Schools and departments embrace e-learning, their peculiar chal-

lenges, and opportunities, all of which an institution-wide implementation must take into consideration. The processes and activities described in these empirical reports clearly evidence the absence of sound theoretical underpinnings that can guide new e-learning initiatives and improvements in existing e-learning projects towards supporting students' learning.

The uses of e-learning in classrooms for specific courses have also been reported in the extant literature. These reports often highlight the unique experience of students or an instructor in the use of the e-learning platform to achieve learning objectives. These implementation cases are evidence of the wide applicability of the e-learning system in different fields of study. For instance, Stricker et al., (2011) reported the evidence of its efficient applicability in psychology courses.

The diagram below depicts the broad processes involved in an institutional implementation of e-learning. The processes entail decisions and actions undertaken by institutions towards realizing various e-learning objectives. These decisions and actions are sub processes which constitute discrete activities performed to achieve the overall e-learning implementation objectives.

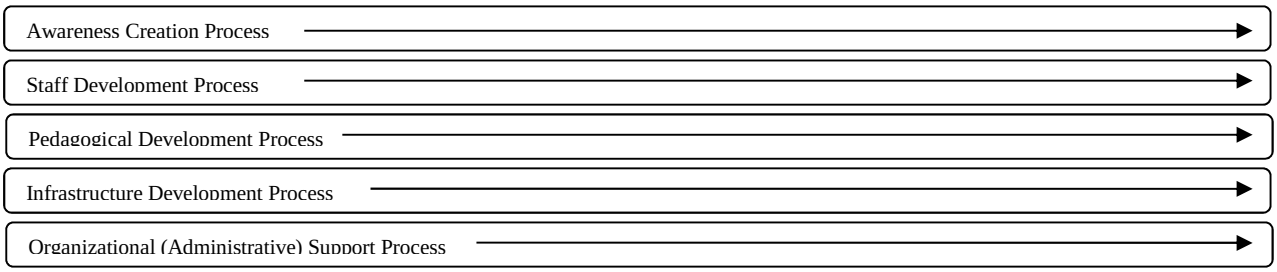



Figure 5: Broad processes observable in an institutional e-learning implementation

## 2.12 Justification for e-learning implementation research (call for institution-wide research)

Lonn et al. (2011) called for larger studies into LMSs across courses, disciplines and institutions as a result of their pervasiveness, so that "lessons learn" could be generalized and more widely disseminated. They suggested that such lessons could help improve how LMS are implemented and utilized at university-level teaching and learning.

In commenting about the advancement in technological development and the opportunities offered for educational innovation, Barajas & Owen (2000) submitted that, '…..the implementation of technology in educational environments and in the learning process, in formal or

in more informal learning structures, poses a real challenge for the education and training institutions undertaking it'. They suggested that if the implementation of VLE was to result in education and training improvement, elements related to the teaching (pedagogical effectiveness) and institutional sphere (institutional restructuring, resistance to change, etc) had to be considered. They subsequently requested a holistic approach to implementing e-learning in HEIs.

Many e-learning implementation research in the past have avoided developing models highlighting the process and sequence of the technology's introduction and integration into the traditional learning environment, probably what Barajas & Owen (2000) describe as, "..engage in a prescription of the procedural steps to follow when implementing VLEs". They contended that VLEs are defined within very specific learning contexts including the technology, learning paradigm, target audience, type of institution embedding the VLE and hence, procedures could not be generalised over different conditions. We offer a different perspective however. The contextual factors they cite exist outside of the implementation process but can potentially influence and determine the outcome of any implementation effort. As such, understanding the process of implementation and how the contextual factors influence and shape outcomes would enable educational institutions to analyze their positions more effectively and develop better strategies for implementing e-learning. Therefore the description of a model in this direction would not amount to 'providing vague processes' as argued by Barajas & Owen (2000) but rather lead to a deeper, more structured understanding of the e-learning implementation process and how the contextual factors influence it. Umble et al. (2003) agreed with this assertion in contending that although an ERP system could be complex and difficult to implement, a structured and disciplined approach could greatly facilitate the implementation. Besides what is described as the influential contextual factors are debatable. Therefore more generally accepted factors as influencing e-learning implementation would need to be identified and addressed.

Over the years, a lot of attention has been given to 'e-learning issues' in the literature. The literature is replete with critical success factors necessary for effective and successful e-learning implementation. Admittedly, the factors that have been identified have also been shown to influence implementation. However, since implementation has been presented as a one-off event, these factors appear to affect implementation at one point in time. Our knowledge and understanding could have been improved if the process of implementation

was well understood in terms of the stages involved, the outputs and outcomes of each stage as well as the effect of the contextual factors on the outputs.

McPherson & Nunes (2007) argued that the implementation of LMS in traditional HE settings usually required processes of change management, which can involve complex technical component and require a systematic design and development methodology to translate pedagogical models into practical reality. It can be inferred therefore that if the implementation of e-learning in a HEI required a change management process approach, the implementation itself follows a change process pattern. Change process models can therefore be applied to e-learning implementation in HEIs. Further, contending that the design of an e-learning system should result from the specifications emerging from the process of analysing curricular problems and needs, they suggested the need for institutionally defined goals for learning. They argued that the open nature of e-learning systems made it susceptible to influences from student needs, adopted pedagogical models, technological constraints, institutional norms, and societal needs and as such required a systematic process of design which need not necessarily be linear but required a holistic view of e-learning to be successful.

McPherson & Nunes, (2007) in their conclusion proposed the conduct of longitudinal implementation studies within several institutions to verify whether the CSFs continue to apply over time.

# CHAPTER THREE

## 3.0 METHODOLOGY AND RESEARCH DESIGN

### 3.1 Introduction

The purpose of this chapter is to describe in detail the methodological considerations that guided the conduct of the research to enable readers understand, evaluate and replicate the procedures and assumptions considered. The chapter addresses the researcher's critical consideration of the relevant philosophical underpinnings, their epistemological, ontological and axiological assumptions, methodology, methods, ethical consideration and trustworthiness. Grix (2002) notes that a clear and transparent knowledge of the ontological and epistemological assumptions underpinning any research would enable:

(1) understand the interrelationship of the key components of the research (including methodology and methods);
(2) avoidance of confusion during theoretical debates and the discussion of approaches to social phenomena; and
(3) recognition of others' positions, and defend our own, positions.

Without clear understanding of one's research philosophical position, there is the possibility of arguing past each other since some positions might not allow the inclusion of certain perspectives Grix (2002).

### 3.2 The Philosophy of Science

The philosophy of science is the branch of philosophy that deals with what science is (structure), how it works (techniques), components, assumptions, limitations, and the logic through which scientific knowledge is built. Although the early years of scientific enquiries viewed the process of knowledge acquisition as objective, rational, and empirical to allow rigour, consistency and prevent human subjectivity from hindering the process of nature discovery, it is now an accepted view that science is inescapably infected with humanness. Science can be broadly viewed as the logical search for knowledge. Ponterotto (2005) viewed the philosophy of science as the conceptual roots undergirding the quest for knowledge. According to him, the philosophy of science incorporates the beliefs or assumptions regarding ontology (the nature of reality and being), epistemology (the study of knowledge, the acquisition of knowledge, and the relationship between the knower and the would be knower), axiology (the

role and place of values in the research process), rhetorical structure (the language and presentation of the research), and methodology (the process and procedures of research). These philosophical anchors are briefly considered below and later examined with some prominent research paradigms in the subsequent section.

### 3.2.1 Ontology

Ontology is concerned with the nature of reality and being. Ontology addresses the question: what is the form and nature of reality and what can be known about that reality? There are two predominant views on reality and being: objective and subjective. The perception of an objective reality views reality as apprehendable, identifiable and measurable. Proponents of this view typically fall within the positivist and post-positivist paradigms, with the post-positivists arguing that the reality can only be apprehended and measured imperfectly. The view of reality as subjective on the other hand contends that there are multiple realities which are socially constructed. This reality is believed to be influenced by the context of the situation – the individual's experience and perceptions, the social environment, and the interaction between the research participant and the researcher (Ponterotto, 2005).

### 3.2.2 Epistemology

Epistemology is an area of philosophical debate that deals with the issue of what knowledge is. It is concerned with the questions: What is the relationship between the knower and what is known? How do we know what we know? What counts as knowledge? (Tuli, 2010; Ponterotte, 2005). Following from the previous discussion on the objective and subjective views on reality, advocates of objectivism (positivists) assume a distinct independence between the researcher, the research participant and the subject of investigation using rigorous and standardized procedures that can guarantee a bias-free outcome. The belief therefore is that social phenomena should be, and can be studied without the influence of the researcher, such that the replication of a research finding will be deemed to be true, and subsequently enhance theory verification evidence (Ponterotte, 2005). The advocates of subjectivism on the other hand contend that a dynamic relationship between the researcher and what is known is important since reality is socially constructed. In other words, the researcher cannot be separated from the research participant or the phenomenon under study and that through mutual interaction, the lived experience of the participants can be captured and described. These subjective interactions between the researcher and the participants lead to a deeper understanding of the phe-

nomenon under study through a mutual construction and interpretation process of the lived experience of the participant that is not necessarily required to be concisely replicated. As Tuli (2010) notes, “Building a partnership with the study participants can lead to deeper insight into the context under study, adding richness and depth to data.”

### 3.2.3 Axiology

Axiology deals with the role of the researcher values in the scientific process. The objectivist stance on this is that the values, hopes, expectations, and feelings of the researcher have no place in scientific enquiry. This, they contend can be achieved with strict usage of standardized and systematic investigation methods that can eliminate or control any influences the researcher could have on the research process or participants. The subjectivism stance on the researcher’s value role is more relaxed and believed to be inseparable from the lived experience. They contend that the researcher ought to acknowledge, describe, and ‘bracket’ his values, but not eliminate them (Ponterotte, 2005). As Ponterotte (2005) asserted, underlying the constructivism paradigm is a, “close, prolonged interpersonal contact with participants in order to facilitate their construction and expression of the ‘lived experience’ being studied.” He argued therefore the fallacy of thinking to eliminate value biases in such an interdependent researcher-participant interaction.

### 3.2.4 Rhetorical structure

Rhetoric refers to the language used to present the procedures and results of a research to an intended audience (Ponterotte, 2005). Ponterotte (2005) contended that the rhetoric used in one’s research flows from one’s stance on epistemological and axiological positions. From an objectivist perspective, a researcher’s rhetorical style would assume a precise (as is) and “scientific,” manner (Ponterotte, 2005). However, the subjectivist’ rhetorical style, marked by a subjective and interactive researcher role, displays a markedly first person and personalized style (Ponterotte, 2005). This structure displays the researcher’s own experience, expectations, biases, and values in a comprehensive manner.

### 3.2.5 Methodology

This clearly flows from one’s ontology, epistemology and axiology. As pointed out by Ponterotte (2005), when the objective of a research is to simulate as concisely as possible strict scientific methods and procedures, such that variables are carefully controlled or manipulat-

ed, and where the researcher's values on the problem under investigation are irrelevant, and the goal is to uncover and explain relationships among variables that eventually will lead to universal laws that form the foundation for prediction and control of phenomena, the methodology pursued is highly positivistic, and often provide in quantitative terms how variables interact, shape events, and cause outcomes (Tuli, 2010). This scientific inquiry leads to quantitative research methods such as the conduct of experiments with clearly controlled environments and variables, or when unavailable, quasi-experiments are used (Ponterotte, 2005).

Researchers who adopt a naturalistic approach to their study stress on the importance of achieving understanding through an interactive process plagued by subjectivity. Through an immersion in the world of the research participant, over a considerable period of time, using such methods as observations, interviews, etc., the researcher gains a deep understanding of the phenomena through a dialogic approach. This mode of naturalistic enquiry births qualitative research methods.

## 3.3 Research Paradigms

Filestead (cited in Ponterotto, 2005) defined a paradigm as a "set of interrelated assumptions about the social world which provides a philosophical and conceptual framework for the organized study of the world." In other words, the selected paradigm guides a researcher in philosophical assumptions about the research and in the selection of the tools, instruments, participants, and methods used in the study (Ponterotte, 2005). A clear understanding of the research paradigm utilized by a researcher can provide an insight into the assumptions, beliefs and subsequent interpretation of data. Creswell (2009) describes these paradigms as 'worldviews' that guide action and presented four worldviews in his book: Post-positivism, Constructivism, Advocacy/Participatory and Pragmatism.

The ability of a researcher to conceptualize and classify a piece of research into one of the numerous paradigms provides guidance for the conduct, interpretation and contribution of the research along distinct philosophical lines. A number of classification schemes have been proposed in the literature (Creswell, 2009). A few of these are reviewed below to provide an appropriate paradigmatic context for this research using Guba & Lincoln's (1994) schema and the adaptation provided by Ponterotte (2005). This schema includes: positivism, post-positivism, constructivism-interpretivism and critical-ideological.

### 3.3.1 Positivism and Post-positivism Paradigms

Positivism is that branch of philosophy that closely follows the hypothetico-deductive method (Ponterotte, 2005). Having its roots in Mill's (1983/1906) book, '*A System of Logic*' (Lincoln & Guba, 1985 cited in Ponterotte, 2005), it operates on the following assumptions: (a) that the social and natural sciences should have the same goals – the discovery of laws that lead to explanation and prediction, (b) that the social and natural sciences should incorporate the same methodology (hypothetico-deductive method), (c) that concepts should be defined by empirical categories, (d) that there is uniformity of nature in time and space (this speaks to the existence of a true, identifiable reality), (e) that the laws of nature be derived from data, and finally (g) that large samples suppress idiosyncrasies in data and reveal general causes of the ultimate laws of nature (Lincoln & Guba, 1985; Ponterotte, 2005). The idea was that if social scientists spent more time emulating their natural science counterparts, it would speed up the development of the field. Ponterotte (2005) noted that for over 150 years, positivism was the dominant force in science.

Post-positivism on the other hand arose as a result of dissatisfaction with some aspects of the positivist position (Ponterotte, 2005). These disagreements bordered on whether or not one could really apprehend a reality that is objective (positivist stance) or that there were imperfections even in objective realities (post-positivist stance). Post-positivism contends that there are flaws in the human intellectual mechanisms which coupled with the fact that issues in social phenomena are not that straightforward, capturing a 'true' reality can be an effort after futility. Guba and Lincoln (cited in Ponterotte, 2005) identified a key distinction between positivism and post-positivism views to be 'theory verification' and 'theory falsification' respectively. In other words, while the former seeks to prove or confirm a theory, the latter opines the possible existence of an equally possible causation through falsification. An illustration is that, "whereas a million white swans can never establish, with complete confidence, that a proposition that all swans are white, one black swan can completely falsify it" (Guba and Lincoln, 1994).

Both positivism and post-positivism however have as an objective to provide an explanation that leads to control and prediction of a phenomenon. The two paradigms underline the existence of a cause and effect linkages in phenomena that can be studied, identified and generalized, and both proffer an objective, detached researcher role (Ponterotte, 200). The two paradigms are believed to be the primary foundation and anchor for quantitative researches.

### 3.3.2 Constructivism-Interpretivism Paradigm

Constructivism (or interpretivism) paradigm sharply contrasts with the positivist view as it fundamentally disagrees with the existence of a single objective external reality in favour of a relativist position that assumes the existence of a multiple, apprehendable and valid realities (Schwandt,1994 cited in Ponterotte, 2005). The basic belief of this view is that reality is constructed (interpreted) in the mind of the individual, as opposed to reality being an external entity. This paradigmatic position essentially supports a hermeneutical approach, which maintains that meaning is hidden and must be brought to the surface through deep reflection (Ponterotte, 2005; Schwandt, 2000; Sciarra, 1999).

The deep reflection suggested by the constructivist (interpretivism) paradigm is assumed to be stimulated by the dialogical interaction between the researcher and the participant. This interaction is a central characteristic of constructivism. It is only through this subjective 'interaction' that deeper meaning can be uncovered. Findings are jointly constructed by the researcher and the participants. The constructivist (interpretive) thinking is based on the belief that one cannot separate an objective reality from the person experiencing, processing and labelling the reality (Sciarra, 1999; Ponterotte, 2005). This ontological belief that reality is constructed (interpreted) by the person experiencing it, is the distinguishing feature between positivism/post-positivism (and the quantitative methodologians) and the constructive/interpretive (essentially qualitative approaches).

Another important distinction between constructivism and the positivistic tradition is that while the former is focused on understanding, the latter concentrates on scientific explanation. As Dilthey identified, there is distinction between *Naturwissenchaff* (natural science) and *Geisteswissenchaft* (human science). While the goal of the first is to provide scientific explanation (positivism) to phenomena, goal of the second is to provide understanding of the meaning of social phenomena (Schwandt, 1994).

The goal of constructivism (interpretivism) therefore is focused on providing an understanding of the 'lived experiences' from the perspective of those involved in it. Dilthey for instance believed that every 'lived experience occurs within a historical social reality'. He further believed that although these lived experiences were outside of the immediate awareness of those involved, they could be brought to consciousness through recollection and reflection

(Ponterotte, 2005). This paradigm provides the primary foundation and anchor for qualitative research methods (Ponterotte, 2005).

### 3.3.3 Critical-Ideological paradigm

The critical-ideological paradigm is one of emancipation and transformation, one in which the researcher's proactive values are central to the task, purpose and methods of research (Ponterotte, 2005). It is a paradigm that disrupts and challenges the status quo according to Kincheloe & McLaren (1994). A basic belief of this paradigm is that the construction of lived experience is mediated by power relations within social and historical contexts. Another tenet of the paradigm is the emphasis on the dialectical interaction that leads to an emancipation (from oppression) and a more egalitarian and democratic social order (Kincheloe & McLaren, 1994).

Critical theorists operate on certain basic assumptions. These assumptions have been articulated by Kincheloe & McLaren (1994) and include: (a) the belief that all thoughts are fundamentally mediated by power relations that are socially and historically constituted, (b) facts can never be isolated from the domain of values or removed from some form of ideological inscription, (c) language is central to the formation of subjectivity, (d) certain groups in society are privileged over others, (e) oppression has many faces and that focusing on one at the expense of others often elides the interconnection among them, and (f) mainstream research practices are generally implicated in the reproduction of systems of class, race, and gender oppression.

Similar to the beliefs of criticalists is the acceptance that reality is constructed within a social and historical context. More importantly, the criticalists conceptualize reality and events within power relations, directing their enquiry towards emancipating oppressed groups. The criticalists emphasize a dialectical stance on the relationship between the researcher and the participant interaction aimed at empowering participants to work towards egalitarian and democratic change and transformation. Denzin (1994) notes that "an emancipatory principle drives such research, which is committed to engaging oppressed groups in collective, democratic theorizing" about their common and different perceptions of oppression and privilege.

An obvious observation in this paradigm is the influence of the researcher's proactive values, a tenet in sharp contrast with positivism and post-positivism paradigms, but markedly in consonance with constructivism-interpretivism paradigms. Ponterotte (2005) notes that this view of reality forms the conceptual base for qualitative multicultural researches.

## 3.4 Philosophical and Paradigmatic positions of the current research

The table below explicates the philosophical and paradigmatic positions that underpin the research. This hopefully will allow the reader to understand and assess the choices made in the research with regards to the research questions, data collection, interpretation and conclusions made. The rest of this section considers the place of hermeneutics in the current research.

### Table 11: Research philosophical and paradigmatic positions

| Philosophical Anchors | Research positions |
|---|---|
| Ontology (Nature of Reality) | Subjective, constructivism-interpretivism, |
| Epistemology | Subjective, hermeneutical |
| Axiology (Role of values in research) | Subjective, hermeneutical |
| Rhetoric | Subjective, Hermeneutical |
| Methodology | Qualitative |

### 3.4.1 Hermeneutical considerations in the current research

Per the hermeneutical thinking, life is like a text that one tries to understand. In so doing our pre-understanding influences our interpretation of this text (the world), but in turn, is changed and enlightened by the interaction.

According to Gadamer's, we stand in tradition and tradition is irrevocably linked to language. Tradition is the shared culture, history, and language handed down to us from the past, forming the present in which we live, and shaping the future to whom it is handed. Tradition therefore provides the basis (ground) and setting/backdrop (background) against which knowledge is developed, and this occurs through language. According to Gadamer, "language is the fundamental mode of operation of our being-in-the-world and the all-embracing form of the constitution of the world". Gadamer's point was that we only come into being through tradition.

Through language, we come to know all that we know. Language as we grow into it gives us our world. Knowledge arises through being-in-the-world, of past and present, and is shaped by the tradition in which we live. Tradition thus prefigures knowledge. Additionally, as knowledge arises through the shared world of history, culture and language (tradition), it is inter-subjective. The shift from an individual/subjective to a shared/inter-subjective understanding of knowledge occurred with Gadamer's move beyond Heidegger' foundational ontological primacy of 'being'. The inter-subjective perspective of understanding presents knowledge as co-determined (shared) because knowledge does not reside within an individual but within tradition.

The shaping of knowledge always takes place in relation to an 'other' (jointly), whether that other(s) arise through a socio-political system, book, family dynamic or teacher.
Tradition is background and ground; knowledge is shared and inter-subjective. While hermeneutics allows such an understanding of implementation, it lacks an embodied perspective and is problematic as people are essentially embodied beings. It is therefore essential to unite the hermeneutical discuss with the body.

Following Gadamer's notion of tradition, a concept of embodiment can be included in an expanded view. The body houses everything we know and contains deep structures of memories passed down to us from generation to generation. The body is also the locus of complex interactions between us and experiences of the past, present and future. All that we are, and can be is bound to and at one with our body.

Embodiment erases the dualism of ontology/epistemology, emotion/cognition. Mind/body by unifying the two. To come into being does not refer to a disembodied entity but rather being occurs in a body. To incorporate embodiment into Gadamer's notion of tradition, we need to recognize our bodily inheritance. Our human bodies have inherited historical experiences made up of things handed down from generation to generation. The inheritances are also cultural, having as its basis ethnic diversity. The inheritance is also socio-political, where there exists conflicts and struggles as in gender and across different groups. These bodily inheritances are inter-subjectively given, and change over time and place in the same way as other traditions.

The notion of embodiment can therefore be seen to enrich the hermeneutic understandings of knowledge through a reunification of knowledge with the house of its being, the body. This ontological belief in embodied realism has alternatives that include critical realism, historical realism and relativism. Experience is believed to be the result of embodied sensorimotor and cognitive structures that generate meaning in and through our on-going interactions with our changing environments (Johnson & Lakoff, 2002). According to (Johnson & Lakoff, 2002), experience is always an interactive process, involving neural and physiological constraints from the organism as well as characteristic affordances from the environment and other people for creatures with our types of bodies and brains. Meaning, they claim comes not just from 'internal' structures of the organism (the 'subject'), nor solely from 'external' inputs (the 'object'), but rather from recurring patterns of engagement between organism and environment. Heracleous & Jacobs (2008) argue that in ontological terms, embodied realism holds that reality neither possesses a fixed essence independent of perception, as in positivism, or the institutionalization of interpretations and practices, as in social constructionism. On the other hand, it holds that our bodily experience and on-going patterns of interactions with the physical world are central to structuring our thoughts, interpretations, and actions through the transfer of conceptual correspondences from these experiences to more abstract domains. This is in keeping with phenomenology's emphasis on human experience's fundamental corporeal nature, where bodily experience both precedes and shapes conscious processes of thinking and interacting with the world.

### 3.4.2 The critical hermeneutics of Gadamer and Ricoeur

The critical hermeneutics was argued by Gadamer and Ricoeur in critique of 'pure' hermeneutics and has been extensively used in IT/IS implementation research, education, medicine, anthropology, nursing, sociology, architecture and many others (Myer, 1995). Though the hermeneutical approach as a discipline has traditionally dealt with the interpretation of literary, judicial and theological text, in contemporary times, its application has been extended to look at societies, cultures and organizations as text analogues. It is generally accepted to be primarily concerned with the meaning of text or text analogue (Radnitzky, 1970 cited in Myers, 1994). The texts or text analogues are believed to 'contain' the perceptions, beliefs and experiences of those who experienced or are experiencing the phenomenon.

'Pure' hermeneutics deals with the interpretation of text as given, often emphasizing placing oneself in the place of another person to better understand the phenomenon. According to Taylor 1976 (cited in Myers, 1994), "Interpretation, in the sense relevant to hermeneutics, is an attempt to make clear, to make sense of an object of study. This object must therefore, be a text, or a text-analogue, which in some way is confused, incomplete, cloudy, seemingly contradictory – in one way or another, unclear. The interpretation aims to bring to light an underlying coherence or sense".

The hermeneutic circle as espoused by Gadamer refers to the dialectic between the understanding of the text as a whole and the interpretation of its parts, where the descriptions are guided by anticipated explanations. There is as such an expectation or anticipation of some explanation 'behind' a given text, which can also be an interview transcript. The 'hidden' meaning behind a given text is what the hermeneutical approach seeks to bring to light in order to better understand a given phenomenon. So as Gadamer stated about the hermeneutic circle, 'It is a circular relationship…The anticipation of meaning in which the whole is envisaged becomes explicit understanding in that the parts, that are determined by the whole, themselves also determine this whole.' In other words, to understand the whole within a given context, the different parts that constitute the whole play an important role in our understanding the whole. Myers deduced that there is an expectation of meaning from the context of what has gone before. This context represents 'the past' conditions, events and actions (decisions and activities). As Gadamer notes, the movement of understanding 'is constantly from the whole to the part and back to the whole'.

As Myers (1995) opined, ".. a richer, integrative view of information systems implementation is required." This suggests that IS implementation does not simply consist of the technical aspects of the technology but also the social, political and cultural aspects, which requires a view that is broad and encompassing like the critical hermeneutics of Gadamer and Ricoeur. The application hermeneutic discipline therefore in contemporary times has been broadened to include the interpretation of societies, cultures and organizations as text analogues in addition to interpreting literary, judicial and theological texts (Myers, 1995).

Critical or dialectical hermeneutics is an integrative perspective (Thompson, 1981 cited in Myers) combining interpretive and critical theories which once were considered as distinct from each other. Myers (1995) argued that the philosophical basis for the integration is pro-

vided by the works of Bernstein (1983 cited in Myers) who argued the existence of a common ground between the critical theory of Jurgen Habermans and the hermeneutics of Hans-George Gadamer. He further argued the possible integration of interpretive and critical approaches (Hoy 1988 cited in Myers) emphasizing the works of Paul Ricoeur as providing the framework for such integration.

Another important contributor to this notion of the need for integrative theories is Walsham (1992) who argued that the emphasis of the subjective meaning for the individual actor and the social structures that condition and enable such meanings by 'constitutive process theories', provides a new approach to research on the social aspects of computer-based information systems.

Myers (1995) posited that critical (dialectical) hermeneutics is one such constitutive process theory, that in effect acts as a meta-theory providing a framework for integrating multiple perspectives. Although dialectical hermeneutics builds on the theoretical foundations of 'pure' hermeneutics of Gadamer & Heidegger, clear differences exist between it and 'pure' hermeneutics and critical theory as they have been traditionally used.

Hermeneutics involves the understanding of being (Sung 2001) and is primarily concerned with the meaning of a text or text analogue. Radnitzky (cited in Myers, 1995) notes that the basic question in hermeneutics is: what is the meaning of this text?

According to Gadamer (1976 cited in Myers, 1995) the idea of a hermeneutic circle refers to the dialectic between understanding of the text as a whole and the interpretation of its parts**,** in which descriptions are guided by anticipated explanations. To achieve an understanding of a phenomenon therefore, there is a movement from the whole of the text to its parts, seeking an interpretation of the parts in order to make sense of the whole, and the whole to give meaning to the parts. Gadamer explained it this way, "It is a circular relationship…The anticipation of meaning in which the whole is envisaged becomes explicit understanding in that the parts, that are determined by the whole, themselves also determine this whole." As Myers notes, 'there is an expectation of meaning from the context of what has gone before (i.e. sense can only be made of the present through an understanding of its development). In all of this, the agenda is to understand the phenomenon through an interpretation of its parts, as well as the whole, bringing clarity and coherence that improves understanding.

Ricoeur (cited in Myers, 1994) notes that 'interpretation...is the work of thought which consists in deciphering the hidden meaning in the apparent meaning, in unfolding the levels of meaning implied in the literal meaning.'

Hermeneutics though primarily concerned with inter-subjective meanings through an examination of social reality in terms of shared beliefs, symbols, language, etc, it has been shown to be applicable to the design and implementation of information systems through a growing interest of IS researchers in its use.

### 3.4.3 Textual material in IS implementation research

As indicated by Myers, "In case studies dealing with the implementation of information systems, the text is social and political action: case study notes, interviews and documents record the views of actors and describe certain events and so on" He contended that this material needs to be "ordered, explained and interpretation order to 'make sense' of the case." This ordering, he further submitted, is done according to the researcher's theoretical position. In addition, he contended that the researcher's role as an interpreter involves comparing one text to another, citing the comparison of the statement of an informant with a document. In his view therefore, the researcher's understanding of the whole has to be continually revised in view of the reinterpretation of the parts (this can go on and on and on – Interview confirming interpretation with participants).

Pure hermeneutics has been argued to be uncritical as it takes statements or ideologies at face value (Radnitzky, 1970 cited in Myers). Dilthey (cited Myers, 1995) for instance advocated a pure hermeneutics that stresses empathic understanding and the understanding of the human action from the 'inside'. Radnitzky argued that Gadamer was in support of understanding what the thoughts or sentences expressing these thoughts were about, as opposed to just imagining oneself in the place of another person. This view then requires the researcher to become aware of his own historicality (Myers 1995). A dialectic can therefore be observed between the text and the interpreter which was ignored in pure hermeneutics in an attempt to understand the text in terms of itself. This however has been brought to the fore in contemporary hermeneutics. Gadamer's (1975) and Ricoeur' contemporary hermeneutical dialectic approach, overcomes most of the weaknesses inherent in the purely interpretive approach. Some of these weaknesses were summarized by Orlikowski and Baroudi (1991).

Table 12: Weaknesses inherent in interpretive research

| S/n | Weaknesses | Resolutions |
|---|---|---|
| 1 | Interpretive perspective does not examine the conditions, often external, which give rise to certain meanings and experiences | So potential conditions need to be examined |
| 2 | Research in the interpretivist perspective omits to explain the unintended consequences of action, which by definition cannot be explained by reference to the intentions of humans concerned | Unintended consequences of action must be explained |
| 3 | The interpretivist perspective does not address structural conflicts within society and organizations, and ignores contradictions which may be endemic to social systems | Structural conflicts need to be explained along with a consideration of inherent contradictions |
| 4 | The interpretive perspective neglects to explain social change; that is how a particular social order came to be what it is, and how it is likely to vary over time | Social change needs to be explained - |

Source: Orlikowski & Baroudi, 1991

These weaknesses, Myers argued were inherent in the pure hermeneutics approach, and are overcome in the critical hermeneutics of Gadamer and Ricoeur. Dialectical Hermeneutics emphasises the fact that social reality is historically constituted. As noted by Myers (1995), one of the key differences between purely interpretive approach and dialectical hermeneutics is that the researcher does not merely accept the self-understanding of participants uncritically, but seeks to evaluate critically the totality of understandings in a given situation.

The researcher, according to Myers, analyses the participant's own understanding historically (In terms of what may have happened in the past leading to the present understanding of things. In short, its 'historical constituents'. So questions asked delve into the past in terms of what may have been done and in existence to warrant the present conditions of things) and in terms of the changing social structures (What may have been in existence but is changing) which condition and enable such meanings and are constituted by them**.**

This view shows that approaches that consider the subjective and objective aspects of a phenomenon are required to 'fully' understand a phenomenon. Myers contended that the dialectical hermeneutic theory can be used as a meta-theory that integrates research emphasizing subjective meaning and research that focuses on the institutional character of information systems.

An important observation with the dialectical hermeneutical approach is that although it is critical and not purely 'subjective' differences between it and critical theory still exists (Myers, 1995). A major distinction between the two is an assumption from the outset that the most important oppositions, conflicts and contradictions are in contemporary organisations, unlike critical theorists who focus their research on a critique of class based societies and capitalist forms of production. Interpretive hermeneutics on the other hand goes hand in hand with a critical analysis of organizations and societies (Myers). According to Myers (1995) there is a dynamic interplay between a hermeneutic analysis and a theoretical critique, in which the critique is firmly grounded in social reality. The following summary presents the differences among the three theoretical frameworks.

Table 13: Summary of three theoretical approaches

| **Theory** | **Primary focus** | **Description** |
|---|---|---|
| 'Pure' hermeneutics | Meaning, Intentions | Interpretive, 'subjective' |
| Critical theory | Contradictions, unintended results | Critical, 'objective', historical |
| Dialectical hermeneutics | Social reality, intended and unintended results | interpretive and critical, subjective and objective, historical |

Source: Myers, 1995

### 3.4.4 Dialectical hermeneutics and IS implementation

Myers notes that when applied to information systems implementation, the object of the interpretive effort is to make sense of the whole organization as text analogues, in which the different stakeholders may have confused, incomplete, cloudy and contradictory views on many issues such as purpose, impact, approach, need, etc. Myers claims that the aim is to make sense of the whole and the dynamic relationship between the organization and the implementation of new information technology, in the present case, a learning management system (LMS).

Like Bronsema & Keen (cited in Myers, 1995) note about the relevance of the interpretive effort during implementation,

> "Implementation is a dynamic process; it includes cognitive and affective components. The stakes are often high; people see computers as affecting their sense of self, their jobs and their skills, politics, and organizational relationships. It is hard to elicit

> these perceptions and processes except by letting people express their views in their own way. We thus view our research as a form of detective work and discovery. There are contradictory perceptions of 'fact', subjective perceptions, and historical perceptions that shape the context of the implementation effort. The data collected via the structured interviews is a form of text that is to be analysed in terms of themes, motif, and key words in the same way as literary text is."

Bronsema & Keen view organizations as text analogues, which, as Myers notes, can be understood in the same way as text itself, including interviews with people (See Hermeneutical interviews), which in the first instance is oral in nature.

Myers contends that the idea of a hermeneutic circle draws attention to the way in which an organization is understood as a text analogue (systems theory?). He contends that in qualitative enquiry, the movement of understanding 'is constantly from the whole to the parts and back to the whole'; He contends that, in other words, the more information gathered – through interviews, documents, etc. the better the understanding that would be gained of the organization as a whole and of its constituent parts. This collection and interpretation of the organization as 'texts' or text analogues would continue until the apparent absurdities, contradictions, and oppositions in the organization no longer appear strange but makes sense (Myers, 1995).

The dialectical hermeneutic process described above is carried out in a critical manner. As Myers notes, the approach "does not accept uncritically participants' own views on a particular topic; rather it recognizes that the researcher (or developer) attempts to critically evaluate and transform social reality, a reality that is historically constituted." Myers contends that this perspective is well suited to information systems development, which is first and foremost about organizational transformation through new technology.

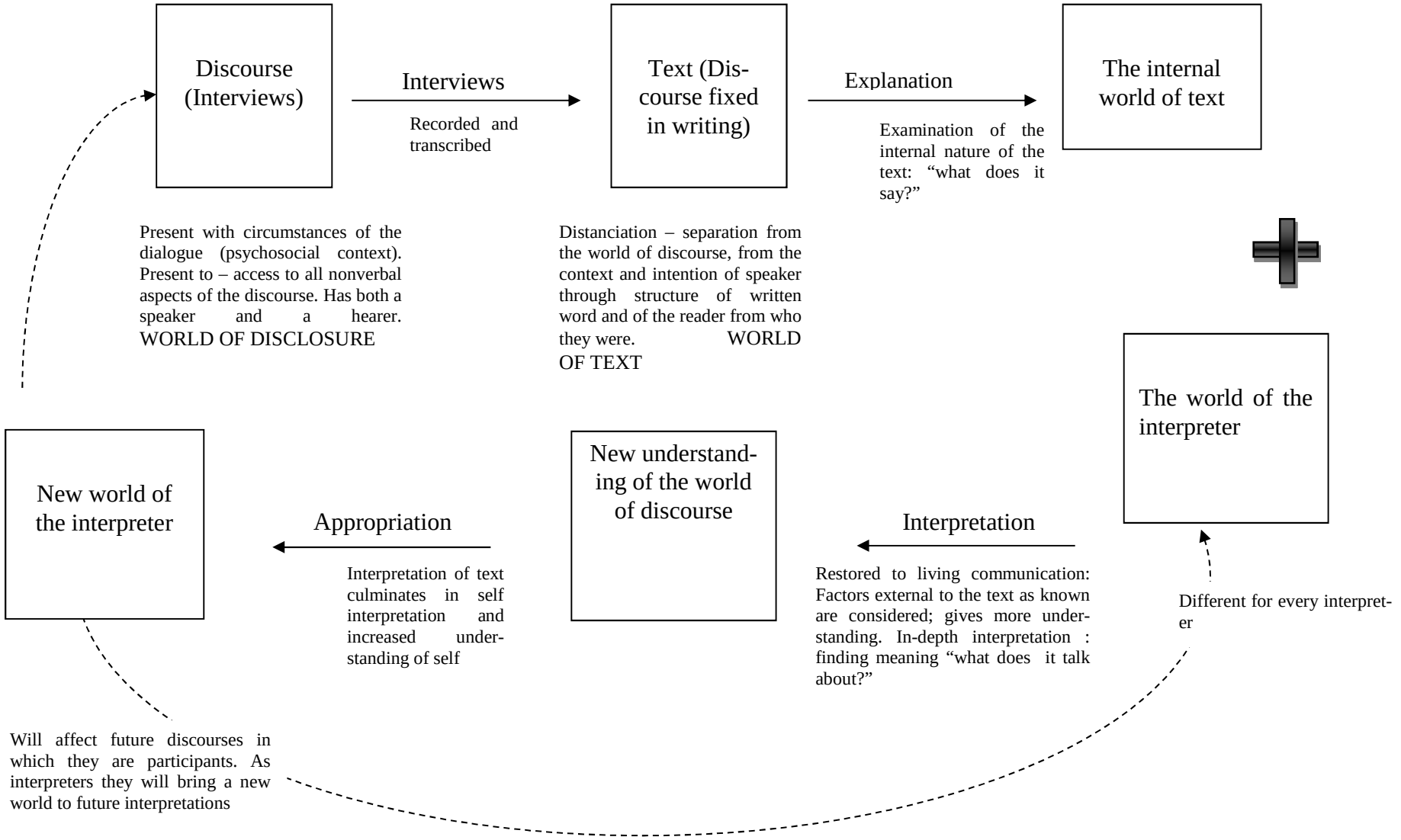
However, dialectical hermeneutics requires the researcher and developers to develop a more critical awareness than they have in the past of the relationship between the organization and the information technology. He further notes the suggestion by hermeneutical approach of researchers' need to acknowledge and explore their own historicality and the relationship between the text and the interpreter.

Myers notes that the advantage of the hermeneutic dialectic approach is that it enables one to portray the real complexity of organizations as social, cultural and political systems.
Myers notes that a hermeneutic dialectic analysis of IS development requires a researcher to look at IS implementation from many different perspectives; contending it is necessary to look at the meaning of a new information system for various stakeholders in an organization and the real value conflicts that there may be. He contended further that it is also necessary to look at the objective social impacts which are part and parcel of implementing information systems.

The interaction between a researcher and a participant or between a reader and a text is a constant discourse, rendering interpretation a collaborative process. This process is what is referred to as a 'fusion of horizons'. The process is seen as being one of constant mediation between the past (tradition, culture, experience) and the present horizon (the immediate experience) of the interpreter. According to this therefore, our understanding is continually expanding as we expose it to dialogue with text, be that written or lived experience.

The diagram below is a simplified description of Ricoeur's (1981) process of interpretation.

Figure 6: Ricoeur's theory of interpretation (Source: Tan & Wilson, 2009)



### 3.4.5 Text and distanciation

Ricoeur's theory is essentially about understanding text and the concept of distanciation which assumes a standing separate from or being objective in relation to the text. Ricoeur argued that "text is discourse fixed in writing". In his view, text displays "a fundamental characteristic of the historicity of human experience, namely that it is communication in and through distance". Ricoeur discussed this around four themes: (a) text as a relation of speech to writing, (b) text as a structured work, (c) text as the projection of the world, (d) text as the mediation of self-understanding (Ricoeur, 1981).

Accordingly, Ricoeur was of the view that given the nature of the relationship between speech and writing, and the role of the writer and reader, a comparison of this to the relationship between the participants of spoken discourse leads to the conclusion that the distancing of text from the oral situation causes a change in the relationship between language and the subjective concerns of both the author and reader. To Ricoeur, those involved in a discourse are present both with (in the psychosocial circumstance of dialogue) and to each other (conscious of the nonverbal aspects of the dialogue), a situation which is no longer achieved (absent) when text takes the place of 'live' discourse.

According to Ricoeur (1981), when a discourse, which is an event, occurs at a particular point in time, it is not preserved entirely unchanged when committed to written form like an interview transcript. Ricoeur was also emphatic that a discourse always refers back to its speaker. This he contends has a world (the world of discourse, a particular context) and an "other", a hearer to whom it is addressed. Ricoeur argued that a discussion committed to text no longer necessarily coincides with what the author wanted to say. He further contended that the language they use even in live dialogue does not necessarily convey to the listener what they intended to say. He concludes that this is even more likely when the discourse has become text.

Ricoeur contended further that when live 'text' is converted to written form, it has a different audience (people who can potentially read), rendering the audience 'distanced' from the social and psychological context of the original intended audience.

According to (Tan & Wilson, 2009), in the analysis of interview transcripts, recreation of the event is not entirely possible since some aspects of the original event like the non-verbal cues may be absent, even though some inflections of tone and nuance may be recaptured when the audio recordings are listened to. The interview transcripts therefore are the only concrete link to participants' expression of their experience. When interpreting the experience of the participants, the researcher is dependent on the text from which, to a degree, they have become distanced, even when they personally conducted the interviews.

In one of Ricoeur's modalities of distanciation, text is viewed as a projection of the world (the world of text). Live discourse is believed to express the world. This however is done within the context of a reference or reality common to the speaker and the listener(s).

According to Ricoeur (1981), if hermeneutics could no longer be defined as the search for another person and their psychological intentions, which are hidden behind the text, and neither is it understanding merely reduced to the identification of language structures, then "to interpret is to explicate a sort of being-in-the-world". This closely relates to Heidegger's (1967) hermeneutic circle in that the interpreter' inner world meets the unique world of each text to create a new picture or understanding of a possible world in the consciousness of the interpreter.

### 3.4.6 Appropriation

This is the process through which as a result of interpreting a text, an interpreter' understanding is improved, gains clarity or makes sense. As Ricoeur indicated, " By 'appropriation' I understand this: that the interpretation of text culminates in the self-interpretation of a subject [the interpreter] who thenceforth understands himself better, understands himself differently, or simply begins to understand himself". To Ricoeur, if objectifying meaning is a necessary mediation between the writer and the reader, then this mediation calls for a process "appropriation of meaning".

This process of understanding which includes appropriation is an event, set in a particular time frame.

### 3.4.7 Explanation, interpretation, and understanding

Ricoeur notes that texts can be looked at in two ways: in terms of its internal nature (as given, with no context, external world, author or audience (Ricoeur, 1981; Tan & Wilson, 2009) and its restoration to, "a living communication". According to Ricoeur, "On the basis of this choice, the text has no outside, but only an inside; it has no transcendent aim". In other words, it has no purpose to achieve anything. It is 'as is' and can be interpreted in varying ways. What subsequently emanates from this is 'explanation' as the text (through distanciation) is as objective as possible. Not much understanding can be gained from this mode of explanation. As Tan & Wilson, (2009) put it, 'understanding is relatively immature' at this stage. This they argue takes into account "…the meaning of the words as the reader understands those, which, of course, might not be the exact meaning intended by the writer or the interviewer."

In considering text as 'a living communication' the interpretation of the world of text combines with the world of the reader to form something new (Ricoeur, 1981; Tan & Wilson, 2009). They argue that this interpretation, although adding to the interpreter's understanding is still fairly superficial. As the process progresses, the interpreter begins to take into account other factors. Some of these factors include:

- What is known about the author as informed by the field notes about the context of the interview and the interviewee
- What the interviewees reveal about themselves in the interview text (past situations etc.)

According to Ricoeur (1981), there is a relationship between explaining and interpreting. As he puts it, "To explain is to bring out the structure, that is, the internal relations of dependence which constitutes the statics of the text; to interpret is to follow the path of thought opened up by the text, to place oneself en route towards the orient of the text".

According to Ricoeur (1981) any effort aimed at interpreting text would follow the levels explicated below (Tan & Wilson, 2009).

#### *3.4.7.1 Level 1 analysis: Explanation*

1. Code each transcript to a free node (related to implementation)
    a. Code words, phrase, sentence, or group of sentences that said anything about the institution's efforts at implementing e-learning, activities, decisions, people involved, external and internal considerations, etc.
    b. At this stage words are taken at face value, with no attempt made to interpret
    c. No decision is made or attempt made to interpret or analyse whether certain words, or phrases or sentences have same meaning.
2. Reread each document to ensure nothing is missed or inaccurately misrepresented

#### *3.4.7.2 Level 2 analysis: Naïve understanding*

1. Stage 1 involves:
    a. Examine free nodes to determine which one refers to same or closely connected ideas
    b. Group those with common meaning into themes with descriptions identifying main idea
    c. Focus on the collection of ideas in each of them
    d. Identify sub themes in each theme
    e. Examine each sub theme individually to identify *how the free nodes coded into it could be grouped into categories*
    f. Each category should speak about some aspect of the sub theme
    g. Each category should be given a description (data coded into subthemes could be used to create some kind of profiles)

The analysis here is similar to thematic analyses described by Luborsky (1994). It is based on the internal nature of the text but includes some decisions about the similar or near identical meanings of particular words or phrases. The interpretation process which begins here is influenced by the reader' understanding of words and their experience of the participants involved.

#### *3.4.7.3 Level 3 analysis: In-depth understanding*

Ricoeur (1981) contends that the process of arriving at an in-depth understanding involves moving back and forth between explanation and understanding (Myers, 1995). They claim

that the acts of interpretation that are part of the process are informed by areas of knowledge (Geanellos, 1998; 2000; Tan & Wilson, 2009). These include:

1. The experience and beliefs which the researcher brings to bear upon the task (pre-understanding) – ***which were documented***
2. The researcher' knowledge and experience of the individuals taking part in the study
3. The handling and resolution of apparent contradictions or ambiguities in the data presented by the same or different participants

This interpretation of factors external to the text brings it to a living communication.

#### *3.4.7.4 Elements of Rigor in using Ricoeur' stheory*

The following five areas were suggested by Rice & Ezzy (1999) to ensure rigor in qualitative studies:

- Theoretical -: Having a theoretical underpinning and methods which are consistent with this theory
- Procedural -: This is achieved through careful documentation of how all decisions are reached
- Interpretive: - This is achieved if an account accurately represents the understandings of events and actions within the framework and worldview of the people engaged in them. However, according to Tan & Wilson, (2009), "adherence to the process of three levels of analysis, as outlined by Ricoeur, which includes conscious awareness of and consideration of the experience and worldviews of all participants, including the researcher, the use of direct quotes and the documentation of all analysis decisions (procedural rigor) supports our aim to faithfully represent a text by providing every opportunity for its truth to be revealed"
- Evaluative :- and,
- Reflexive rigor: - This is the case when the role of the researcher in the research process is taken into consideration. Rice & Wilson (1999) describe this as, '…honest reflexivity'. They argue that:
    - It needs to include an awareness and openness on the part of the researcher about how his or her background, beliefs, life experience, and political views affect their involvement in the research

Integral to Ricoeur's theory of interpretation is the acknowledgement that the researcher is a part of the environment of the study and that his or her impact needs to be constantly assessed and taken into account along with the other data. (Tan & Wilson, 2009) argue that this is a part of the process of Ricoeur's hermeneutic arc in which an interpretation arises out of the moving back and forth between the parts (including the impact of the researcher) and the whole. They conclude that the use of this theory as a tool for data analysis therefore enhances the likelihood of achieving rigorous reflexivity.

Following Ricoeur's argument that social action and situation can be understood and read as texts, it follows that the hermeneutical philosophy and theory can be employed to examine, describe and understand social phenomena.

Butler argues that a social entity is like a text that must be construed as a whole, but that the understanding of the 'whole' begins with an interpretive understanding of its constituent parts (introducing the concept of the circle of understanding).

It is argued that in the context of hermeneutic study in IS, the text to be interpreted is the social and political action - case study notes, interviews and documents that record the views of actors and describe certain events' (Butler, 1998; Myers, 1995). Butler included the extant research literature as 'texts' on the phenomenon of interest.

Butler (1998) notes that in the interpretation of social action, the meaning of these actions is not fixed by the social actors who perform or participate in such action whatever the ends of these actions may be. This is because the results of social action can be unanticipated and unintended, hence intended ends may not be congruent with the actual ends. As noted by Gadamer (1975), the tradition, culture or social background in which such actions are embedded has an enormous impact on them. Thompson (1981) captures the essence of this predicament in his argument that to fully comprehend a subject's actions, the action must be placed within a wider context of institutions and social structure.' Butler argues that this has a corresponding imperative for an interpreter to incorporate the institutional and social structure dimensions into the interpretation of social phenomena to better understand the actions and interpretation of social actors.

## 3.5 Research Design

This section describes in detail the approach used to collect and analyze data in answer to the research questions and objectives of the research. The design therefore provides a framework for understanding how the research problem, research questions, aims and objectives, research participants, data collection, analysis, and communication relate and contribute to the desired outcomes. The diagram below shows the various stages and activities undertaken to generate the data for understanding the phenomenon.

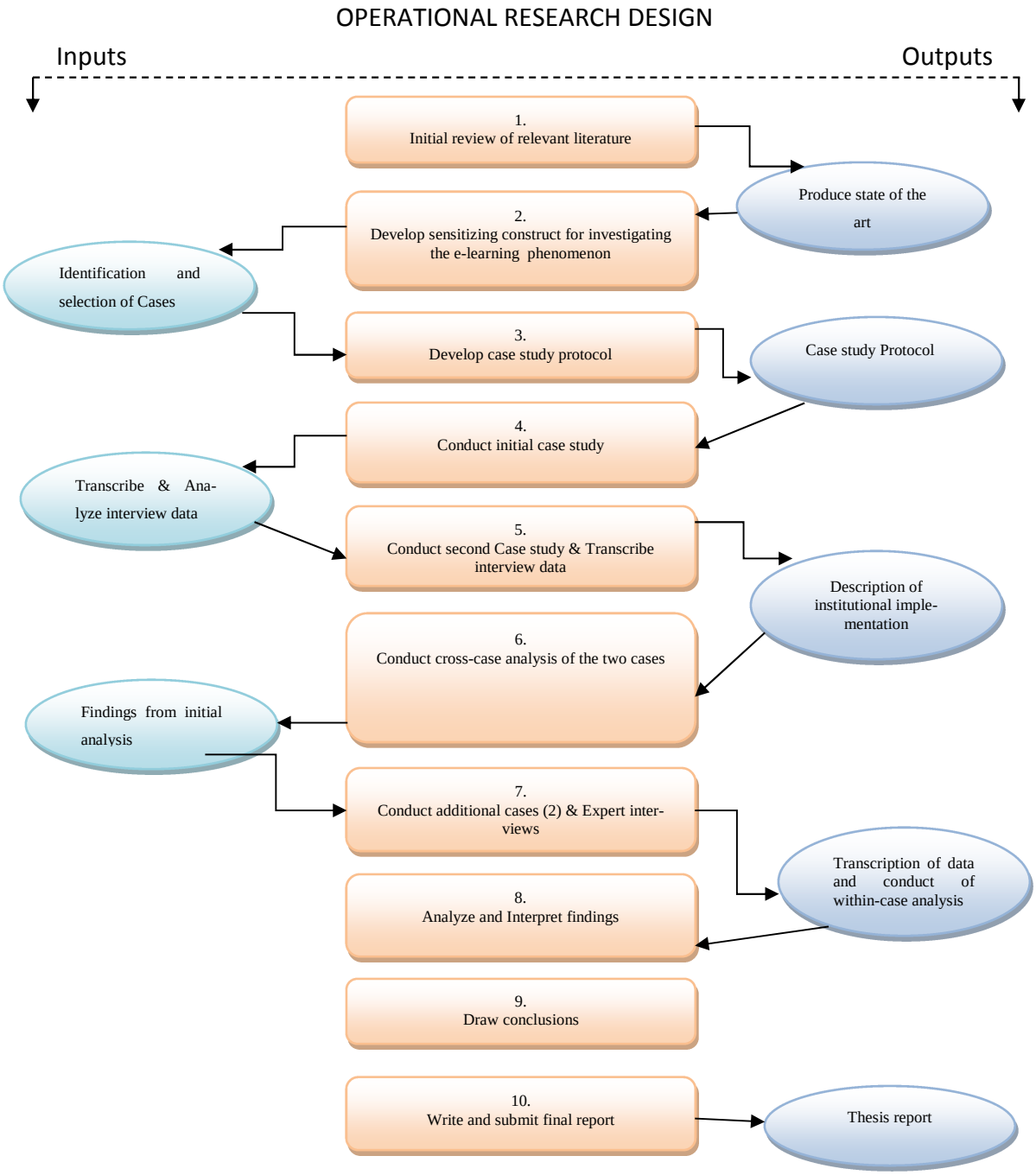



Figure 7: Diagrammatic view of the research design

### 3.5.1 The Selection of the country

Ghana is a developing country located in the Western part of Africa. Typical of most developing countries, the per capita income is relatively low and has a low penetration and usage of technology in education. Compared with other institutions of higher learning in other countries, many of the HE institutions in Ghana rank low on the Webometrics website. This is also typical of most institutions in developing countries. Ghana can however boast of some level of telecommunications infrastructure network with six (6) mobile phone operators and internet service providers. Most higher education institutions thus have access to the internet although with varying bandwidths ranging from 2MB. Some institutions have made arrangements with some service providers for higher bandwidths albeit very high. Some of the phone operators have laid fibre optic connections throughout the whole country aimed at enabling high speed internet access to institutions and home consumers. This notwithstanding, institutions still encounter challenges with internet access both from the service providers and their local area network connections. One could trace the source of the internal challenges faced by these institutions to their technical teams manning their infrastructure. Major challenges therefore can be identified both externally and internally for institutions seeking to engage actively with technology as a major component of their educational delivery system.

Currently, the population of higher education institutions in Ghana stands at a little over a hundred (100). Very few of these institutions could be identified to be engaged in the implementation of Learning Management System (LMS)/Course Management System (CMS) . With its present population standing at a little over 24 million, Ghana has challenges with students' enrolment into higher education. The traditional universities turn away large numbers of applicants every academic year due to inadequate resources. Worse still, qualified applicants fail to gain admission into their programme of choice, consequently resulting in their pursuing programmes in which they lack the necessary motivation and interest. This phenomenon created a vacuum which saw the entrance of private universities to augment the inadequate higher educational opportunities. This however has not solved the problem of admission into HEIs, and existing problems of quality have been compounded. One possible reason may be due to the exorbitant fees charged by these private institutions. Two major problems that emanated from the inadequate resources and the increasing number of institutions was (a) the large student to lecturer ratio, and (b) the increased competition among institutions for qualified lecturers. This has serious implications for quality since a lecturer is in some cases required to handle over 500 students per course, while institutions compete for

lecturers. Given this situation, the quality of attention would be minimized. This problem is further compounded by lecturers acting as adjuncts in several institutions with equally large numbers of students. Lecturers often therefore move from one institution to another with very little time to address the individual needs of the students. In a related development, a large number of the working population are undertaking further education through a variety of options – distance, evening, weekend - provided by these institutions.

Due to the need to understand 'how' LMS systems are implemented in higher education institutions in developing countries, a sample of the higher education institutions that had deployed such systems in Ghana became potential 'institutional' participants in the research. An initial survey through telephone calls and personal contacts was used to ascertain institutions that were familiar with and had deployed LMS. This was to gain an initial awareness of the level penetration among the HEIs, and the nature of usage. The initial survey questions sought to address whether or not the institutions had knowledge of what LMS were, had actually deployed them, and how they were being used – provide online learning, support distance learning, on-campus learning, etc. This survey showed a concentration of LMS usage within the Greater Accra region, in comparison with other regions.

In the final selection of participating institutions, the need to isolate extraneous factors such as access to and reliability of the internet and electricity were taken into consideration. The institutions were selected from the Greater Accra region and its immediate surroundings to rule out potential differences in access to and reliability of the internet and electricity.

The research is essentially a case study of e-learning implementation by HEIs in Ghana. Ghana was selected due to its challenges in the HE sector and the relative ease of access to potential cases. Below, an explanation and justification for the case study approach to the study is presented.

### 3.5.2 Case Study Designs

The case study research approach has been described as most suitable for the study of a phenomenon where much is not known and there is the need to gain an in-depth understanding. The current study seeks to understand how HEIs in Ghana implement e-learning to support students' learning. To this end, it seeks to gain an understanding of the processes involved

and the factors that influence the processes, and subsequent outcomes. This would facilitate the development of a framework (model) that would be used to assist institutions in their e-learning implementation efforts.

Gaining deep understanding into a phenomenon is best achieved through an in-depth study into the nature and dimensions of the phenomenon. More especially, if the phenomenon is the result of the decisions and actions of people in an organization, then the phenomenon is likely to vary from context to context. In other words, how the phenomenon plays out in country 'A' can vary from countries 'B' and 'C', although some similarities can be observed. In the same manner, the experiences of organization 'D' can vary from that of 'E' in respect of the same phenomenon. However, with a deep understanding of how organization 'D' and 'E' approached and addressed the emergent issues (decisions and actions) that arose in relation to the phenomenon, much can be learnt to facilitate future initiatives by similar organizations. The case study design has been proven to be a useful methodology for achieving deep understanding into contemporary phenomena that occurs in a real-life context, aims at understanding how and why the phenomenon occurs, and over which the researcher has little or no control (Yin, 2009; ; Darke et al., 1998).

The focus of Case study research is on in-depth understanding of a phenomenon and its context (Cavaye, 1996). It typically combines data collection techniques such as interviews, observation, questionnaires, and document and text analysis. As Yin (1994) indicated, both qualitative data collection and analysis methods (which are concerned with words and meanings) and quantitative methods (concerned with numbers and measurement) can be used in case studies.

The case study methodological design is essentially a qualitative research method, although it can be applied in a quantitative sense (Yin, 2009; Eisenherdt, 1989). It is a well-known fact that qualitative research methods focus on understanding social phenomena in their natural setting; and although there are numerous qualitative methods such as action research and ethnography, for undertaking research that seek to understand phenomena in their natural setting, the case study research is the most widely used qualitative research method in information systems research. The case design is claimed to be well suited to understanding the interactions between information technology-related innovations and organisational contexts (Shakir, 2002). A multiple case study design was adopted in the current study.

#### *3.5.2.1 Multiple-Case Design*

Multiple-case designs allow a phenomenon to be studied in two or more cases. This allows the evidence to be regarded as more compelling and the study more robust (Yin, 2009). In the current study however, the idea is not necessarily to cater for transferability, but rather to deepen the understanding being sought to guide future implementation efforts through the observation of patterns immerging in more than one case. In other words, instead of selecting the cases with a view to generalizing the research findings as is often implied in positivist research (statistical generalization), the objective here is to generalize the findings here to a broader theory (analytical generalization) (Yin, 2009).

The replication logic adopted in the current research is both literal and theoretical. Whereas literal replication logic in a multiple-case design seeks to predict similar results, the theoretical replication logic seeks to predict contrasting results (Yin, 2009; Bengtsson, 1999). Where the objective is to understand the phenomenon in its natural setting with all the contextual influences, the similarities and differences are all important to achieving this understanding. Of central importance in the selection of cases is the contribution of the cases to our understanding of the phenomenon given their unique experiences. The cases in this instance are selected to enhance our understanding with the potential of highlighting differences and similarities that could be further analysed to enable the development of a framework to guide future efforts in similar directions.

#### *3.5.2.2 Justification for the case design approach*

Implementation an information system such as the LMS in HEIs requires a commitment to institutional decisions and activities that can translate into system introduction, use and acceptance among institutional stakeholders. This process is not a straightforward one and often requires an understanding of the context within which the IS would be implemented. The necessity of this understanding stems from the potential of the new technology to influence the structure of the organization and in turn become influenced by the organization. This is what has been termed the duality of technology (Orlikowski, 1992). In other words, separating the technology from those implementing it would leave a big gap in our understanding, necessitating a methodology that gets the researcher close enough to examine the phenomenon in its natural setting without influencing the situation (Benbasat et al., 1987; Yin, 1994; 2009). In a review of extant literature on IS implementation, Kwon & Zmud (1987) identified

five contextual factors that have been shown to influence implementation: task, technology, individual, environment and organization. To understand how IS implementation is done and what factors influence this process in order to provide a useful guide for future implementation efforts, a case study design can be a useful tool in this direction. There are some researchers, however, like Darke et al. (1998) who argue that case studies may not be appropriate for some situations such as:

- where a phenomenon is well understood and mature
- where constructs exist already and are well developed
- where understanding of how and why the phenomenon occurs is not of interest
- where understanding of the contexts of action and the experiences of individuals in single settings is not relevant

In the current research however, given that institutions of higher learning continue to spend huge amounts of time and monies on e-learning implementations with little success, it can be argued to what extent existing knowledge about IS implementation phenomenon is adequate. This necessitates a closer study of the phenomenon within the context where they are being carried out to shed more light on them. In addition, Darke et al. (1998) notes that where a comprehensive picture of the phenomenon over a period of time is required to highlight what may have caused the current situation and not a comprehensive picture at a specific point in time, a case study approach is a very handy tool as it allows for back-tracking of historical evidence.

As noted above, the current research is focused on the e-learning system (IS) implementation phenomenon, an area that continues to present both practical and research difficulties. After the initial survey of the HEIs engaged in the deployment of e-learning systems, a sample of four were selected to ascertain what could be learnt about e-learning deployment in HEIs. The selected institutions included the University of Accra (UA), the Metropolitan University of Ghana (MUG), Greater Accra University (GAU) and World University of Ghana (WUG). Contacts were made with individuals who were leading and active members in the institutional deployment and visits arranged. The meetings lasted on the average one hour in each location. The initial impression from the discussion highlighted different experiences in the institutional journey towards e-learning introduction and integration. Another impression gained from those meetings was the existence of certain similarities which could potentially provide pointers to what works in successful e-learning implementation.

It was evident from the discussions with these participants who were lead players in the implementation of e-learning within the institutions that the phenomenon involved decisions and activities which were similar in some cases and different in others, with the impression created that a lot of subjective human judgements were involved. Thus simply ascertaining from the literature on e-learning what conditions or factors are important may be inadequate in providing holistic understanding needed for strategic planning activities; and no one particular case could show the way due to differences in contexts.

The discussions also revealed clear challenges experienced by the implementers at different levels. One could get the impression that some of these existed prior to the initiative and some were emergent as the project rolled on. These experiences clearly shaped the outcomes that were visible and a detailed description was seen to be critical to achieving understanding in these social systems.

It also came to light during the meetings with these institutional representatives that objectives that guided the initiatives varied from the onset to actual implementation experiences and sometimes generated confusion and disagreements which led to a blurring of institutional vision and direction in some cases.

An important observation was the distinct fact that the events in the phenomenon were clearly outside the control and influence of the researcher and to gain a deep understanding in order to be able to guide successful future implementation efforts to solve the challenges being experienced in Ghanaian HE environment, deep understanding of the institutions' experiences in e-learning implementation was required. More than one case therefore was considered useful since it could strengthen findings and the conclusions drawn.

Finally, the case study approach was selected for its inherent ability to highlight the important role played by the institutional context in determining e-learning implementation outcomes. It is important to note that great difficulty exists in delineating the context of an IS implementation from the system (institutional context) since the context essentially gives meaning to what is implemented and how it is used. The case study design therefore provided a rare opportunity to capture these essential meanings from their natural settings.

#### *3.5.2.3 Justification for Multiple-Case Design*

There is sufficient evidence to conclude that the context of institutional implementation of e-learning varies from institution to institution, as well as country to country. Thus where possible, similar researches should be conducted across countries to enable cross country comparisons. However since resource constraints do not immediately lend the researcher to this possibility, and since much insights can equally be gained from cross-case comparison of different institutional contexts, a multiple- case design involving HE institutions in Ghana provided an excellent opportunity. As Darke et al. (1998) noted, the amount of cases to be studied depends on the focus of the research question. And though single cases provide for in-depth investigation and rich description, multiple-case designs allow for literal or theoretical replication and cross-case comparison (Yin, 2009). Yin (2009) was also of the view that although more replications gave greater certainty, in reality, there is no ideal number of cases (Darke et al., 1998). Also, multiple-case studies can strengthen research findings in the way that multiple experiments strengthen experimental research findings (Benbasat et al., 1987; Yin, 1994, 2009). Eisenhardt (1989) however suggested that between four and ten cases are desirable for theory building using case studies. Four cases were subsequently identified and used in the current research. This number however was subject to availability, resources and time.

### 3.5.3 Selection of cases

Two cases were initially selected to study and understand how institutions implemented e-learning and the factors that influenced them (existing and emergent). The study initially focused on one case, following up with a second case to fill in the gaps, identify similarities and differences, and provide understanding. Two cases were later added to clarify and strengthen understanding. Below is a description of the criteria used in selecting the cases:

Table 14: Case selection criteria

| S/n | Criteria | Explanation | Justification |
|---|---|---|---|
| 1 | Location of institution | Institutions must be located within Accra and its surroundings | To control for extraneous influences |
| 2 | Type of e-learning | Open source Learning Management System (LMS) | To facilitate comparability of systems |

| S/n | Criteria | Explanation | Justification |
|---|---|---|---|
| 3 | Purpose for e-learning | Support students' learning on-campus with plans to support fully online learning options | To cater for both on-campus (blended) and off-campus (fully online) considerations |
| 4 | Institutional strategy | Initiated and supported by the institution | To address top-down strategy |
| 5 | Implemented system | Existing and operational system | To rule out initiated but failed projects |
| 6 | Higher Educational Institution | Institutions accredited by the national accreditation board (NAB) to offer higher education programmes | To ensure that only recognized tertiary institutions are included in the sample. |
| 7 | Literal logic | Demonstrate similarities in terms of stages of implementation (activities & decisions) | To confirm that the stages of adoption, implementation, and institutionalization exist in all institutions |
| 8 | Theoretical logic | Demonstrate differences based on contextual differences | To identify potential differences that are the result of contextual differences. |

After the cases were selected, letters were sent to the institutions through the office of the president in the first two cases, and through the office of the development and management teams in the last two cases. After receiving the necessary consent for the conduct of the research, participants were subsequently identified and invited to participate. Full description of this process is presented below. For purposes of anonymity, the following Pseudo names have been used to identify the cases: Case 1: The University of Accra (TUA), Case 2: Metropolitan University of Ghana (MUG), Case 3: Greater Accra University (GAU), and Case 4: World University of Ghana (WUG). A description of these universities is presented below.

#### *3.5.3.1 Description of cases*

##### 3.5.3.1.1 Case 1: The University of Accra (UA)

The University Of Accra (UA) is one of Ghana's young Universities accredited to run degree programmes in 2006. Prior to that time, it had operated as a training school for one of Ghana's biggest telecommunication operators. Its range of programmes typically covered telecommunications engineering and information technology related fields. In recent times, it has received accreditation to run degree programmes in business. Currently, the university has

expanded tremendously in infrastructure, course offering and human resource capacity. The university currently has a student population of over 4000 students pursuing over 20 undergraduate and post-graduate programmes. UA also has an established working and mutually beneficial partnership with over 20 institutions and universities worldwide. Programmes offered by UA includes certificate, undergraduate, masters and doctoral studies.

Due to Ghana's challenges in the HE environment, and presented with the opportunity, UA has established several branches in five of Ghana's regional capitals – Koforidua, Ho, Kumasi, Takoradi, with the main campus located in Accra. Another branch has been opened in Nigeria, to cater for the large number of international students from West Africa's largest populated country.

#### 3.5.3.1.1.a Vision

UA has a vision to become a centre of academic excellence providing training in technology oriented education to meet the needs of Ghana and the West African sub-region. UA sees Ghana as a nation seeking to take its place in the global economy, and views its participation in the rich traditional and cultural heritage of Ghana through the provision of strategic opportunities to develop the skills and knowledge of the citizens to enable their active participation in the global economy. Particularly, UA sees information and communication technologies (ICT) as playing a central role in the global economy, with the need for mid- and high-level professionals able to plan, organize, operate, and manage the telecoms and ICT-based services. Through the provision of training in engineering and ICT, UA seeks to equip students for successful careers in telecommunications and ICT industries. Through this, and their other commitments to research and public services, it hopes to accelerate the use of the technologies to bring jobs and incomes to the households in Ghana and beyond.

UA is built on a core commitment to students, learning, services, and respect for all persons. The institution takes pride in their values and long term commitment to academic excellence, commitment to students, service to others (all who study there), academic freedom (free exchange of ideas), accountability, integrity (high level of professional ethics), and student centred learning.

#### 3.5.3.1.1.b Mission

As its mission, UA seeks to be a centre of excellence in education, research, teaching, intellectual creativity and innovation. It aspires to promote relevant cutting-edge technology, leadership development and an enterprise culture to enhance the delivery of value to its customers and stakeholders.

To achieve the vision and mission, UA has established three core faculties, in addition to the central administrative setup, consisting of: Faculty of Engineering, Faculty of Informatics, and Faculty of IT Business.

#### 3.5.3.1.1.c Decision making (Administrative Structure) structure

UA' organogram shows the decision making structure and operations required to achieve the institution's vision and mission. Below is a reproduction of the chart.

At the very top of the chart is the governing council. Directly below the council is the President supported by two offices: Internal Audit and President's Secretariat. The internal Audit Unit is also responsible for the university and its international relations. The President' secretariat deals with administrative, projects, and legal issues, and is also responsible for scholarships and fundraising. Directly under the president are five major departments: Office of the Vice President, Head of Finance, Registrar, Head of IT and Head of Security. The office of the Vice President oversees eight (8) units: Faculty of Informatics, Faculty of Engineering, Faculty of IT Business, Graduate School, Research & Consultancy, Librarian, Professional Development, and Development and Logistics. The office of the Registrar heads six (6) offices: Exams & Records, Admissions, Student Affairs, Deputy Registrar, General Administration, and Human Resource. The IT office supervises two support units: IT support Services and Reprography.

#### 3.5.3.1.2 Case 2: Metropolitan University of Ghana (MUG)

The MUG was officially established in 2009 to offer degree programmes. Presently, the university offers certificate, diploma, degree and postgraduate programmes. Located within the greater Accra region, the university has a student population of 2100 – 1800 undergraduates and 300 post-graduates - comprising of both local and international students. Currently, the university has a branch in Togo with plans to establish other branches in other countries.

MUG has a strong engineering and technology focus, in addition to a strong entrepreneurial focus. MUG appears to have successfully implemented on-campus and Open University programmes in different fields using the open source LMS, Moodle. Its campus-based programmes are offered in the fields of engineering, computer science, information technology and business.

MUG is affiliated to well-established local and international institutions like the Kwame Nkrumh University of Science and Technology (KNUST) and the Open University of Malaysia (OUM). Modelled after institutions like the Massachusetts Institute of Technology and the California Institute of Technology, MUG is committed to delivering excellence in academic work, cutting-edge research, and research & developmental work.

#### 3.5.3.1.2.a Vision

MUG' vision is to be a first-class student focused institution of higher learning, professional training and research, striving for excellence in teaching, scholarship, research and service. The institution seeks to attract, develop outstanding, and be recognized as a leader in preparing top-class graduates capable of competing successfully on the international job market. MUG also seeks to become a cutting-edge research intensive institution, attracting and retaining the best faculty, and being responsive to technological advances, changing trends and the economy in pursuance to its cradle of excellence mission.

#### 3.5.3.1.2.b Mission

The mission of MUG is to become a cradle of excellence in education, training and research through the provision of leadership in the educational and the technological world by carefully selecting students of character, integrity, determination and motivation, and choosing individuals of outstanding character, commitment, ability and vision to serve as trustees, officers and faculty.

#### 3.5.3.1.2.c Decision making (Administrative) structure

MUG' decision making structure is depicted by its very elaborate organogram that has at the very apex a board of trustees made up of very eminent personalities in Ghana's academic environment with vast international experience and repute in the area of education. The board is supported by the MUG foundation. Directly under the board is the President who is sup-

ported by a senate and the university advisory council. The advisory council is made up of members who are distinguished in business, the public sector, labour, academia and the professional world, and form an integral part of the university's leadership and governance structure. The council's principal role is to assist the board of trustees, the president and other principal officers and key constituent bodies of the university in an advisory capacity on matters relating to the university's strategic, operational and financial direction, its academic, professional and research programmes and on faculty and student issues. The President directly supervises three offices: Advancement and Innovations, Academic Affairs, and Finance and Administration. The Advancement and Innovations director is in charge of four units directly under him: Planning and Projects, Partnerships, Coordination and Facilitation, Marketing and Communications. The Vice President Academic Affairs is directly in charge two offices: Academic Deans and the admissions and student records unit. The academic dean's office constitutes five (5) schools: School of Advanced Technologies, Engineering and Science (SATES), Advanced School of Systems and Data Studies (ASSDAS), Business School (ABS), Graduate School and School of Professional Certification Programmes (SPCP). There is also the Flying School (AFS), the Institute of Lifelong Learning (IL3), the Institute of Career Advancement and the English Language Institute. Directly under the schools are departments with heads/chairs and the Faculty. The office of the Vice President Finance and Administration is in charge of three (3) offices: Finance, Operations and Technology Systems and Services. Below is a figure of the organogram.

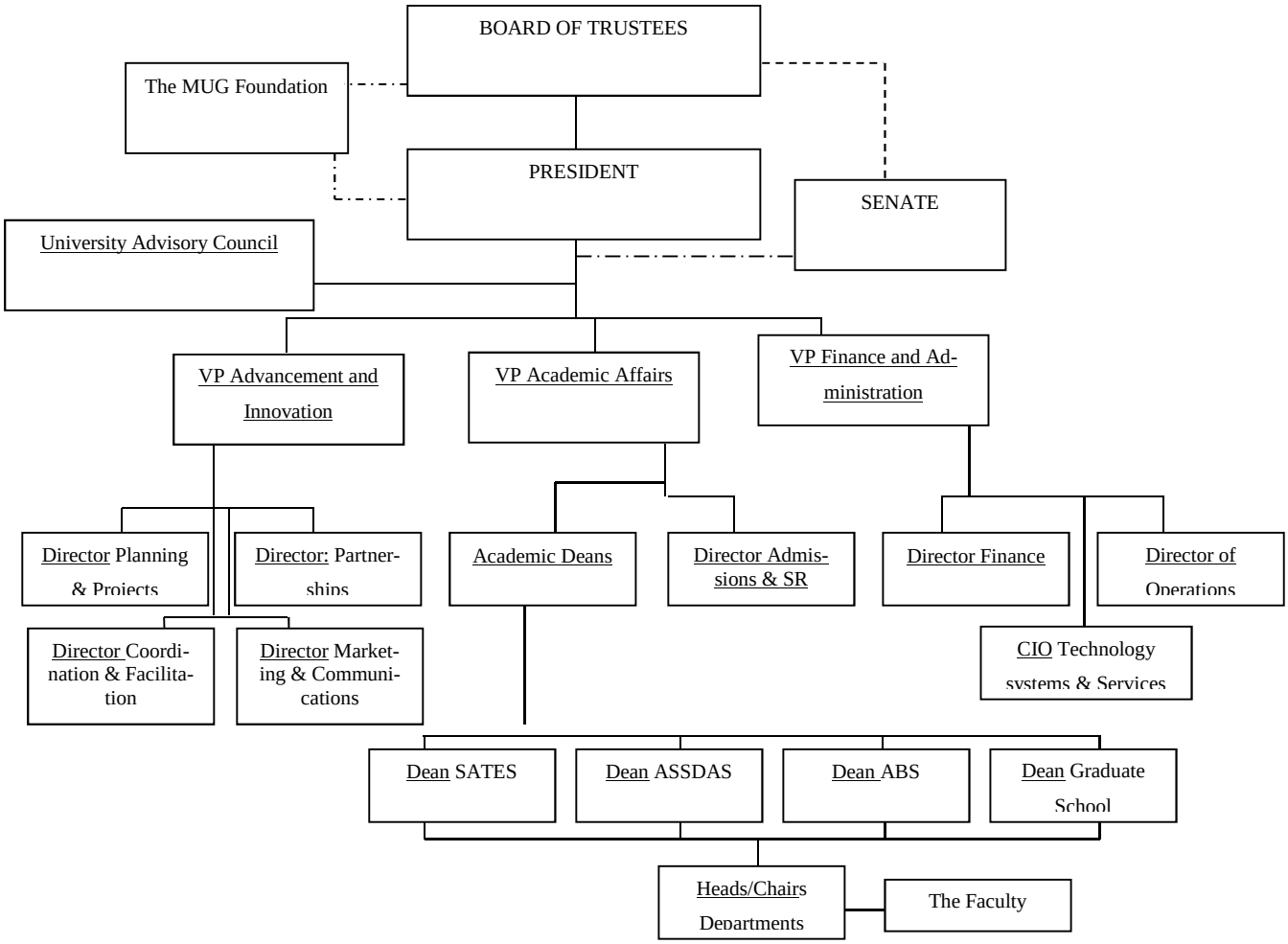



Figure 8: Organisational Chart for Metropolitan University of Ghana

#### 3.5.3.1.3 Case 3: Greater Accra University (GAU)

GAU is also located within the Greater Accra Region of Ghana. Established 40 years ago as a private professional business school, GAU was taken over by the government and turned into an institute of Professional studies and in 2005, it introduced Bachelor degree programmes. In 2008, it became a fully-fledged public university offering undergraduate and postgraduate programmes in several fields including Accountancy and Management. The university is mandated to provide tertiary and professional education in the academic disciplines of Accountancy, Management and other related areas of study. GAU currently has a student population of about ten thousand (10000). GAU strategically seeks to position itself as a unique business education and research model that blends scholarship with professionalism and a university of excellence in Africa and beyond. The institution has three functional areas it believes will enable it achieve its mission: teaching and learning, research and community service, business development and skills training.

The university has the following eight (8) Faculties/Schools: Faculty of Accounting and Finance, Faculty of Management, Faculty of Communication Studies, School of Research and Graduate Studies, Distance Learning School and Weekend School, Evening School and the Institute of Professional Studies.

#### 3.5.3.1.3.a Vision

GAU' vision is to become a world class education provider in both academic and professional disciplines, nationally entrenched, regionally recognized and globally relevant.

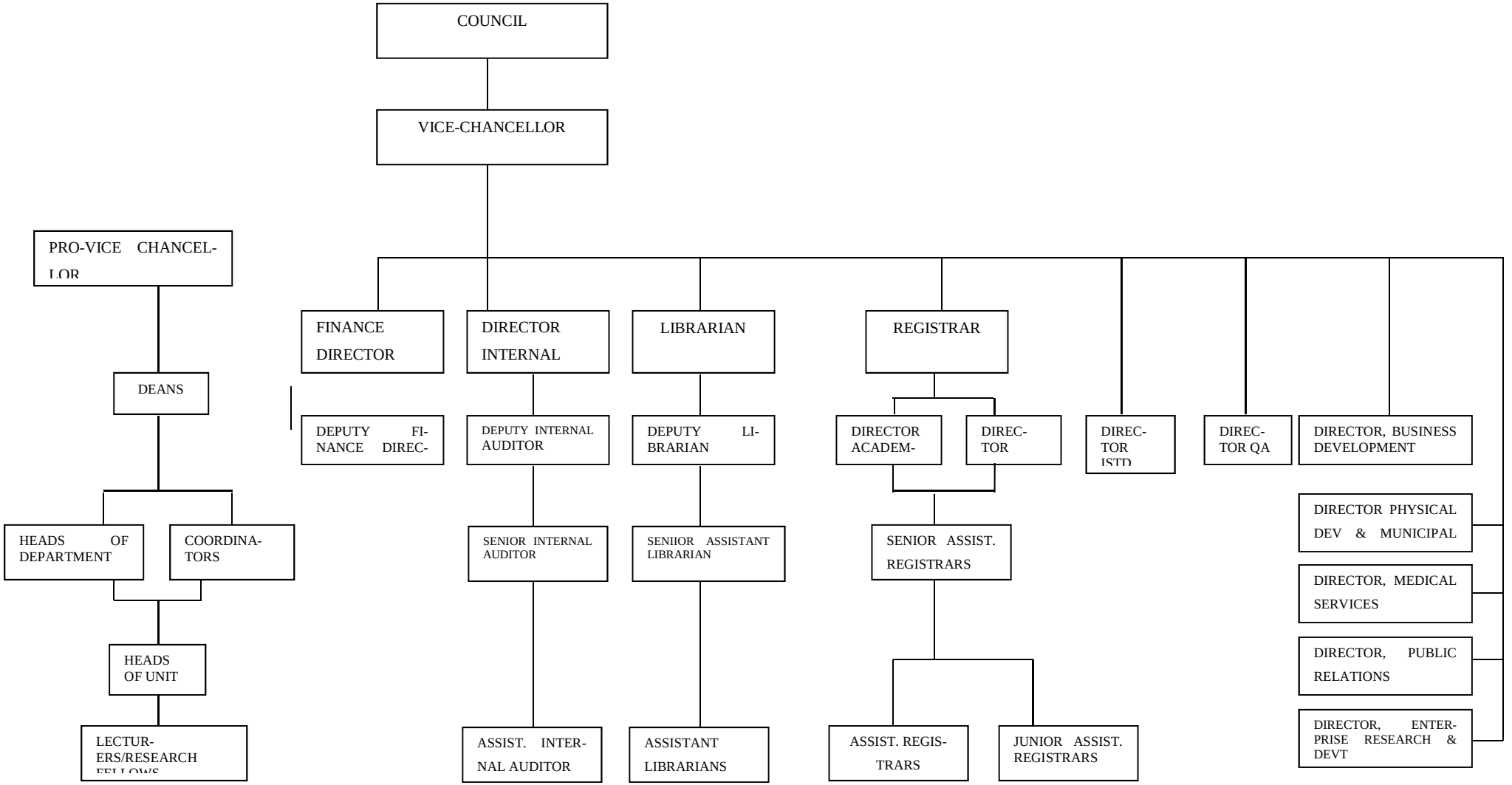
#### 3.5.3.1.3.b Mission

In accordance with their mission, GAU seeks to provide and promote higher professional education and training in business and other social sciences related disciple by leveraging a structured mix of scholarship with professionalism in Ghana and beyond. The institution sees itself as owing its first responsibility to its students, staff, parents, alumni and other stakeholders.

#### 3.5.3.1.3.c Decision making (Administrative) structure

The structure of the university's decision making can be seen in its organogram. At the helm of the chart is the University Council that oversees the strategic decisions of the university. Directly below the council is the Vice Chancellor (VC). Supporting the VC is the Pro-Vice Chancellor who directly heads the various faculties and schools represented by the Deanship positions. Directly under the deans are the heads of the various departments and coordinators. Directly below these departments and coordinators are heads of units. These are followed by lecturers and research fellows. The Vice Chancellor directly heads the following units: Finance Office, Internal Audit, Library, Registrar, ISTD, Quality Assurance, Business Development, Physical Development & Municipal Services, Public Relations, Enterprise Research & Development. The internal audit office directly heads the senior internal audit office which also supervises the assistant internal audit office. Likewise, the Librarian Office directly supervises the senior assistant librarian, who also supervises the assistant librarian. The Registrar's office is directly responsible for two offices: Academics and Administration. These two departments each have senior assistant registrar positions under them. These senior posts each have assistant and junior assistant positions respectively under them. Below is a figure of the organogram.

Figure 9: Organisational Chart for Greater Accra University



#### 3.5.3.1.4 Case 4: World University of Ghana (WUG)

WUG was established in 1992 as a University College of Education and later upgraded to full university status in 2004. Located 67 Km from the centre of Accra, the university is charged with a mandate to provide teacher education and produce professional educators in Ghana to spearhead a new national vision of education that is aimed at redirecting the country's efforts along the paths of rapid economic and social development. With a population of over 40000 students, the university has seven (7) faculties, two (2) schools and one (1) institute; and twenty-nine (29) academic departments. It has six (6) campuses located in different parts of the country and twenty-three (23) study centres around the ten (10) regions of Ghana. The university offers certificate, diploma, undergraduate and postgraduate programmes. The faculties include: Faculty of Agriculture and Education, Faculty of Business Studies Education, Faculty of Educational Studies, Faculty of Science Education, Faculty of Social Science Education, Faculty of Technical and Vocational Education, , Faculty of Languages, School of Creative Arts Education, School for Research and Graduate Studies and the Institute for Educational Development and Extension. Several different degrees are offered under these faculties and schools. The programmes offered are grouped into regular, part-time, certificate and diploma, and postgraduate.

#### 3.5.3.1.4.a Vision

WUG has a vision to be an internationally reputable institution for teacher education and research.

#### 3.5.3.1.4.b Mission

As its mission, WUG seeks to serve as a centre of excellence which will inculcate in its products the requisite academic ability and professional competence, and imbue them with humanistic values for teaching at the pre-tertiary level, conduct research, disseminate relevant knowledge and skills, and influence educational policy.

3.5.3.1.4.c Decision making (Administrative) structure

### Table 15: The institutions at a glance

The diagram below displays the four institutions compared using important characteristics.

| Characteristics | UA | MUG | GAU | WUG |
|---|---|---|---|---|
| Location | Accra | Accra | Accra | Winneba |
| Student population | Over 4000 | 2100 | About 10,000 | Over 40,000 |
| Level of Programmes offered | Certificate, Undergraduate, Postgraduate (masters & doctorate) | Pre-university, Certificate, Diploma, Undergraduate, Postgraduate (masters & doctorate) | Professional, Undergraduate, Postgraduate (masters) | Certificate, Diploma, Graduate, Post-graduate diploma, Postgraduate (masters & doctorate) |
| Strategic Focus | Provide training in technology oriented education to meet the needs of Ghana and the West African sub-region | To be a first-class student focused institution of higher learning, professional training and research, striving for excellence in teaching, scholarship, research and service | Become a world class education provider in both academic and professional disciplines, nationally entrenched, regionally recognized and globally relevant | Be an internationally reputable institution for teacher education and research |
| Number of schools/Faculties/ Institutes | 4 | 9 | 8 | 10 |
| Central implementation unit/team | Information Technology Support Services/Centre for Online learning & Teaching | Office of the President & Technology systems and services unit | IT department (e-learning and web applications) | Special project committee |
| Nature of e-learning implementation | Institutionally sanctioned, institution-wide focus, on-campus use, plan to deploy fully online | Institutionally sanctioned, institution-wide focus, on-campus use, distance education use, plan to use in Open University | Institutionally sanctioned, institution-wide focus, on-campus use, support of distance education programmes | Institutionally sanctioned, institution-wide focus, on-campus use |
| Year of deployment | 2010 | 2009 | 2010 | 2010 |

### 3.5.4 Selection of participants

The initial strategy was to select participants on their involvement with the e-learning implementation process. In particular, the following criteria were used to identify and select participants:

a) involvement in e-learning related activities

b) participation in e-learning related decision making

c) involvement in deployment and use of e-learning system

In particular, a consideration for institutional members, committees, individuals, and management was taken into consideration based on the review of literature to identify relevant potential participants. Below is a description of how participants were selected and the number of participants selected in each case.

#### *3.5.4.1 UA*

After approval was given, the head of research was assigned to assist in identifying people involved in the implementation and use of the e-learning system. An initial list was made up of two (2) IT personnel, two (2) decision makers and four (4) faculty members known to be engaged in the use of the system.

Each of the listed names was called by the research officer and dates arranged for interviews. Following interviews with these participants, further interviews were arranged between the researcher and the participants since the initial interviews ascertained their level of involvement and knowledge of the institution' efforts at introducing the e-learning system.

#### *3.5.4.2 MUG*

An initial visit to the university based on a contact's recommendation led to an interaction with the IT manager which later resulted in a letter being sent to the President's office for approval and permission to study the institution's efforts at introducing e-learning. After permission was granted, interviews were arranged with the President, two (2) IT personnel, a faculty member, an administrator, a student and a former employee. Follow-up interviews were subsequently arranged to clarify and further understand and agree on findings with these participants.

#### *3.5.4.3 GAU*

A visit to the institution's director of Information Technology Services led to the identification of the personnel, originator, and department responsible for the deployment of the e-learning system. This led to an arrangement for an interview meeting which led to follow-up interviews for clarification and confirmation of important research questions regarding the institution. A few random interviews were conducted with other institutional members to ascertain the validity of some information.

#### *3.5.4.4 WUG*

Based on recommendation and an assessment of institution's activities, the Coordinator of the university's e-learning project was contacted and interview dates scheduled. After the interview, documents were collected, studied and follow-up interviews scheduled.

### 3.5.5 Data collection tools

Case studies are known to provide a variety of data for study and understanding of phenomena. Notably, observation, document review, interviews and questionnaires constitute some of the prominent data collection tools often utilized. These tools can be used to collect a variety of data that could be triangulated to strengthen findings and understanding about a phenomenon under study. The current study utilized a variety of these data collection tools based on their availability. In particular, the interview, observation and document review tools were used. These tools were selected based on their ability to capture important data about the phenomenon, and in particular situations where other data collection tools could not be used to collect the appropriate data. Below is a description of the data collection tools utilized in the research and justification for their use.

#### *3.5.5.1 Interviews*

The interviews provide a unique opportunity to collect data from the people involved in the phenomenon. This is very important as it affords the opportunity for the researcher to interact directly with the participants who share their opinions and perspectives about the phenomenon. Through this medium, the researcher is able to gain an impression of what the participants think, feel, understand and perceive about the phenomenon. The researcher is also provided the opportunity to clarify from the participants any misunderstanding about some in-

formation provided which may be conflicting or contradicting with other information gathered.

More particularly, since the purpose of the research is to understand how e-learning systems are implemented within a higher educational institution, which can be likened to an organization, a social system, the subjective interpretation of the phenomenon within its natural environment by those participating in it becomes an important consideration in truly understanding the phenomenon. The interview therefore allows the researcher to both interact with the environment and the research participants, observing cues from facial expressions, voice tones, and the environments, enabling a full grasp of the institutions' experience with e-learning implementation.

Another important consideration for the use of interviews was the almost absent existence of documentations related to the implementation efforts, except for one of the institutions, WUG. This made the interview the most important tool for the collection of information from participants regarding the institutions efforts. Below, a description of the type of interviews and questions asked is presented.

#### 3.5.5.1.1 Unstructured interviews

The unstructured interviews were essential to getting the participants to talk about their experiences by inquiring into their knowledge of how the whole project was initiated and their participation in the project. These interviews enabled the participants to talk at length, with interesting responses followed by 'follow-up' questions. Since the institutions had deployed the e-learning systems long before the conduct of the research, and following the assumption that every activity and decision relating to the e-learning was relevant, this form of interview enabled data on the context of the institution prior to the introduction of the e-learning system, activities, decisions, participants, etc., to be collected up until the current state.

The interviews under this category started with the researcher describing the research and its purpose to the participants after introducing himself. Participants were then asked to talk briefly about themselves and their role in the e-learning implementation. The purpose was to get an insight into what the institution did to introduce the e-learning system and to gain an

insight into the participants' roles in the process. This interview format was utilized in all the four case studies for all the case participants.

#### 3.5.5.1.2 Semi-structured interviews

The unstructured interview was followed by a semi-structured interview aimed at clarifying, structuring and piecing in the details. This was also aimed at enabling consistency in each individual case since some initial patterns were identified in the cases, while allowing follow-up on important issues for understanding and clarification.

The first section of the semi-structured interviews focused on activities and decisions prior to the e-learning system being physically introduced. The second section focused on activities and decisions focused on the physical introduction (installation, configuration, etc.). The third and final section focused on activities and decisions after the physical introduction of the system. The questions sought to capture the initiatives of the institution and the decisions involved the participants and their roles played, as well as the outcomes. The purpose was to capture a deep and detailed description of the process followed by the institutions in e-learning implementation journey.

### *3.5.5.2 Observation*

Observations played an important role in assessing the extent of integration the institution had been able to achieve. Observations were made of the campus infrastructure, labs, students activities, staff, faculty, etc. and impressions drawn. These impressions were later raised with some participants for clarification leading to a deeper understanding of the institution's effort and the impacts being made.

### *3.5.5.3 Document review*

The existence of documents including memos, reports, strategic plans, activity schedules, etc. helps in the verification and understanding of issues relating to the phenomenon under study. The cases in a case study may have some of these (and other types) documents available for the review of the researcher. An important use of these documents is to facilitate the triangulation of any findings from observations and interviews. This can strengthen the findings of the current research in many ways. However, with the exception of the fourth case study

(WUG), documents on the institutional e-learning implementation activities were difficult to come by.

Very comprehensive and strategic documentation was provided by WUG regarding their implementation plans, efforts and outcomes. This may be due to the fact that the project was funded by a special international fund which required comprehensive periodic reports on the ongoing project which lasted three (3) years.

### 3.5.6 Type of questions

Mostly open ended questions were utilized in the research. This was to allow participants to answer at length their views, perceptions, and understanding of the issues raised. Follow-up (targeted) questions were asked in relation to certain predetermined categories to elicit their understanding of and identification of some of their activities and decisions.

After the open ended questions, probes were used to explore the participants' experiences and knowledge of adoption, implementation and institutionalization related activities and decisions.

#### *3.5.6.1 Implications (of philosophical hermeneutical interview style) for research questions in IS implementation:*

The concerns raised about the use of theory in qualitative studies were used to guide the design of the research. Purists in both quantitative and qualitative research have argued for and against the role of theory in research, respectively. While the quantitative methodological approach emphasize the hypothetico-deductive approach, Ali & Birley (1998) contend that this seeks to simply prove or disprove a hypothesized relationship between identified variables, and that although useful, it restricts further knowledge from being gained about a phenomenon. The qualitative approach on the other hand which emphasizes the inductive perspective has often come under attack from qualitative purists when theory is used to guide the research. Eisenhardt (1989) and Ali & Birley (1998) have however been able to diffuse this tension by showing how case studies and the use of a priori constructs can be effectively used in qualitative research. In a comparison of variables (as used in quantitative research) and constructs, Ali & Birley (1998) suggest that constructs derived from extant theory were sufficiently broad enough to capture new knowledge depending on how data was elicited from the

participants through questioning. In other words, whereas in quantitative research, the variables and their assumed relationships are determined in advance, constructs in qualitative research should be used to sensitize researchers as to where to look at in the research and to guide analysis. This has the tendency to allow new findings to unfold, a characteristic of qualitative investigations. The perspectives of Eisenhardt (1989) and Ali & Birley (1998) greatly influenced the design and conduct of this research as is highlighted by the following considerations.

An 'atheoretical' approach was used to achieve the research objectives following the hermeneutic tradition (Ali & Birley, 1998; Vandermause & Fleming, 2011). It was noted that though the existing theories were relevant and useful to understanding the implementation phenomenon, non could be adjudged sufficiently robust to capture the complexities of the phenomenon as depicted by the failure of IS researchers to agree on a common model on implementation.

Given the objective to investigate how HEIs implement e-learning using an LMS and the factors influencing the process and their interrelationship so as to better understand and provide a framework or model that could guide future implementations, one way of undertaking this would have been to ask them directly how this was done. As noted by Ali & Birley (1998), this could potentially lead to eliciting information in a form that suggests 'being led' by the researcher. This naturally presupposes an interest in the subject of 'implementation process' which could lead to participants focusing on just that. To avoid this, participants were asked to describe their involvement and experience in their institution's e-learning initiatives. Through this narrative therefore a process could be identified without making it an obvious requirement (Ali & Birley (1998). Heavy reliance was placed on the respondents leading us to identify the nature of the 'processes in their implementation journey.

This approach was also used to elicit factors influencing the process. As participants narrated their recollection of how e-learning was implemented, factors facilitating and limiting their achievement were highlighted. Follow up questions were subsequently asked to clarify and further understand the factors identified. This further ensured that the prior literature review and the potential influences of existing knowledge played little role in influencing the outcome of the research at this stage. As noted above the objective at this stage was to understand the 'how' by getting into the experience of the participants.

The questions asked were directed at eliciting participants' recollection of their involvement and experiences in the institution' e-learning implementation prior to, during, and after the physical introduction of the e-learning system. Although this was not made known to the participants in order not to influence their narration, follow up questions based on the respondents own narration helped clarify these requirements of the research. Towards this end, caution was exercised to ask questions that enabled participants to talk at length, with subsequent questions following up from the aspects of the respondent' answers requiring clarification and further explanations. For example:

**Q:** Please tell us about the institution' implementation of e-learning highlighting your experiences and role played in it.

The responsibility therefore lay with the respondent to narrate how the institution initiated the e-learning implementation, those involved, activities undertaken, their outcomes, factors influencing the process among other information. Through their narration, the nature of the institutional e-learning implementation process unfolded. Thus even though there was a framework guiding the research, the questions asked of the participant did not strictly follow this framework which had distinct stages.

The open-ended nature of the interview questions enabled participants to lead the interaction in a way that was not interfering in nature. This was very important to achieving a hermeneutical perspective of the institution's implementation experiences.

## 3.6 Data Analysis Techniques

Analysis has been described as a process of resolving data into its constituent components, to reveal its characteristic elements and structure (Dey, 2003). Analysis facilitates the description of the phenomenon to which the data refers by breaking it down and putting it back together in ways that enables interpretation, explanation, understanding, and even prediction. This process goes beyond mere description to transforming the data into a more revealing set of information about the phenomenon.

According to Dey (2003), the description of a phenomenon lays the basis for analysis, which in turn, lays the basis for further description. In other words, the description of a phenomenon will enable more critical questions to be asked for clarity and understanding. This process

however can lead to a reconstruction (further description) of the phenomenon that provides a deeper insight into its nature. This process of describing the phenomenon, breaking the data into bits, identifying relationships amongst the bits, and a further description based on a re-conceptualization of the data thus enables a researcher to gain a fresh view of the data. The analysis performed in this research, follows Dey's (2003) process of analysing qualitative data (see figure below). Each of the stages in this process of analysis is described in detail below.

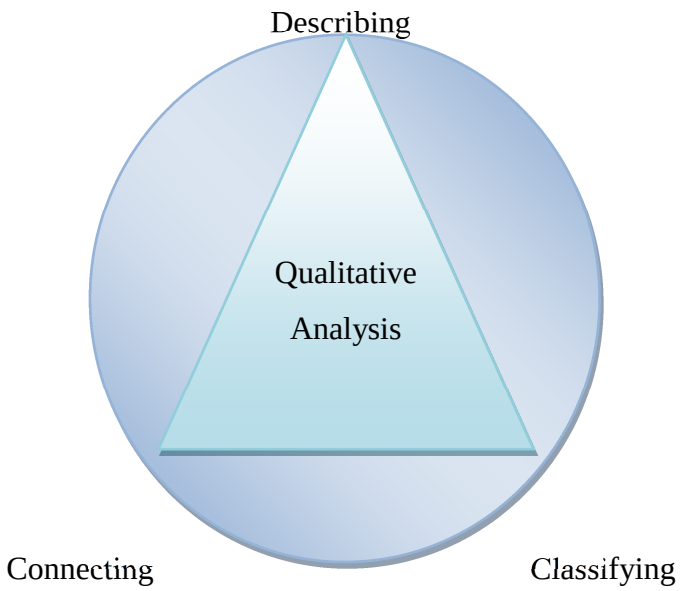



Figure 10: Qualitative Analysis as a circular process. Source: Dey, (2003)

### 3.6.1 Description

The description of a phenomenon using this circular process of analysis provides the initial information for further clarification and analysis that leads to a deeper understanding. To describe, according to Dey (2003) is, "'to set forth in words', to 'recite the characteristics' of a person, object or event". He argued that although description is perceived in some quarters as 'low-level' activity in comparison with other 'more analytic and theoretically oriented research' description permeates scientific theory and without it, theories could have neither meaning and nor application. Dey proposed a framework for providing a thorough and comprehensive (thick) description of a phenomenon under study. Denzin (1978) cited in Dey, 2003) suggests that a 'thick' description includes information about the context of an act, the intentions and meanings that organize action, and its subsequent evolution. This framework therefore encompasses:

- the context of action
- the intentions of the actor, and
- the process in which action is embedded

The following figure depicts the framework.

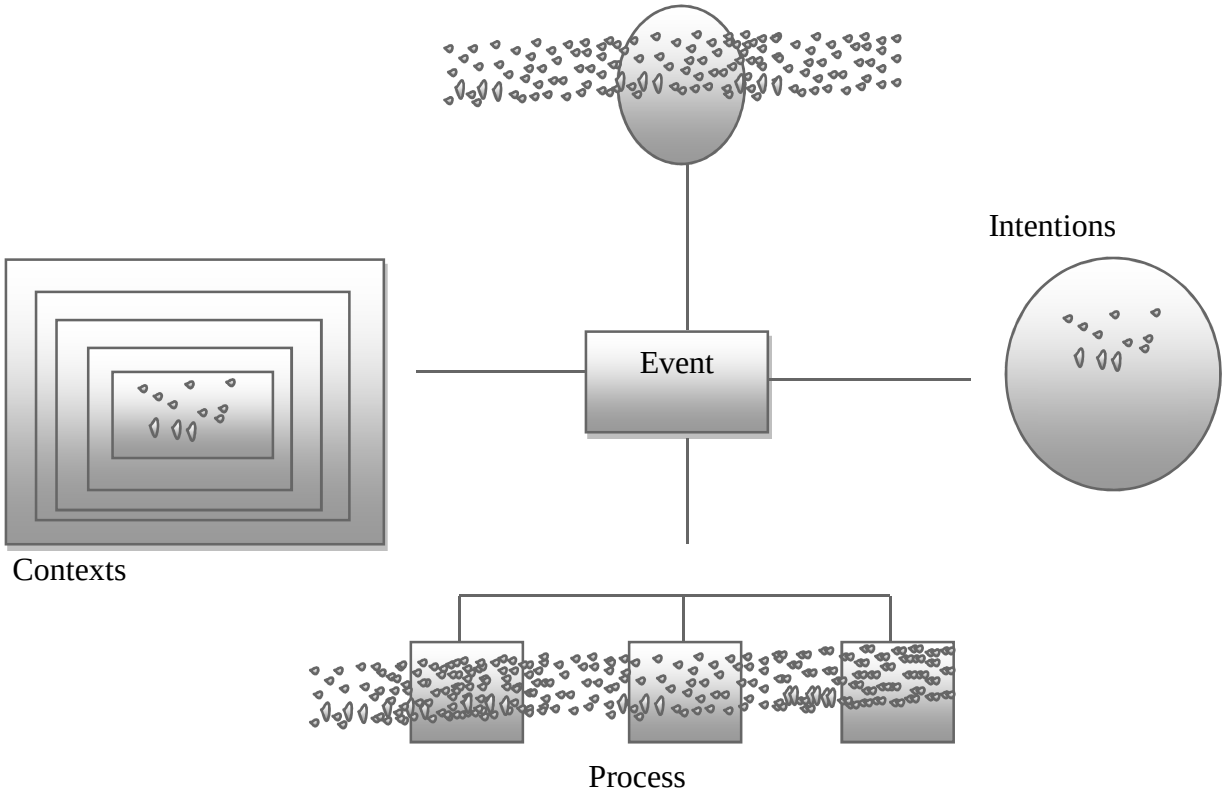



Figure 11: Three aspects of description in qualitative analysis. Source Dey, (2003)

### *3.6.1.1 Contexts*

The relevance of contexts in qualitative analysis cannot be overemphasized. Contexts provide the mechanisms by which actions can be situated and understanding of the social and historical import obtained (Dey, 2003). This requires a detailed description of the social setting within which the action occurs. The meaning of a text or interview transcript can best be grasped if the context of its occurrence is well understood. For instance if one attempted to enter a temple in Bangkok, and saw a sign which read, 'It is forbidden to enter a woman even a foreigner if dressed as a woman' at the entrance, one could interpret it to mean that women, be they indigenes or foreigners, dressed as men were forbidden to enter the temple. Although this is the right interpretation, when the context of 'temple' is not mentioned, one can interpret it to mean that men are forbidden to enter women in a sexual connotation (Dey, 2003). Thus failure to explicate the context of a phenomenon can lead a reader to misinterpret a tex-

tual description which in essence is a reasonable and legitimate interpretation. It is important to note that although interpretation is dependent on context, it does not preclude an objective appraisal of how the events are interpreted. Knowledge of the relevant context therefore provides an opportunity to provide an objective description of the phenomenon.

#### *3.6.1.2 Intentions*

Capturing people' intentions can be a delicate business as meanings can be ambivalent and context dependent. In qualitative research, such intentions can be clarified by requesting participants to further explain themselves. Qualitative analysis therefore focuses on the actors' definition of situations and their explanations of the motives governing their actions. Even where the researcher uses well defined concepts to understand the participants' experience, it is of the utmost importance in qualitative research to ensure that it relates strongly to the intentions of the actors involved. As Dey (2003) noted, the intentions and perceptions of subjects in a qualitative research enjoys a prominent position in sense-making due to their privileged access to the meaning of action.

Where intentions are concerned, Dey (2003) contended that communicating meaning is "always negotiable." She was of the view that subjects could not be relied upon to give rational accounts of their intentions, nor could we, as researchers, infer from their behaviours, what their actual intention is. He contended that an unequivocal guide to interpreting behaviour could not be found in action or intention, rendering any interpretation contestable. However, multiple confirmation of the same information, based on an understanding by members of a group or organization as to the true intent and meaning of an act can be accepted to represent what the act stands for and means to the group or organization.

#### *3.6.1.3 Process*

Unlike quantitative research, qualitative investigations can capture a phenomenon over a period of time, and also take into account past events that have implications for the phenomenon. Dey (2003) argued that meaning derived from a context can evolve and change over a period of time since meaning is negotiable. In other words, a particular observation in a given context can vary over time with negative observations changing for the better or sometimes positive observations changing for the worse. She contended that even though qualitative data could be produced through snapshot methods (e.g. one-off surveys), they are often the prod-

uct of data collected over a period of time through such methods as participant observation or successive interviews. Such types of data highlight the interactions and interconnections between action and consequence, with the data describing the social relationships and interchanges that unfold in the succession of actions and events in which the actors are engaged.

Within this process of collecting data, clarifying data and interpreting data, the researcher is also actively involved with their personal interpretations and actions becoming a legitimate object of subsequent analysis (Dey, 2003). Focusing on the process shifts attention from context and intention to action and consequence where the material as well as the social conditions and consequences need to be taken into account.

Dey (2003) argued that a qualitative description is likely to encompass all the elements discussed above – process, intention and context – in its effort to provide an adequate basis for interpreting and explaining social actions.

### 3.6.2 Classification

Data simply provides the basis for an analysis (sense making) of a phenomenon, but do not dictate how the analysis should be done (Dey, 2003). Dey (2003) contends that analysis requires the development of a conceptual framework through which the actions or events can be rendered intelligible. Interpretation therefore seeks to make an action meaningful to others, sometimes not necessarily within the actors' intentions. It thus requires the development of conceptual tools through which the significance of social actions and their interrelationships can be apprehended. This requires the placement of data into some sort of categories. Categorization can be viewed as a process of funnelling data into relevant categories for analysis. Although the data loses its original shape, the researcher gains through the organization for his analysis. As Dey (200) noted, categorising data enables researchers to make comparisons more effective, facilitating clearer interpretation of a phenomenon.

Initial classification of the data in the current research is guided by a logical flow of institutional initiatives where based on some predefined intention (and research objectives), a decision is made to introduce a selected e-learning platform. This system is then physically brought into the environment and integrated into the existing systems of the institution. Clearly, three distinct categories that logically follow each other can be indentified: actions and

decisions leading to the selection of a specific e-learning system (adoption decision), deployment of the e-learning system (implementation) and regularising the e-learning system's use within the institution (institutionalization). Using this initial classification which broadly relates to the IS implementation framework developed by Kwon & Zmud (1987) and modified by Cooper & Zmud (1989), the initial conceptual categories were developed.

### 3.6.3 Connection

When data is dissected into different component parts, it needs to be put back together through an inter-linking mechanism (analytical framework) that aids in clearer understanding. The initial description and classification activities carried out on the available data provide the necessary foundational work necessary for putting back the data into one piece. Once data has been classified, 'substantive connections' (Dey, 2003) could be made to identify associations through the examination of regularities, differences and singularity of data that eventually lead to patterns being identified. This exercise eventually leads to the building of a clearer and more complex picture than the initial impressions made about the phenomenon. Thus through the search for these substantive connections, fresh perspectives on the data emerges leading to a richer and fuller understanding that aids the identification of some common factors being found that could explain the variations and similarities identified. In other words, simply identifying similarities and differences is insufficient. A researcher's ability to capture the underlying reason for the similarities and differences is what's important in qualitative research analysis (Dey, 2003). According to Dey, establishing connections requires a qualitative analysis of the capabilities and liabilities surrounding the phenomenon, where the capabilities can be analysed in terms of the social structure. He equally contended that in this mode of analysis, theories can provide direction and order, a suggestion pursued in the current analysis.

### 3.6.4 Data Analysis Process

The analysis of the data followed an iterative process with each case data being first transcribed (examined in cases were documents were retrieved) for each interviewee. A process of comparison was then undertaken to clarify inconsistencies where they were identified. The institutional implementation experience was then written out and confirmed with participants. The transcripts were then studied more critically using an initial conceptual framework involving three major phases and sub phases. The objective here was to identify events, activi-

ties and decisions made by the institution, or its mandated representatives in relation to the e-learning implementation. Contextual factors influencing the implementation process were also identified in the narratives of each of the institutions. These factors were subsequently confirmed with the participants for clarification. A structuration analysis was subsequently performed on each case to through more light into their experience. Findings were subsequently interpreted from the hermeneutical, IS implementation process and structuration perspectives. Below is a figure of the iterative process followed by a more elaborate diagrammatic illustration.


Figure 12: Data Analysis process

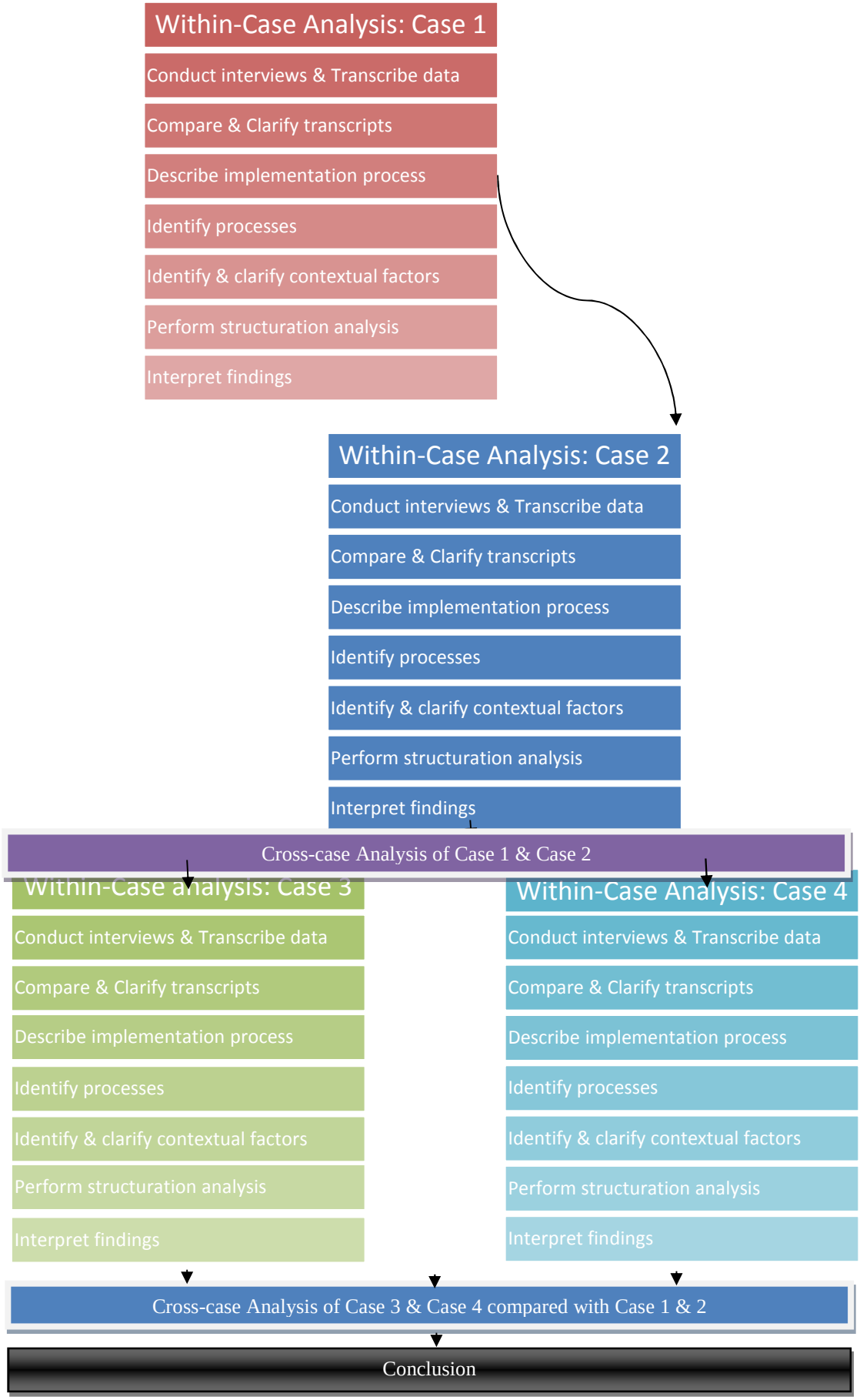



Figure 13: Diagrammatic display of the Analytical Process

A content analysis was used to analyse the interview transcripts. Hsieh & Shannon (2005) describe three distinct approaches to conducting content analysis that runs through the literature: conventional, directed and summative. Qualitative content analysis is defined by Hsieh & Shannon (2005) as an analytic "research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns". In this research a directed content analysis approach is used to analyse the text data gathered through interviews, document review, and observation. This approach facilitates the analysis of data through the utilization of a priori constructs used as 'sensitizing constructs' to guide data collection. Through these constructs developed as a conceptual framework, initial categories and sub-categories were coded. The initial definitions of these categories were based on the a priori constructs with the emerging data allowed to introduce new categories and redefine initial categories. This is in keeping with the naturalistic paradigm as the use of directed content analysis in interpretive studies is believed to be 'too structured' and unsuitable as it has the tendency to bias the study. However, conscious attempts were made to ensure that constructs, rather than specific variables, as pertains with positivist philosophy, were used. Also, the open-ended nature of the questions allowed the participants to talk at length, allowing new and relevant insights to be acquired. Follow-up questions that probed participants were also not leading in nature, helping to avoid the potential of participants responding in ways deemed to be agreeable with the researcher.

The data collected through the interviews were transcribed from the interview notes and tape recordings. Subsequently they were read through to gain insight into what they suggested, prompting follow-up questions to be raised. These data were organized under the initial categories with new categories created for data that could not be categorized under the initial categories. Some of these data also fell under sub-categories, resulting in the creation of several sub-categories.

## 3.7 Ethical considerations

Ethical issues relating to the conduct of research in the social sciences are regarded as very important considerations in the conduct of socially related research involving people. In UK for instance, a Research Ethics Framework (REF) was developed to guide institutions and researchers in their conduct of social research. This framework was developed to ensure that unethical research is prevented from the onset of a research. Six key principles identified to

be essential in the conduct of any social research were highlighted by the REF and considered in the current research to ensure ethical considerations of the highest standard. These include the need for:

- research to be designed, reviewed and undertaken to ensure integrity and quality
- research staff and subjects must be informed fully about the purpose, methods and intended possible uses of the research, what their participation in the research entails, and what risks, if any, are involved
- the confidentiality of information supplied by research subjects and the anonymity of respondents must be respected
- research participants must participate in voluntary ways, free from any coercion
- harm to research participants must be avoided, and
- the independence of research must be clear, and any conflicts of interest or partiality must be explicit.

To ensure that participants were clearly informed about these ethical considerations, an informed participant sheet was given to participant to read and clarify. Prior to interview questions being asked, time was taken to explain the importance of those ethical requirements and participants requested to indicate their understanding. Some requested anonymity, which has been taken into consideration, while others preferred not to answer certain questions they deemed sensitive.

## 3.8 Issues of trustworthiness

Trustworthiness is to a qualitative enquiry what reliability and validity is in quantitative research (Guba, 1981). Guba, like most qualitative researchers, was of the opinion that qualitative research could be not be assessed using the reliability, validity, objectivity and generalizability dimensions utilized in quantitative research. He therefore recommended the use of 'trustworthiness' which encompasses four criteria as a way of distancing qualitative research from the traditions of positivism (see Table 12 below).

Table 16: A comparison of the qualitative measures of trustworthiness with quantitative measures

| S/n | Qualitative criteria of Trustworthiness | Quantitative measures |
|---|---|---|
| 1 | Credibility | Internal validity |
| 2 | Transferability | External Validity/Generalisability |
| 3 | Dependability/Consistency | Reliability |
| 4 | Confirmability | Objectivity |

As indicated in the table above, the criteria of trustworthiness which compares with the quantitative measures of internal and external validity, reliability and objectivity were addressed in the research. In the following sections we describe in detail how these were addressed.

### 3.8.1 Credibility

This aspect of qualitative research seeks to determine the extent to which a research finding(s) is consistent with or fits with the reality. Lincoln and Guba (1985) argue that ensuring credibility is one of the most important factors in establishing trustworthiness. According to Guba (1981), this relates to the concerns about truth value. In other words, it seeks to answer the question about how one can establish confidence in the "truth" of the findings of a particular enquiry for the subjects with which and the context in which the research was carried out. Shenton (2004) enumerated a number of activities from which researchers can select from to promote confidence in the accuracy of their records of a phenomenon. In the current research a number of these were deemed appropriate and considered in the conduct of the research. These include (i) the adoption of well-established research methods, (ii) the early development of familiarity with the culture of participating organisations, (iii) tactics to help ensure honesty in informants, (iv) thick description of the phenomenon under scrutiny, and examination of previous research findings.

### 3.8.2 Transferability

This is the counterpart of external validity in positivist research that seeks to show that the findings of a study can be applied to other situations. Although this is often not the case in qualitative research due to the small number of specific environments and participants as well as the uniqueness of the context within which the research is conducted (Shenton, 2004), Guba (1981) argues a certain level of transferability between two contexts may occur because of

certain essential similarities between them. Some arguments have suggested the impossibility of conventional generalisability due to their specific contextual nature while others have opined that all unique cases are often examples within broader groups. As such qualitative researchers should not be hasty in discarding the prospects of transferability. There is generally a disagreement about the nature and extent of background information required to ascertain the transferability of a qualitative study. However Guba (1981) suggests that a thick description of the contexts would go a long way to aid an assessment of whether the findings in a Context A are also likely to hold in Context B. Shenton (2004) suggested a number of other strategies that can be utilized. Some of these strategies including: (i) the number of organisations taking part in the study and where they are based, (ii) any restrictions in the type of people who contributed data, (iii) the number of participants involved in the field work, (iv) the data collection methods that were employed, (v) the number and length of the data collection sessions, and (vi) the time period over which the data was collected, were considered in this research.

### 3.8.3 Dependability

Guba (1981) refers to this as consistency. He contends that this counterpart of reliability (quantitative studies) seeks to ascertain how one can determine that the findings of a study would be consistently repeated if the study were replicated with the same (or similar) subjects in the same (or similar) context. The major issue with qualitative research is the changing nature of the phenomenon (environment, participant) that is investigated by the qualitative researcher (Shenton, 2004). In addressing this issue, the following strategies were used in this research as suggested by Shenton (2004). This included a detailed report of the processes utilized in the course of the research to enable future researchers repeat the work. The considerations included: (i) the research design and its implementation – this provided a description of what was planned and executed, (ii) the operational detail of data gathering – this provided detailed information about what was done on the field, and (iii) a reflective appraisal of the project – this evaluated the effectiveness of the process of enquiry.

### 3.8.4 Confirmability

Also referred to as neutrality by Guba (1981), it seeks to establish the degree to which one can determine that the findings of a study are a function solely of subjects and conditions of the study and not the biases, motivations, interests, perspectives, etc. of the researcher. How-

ever, even conventional objectivity in positivist research is contendable considering that it is supposed to be performed using instruments that are not dependent on human skills and perception but then these instruments (tests & questionnaires) are developed by humans (Shenton, 2004). Ensuring the confirmability of in qualitative research therefore requires the researcher to show as much as possible how the results are the outcomes of the information provided by the respondents rather than the prejudices of the researcher. A number of strategies have been recommended for resolving the challenge of confirmability in qualitative research. Among those considered in the current research are: (i) the admission of the researchers own predispositions – the underpinning beliefs regarding decisions and methods are acknowledged, (ii) recognition of the shortcomings in study' methods and their potential effects, and (iii) detailed methodological description – to enable readers assess how data and constructs emerge from the research (Shenton, 2004).

## 3.9 Limitations of the study

The limitations of the study mostly lie in the level of access provided by the various cases. Most participants were judicious with their information in many cases while many others could not provide adequate descriptions due to the failure of many of these institutions to engage in detailed planning. Almost all the institutions lacked appropriate documentation of the institutional efforts to introduce e-learning through the deployment of LMS. The researcher therefore had to painstaking utilize dialectical hermeneutics to extract relevant information for understanding the institutional processes.

## 3.10 Chapter summary

The multiple case study design has been very useful in enabling an understanding of institutional implementation of a technological innovation in teaching and learning among HEIs in Ghana to be understood. More importantly, through the application of hermeneutical and structuration strategies, deep understanding of how these institutions go about their implementation could be elicited. In the next chapter, the conceptual framework used as a sensitizing framework is presented.

# CHAPTER FOUR

## 4.0 CONCEPTUAL FRAMEWORK

### 4.1 Introduction

The conceptual framework shown below highlights the e-learning implementation process of higher education institutions. E-learning implementation in HEIs is a complex and dynamic process involving multiple sub-processes that must be managed for a successful and effective implementation. A good understanding of institutional implementation of e-learning therefore requires a framework that captures the innovation, change implications, and diffusion. Such a framework should be strongly underpinned by organisational innovation theories, change theories and the diffusion of innovation theory. The framework should also capture (highlight) the contextual factors and how they influence implementation efforts. Innovation implementation and IS implementation frameworks have been developed and used to deploy information systems in organisations. The current framework, adapted and extended from Kwon & Zmud (1987) and Cooper & Zmud (1990) IS/IT implementation process, suggests that the implementation of a technological innovation such as e-learning goes through a process – from the conception of the idea to its physical realization. The process further identifies distinct rational phases which occur in a sequence but as argued by Cooper & Zmud (1990), "if the stages are thought of as activities, some of which may occur in parallel, such a model can encompass the variety of IT applications and IT implementation processes observed in most organisations". The phases identify activities performed directly or indirectly by an institution with the objective of realizing the technology's purpose. The framework connotes a planned approach to implementation based on lessons from organizational innovation process, planned change process, innovation diffusion theory and IS implementation process framework. A brief discussion of the five contextual believed to influence organisational IS implementation efforts is also presented below and is used to categorise factors identified to influence the cases studied.

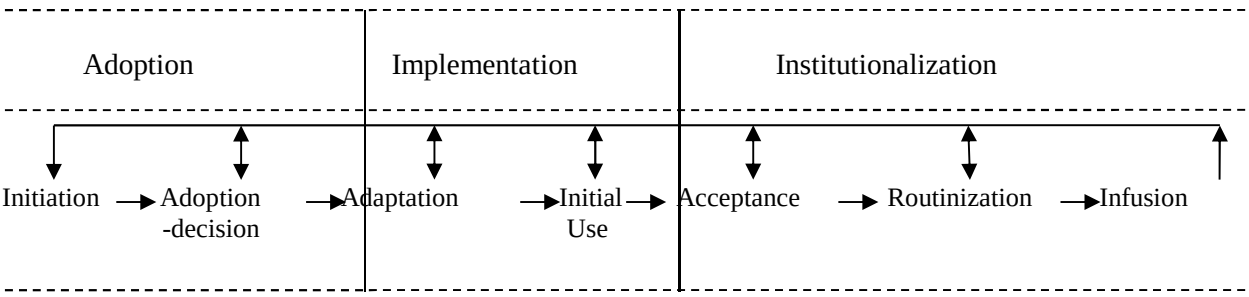



Figure 14: Institutional e-learning implementation process (Source: Cooper & Zmud, 1990)

## 4.2 Initiation stage

At this stage of an institution's e-learning implementation journey, the idea of the technology's potential in solving institutional teaching and learning problems or facilitating the institution's strategic goals is birthed. Such innovative ideas typically originate from a need-pull (perceived institutional need) or technology-push (perceived advantages of the technology) that potentially influences the outcomes of any implementation effort by the institution. The source of the idea and the subsequent activities performed in connection to the idea is important at this stage. The information held by the institution about the technology at this stage is important in shaping the activities to be performed in relation to its introduction. The depth of understanding about the tasks and processes to be facilitated or performed by the technology is also crucial in matching the technology's potential with the tasks at the stage. Serious considerations for instructional design issues, pedagogy and student learning ought to be considered prior to a decision on a particular technological solution.

Important knowledge about the e-learning technological innovation (e-learning system) is developed at this stage by the institution and its members. The characteristics of the e-learning system play a critical role in shaping the beliefs and perceptions institutional members have. The communication of available information about the e-learning system using several communication channels for the purpose of creating the needed awareness while fostering favourable perceptions among institutional members is important in persuading members to make a positive decision to adopt the e-learning system.

Also important in this stage is the assessment of the institution's readiness in terms of IT infrastructure adequacy, IT technical and support services availability, instructional designers and online learning environment (e-learning) experts. This assessment is highly dependent on the specified purpose the institution wants to attain with the e-learning system.

Since several e-learning systems exist on the market, institutions should be led to match tasks to be performed with available solutions on the market to ensure that they are not technology-led. Both proprietary and open-source systems are available on the market with support availability ranging from available (proprietary systems) to partially- and non-available (open-source systems). Although cost and maintenance is a major issue in the selection of an e-learning system, customizability of the system to the institution's process and practices remain an important consideration in the final choice.

An equally important consideration at this stage is a consideration for the institutional processes and practices likely to be affected by the introduction of the e-learning system. Are new roles and processes to be introduced? Will existing roles and processes relating to teaching and learning be changed in a major way? Answers to these questions would facilitate those threatened by the introduction of the e-learning system to be reassured and encouraged to have a positive perception about the system.

**Stage description: The identification of an e-learning solution through an active or passive examination of an institution's needs/opportunities and IT solutions either from a need-pull or technology push drive or both.**

## 4.3 Adoption-decision

At this stage of the institutional e-learning implementation process, a decision is made to adopt a specific e-learning system based on some institutional specifications. This specification must meet the instructional design requirements, pedagogical requirement, IT infrastructural requirement, as well as other important institutional requirement. How this decision is made varies with institutions. However, it is important to acquire the consensus of stakeholders (or their representatives acting as change agents) in the final decision. Their involvement can create a feeling of ownership of the system which will facilitate the adoption process.

Another important activity at this stage is the identification and commitment of the necessary institutional resources for the physical deployment of the e-learning system. These resources should cover infrastructural availability, IT technical support, training, policies and guidelines, e-learning change agents (champions) and e-learning experts.

Also important at this stage is the detailed planning of the rest of the implementation activities after the decision has been taken on the e-learning system to adopt. Of particular importance in the planning activity is how the e-learning will be rolled-out in the actual teaching and learning context. This is more of a strategic than operational issue but nonetheless very essential. The absence of clear guidelines on this issue can mar the expected outcome of any successful technical implementation. Important considerations on how the users can integrate the e-learning system into their individual courses should be given adequate attention.

**Stage description: Rational and political negotiations ensue to get institutional backing for implementation of the e-learning system.**

## 4.4 Adaptation stage

In the adaptation stage, the e-learning system is developed from scratch, or a proprietary or open-source system is acquired, customized, installed and maintained. An important component of this stage is the development of the e-learning content. Several options available to the institution include the purchase or subscription to already developed content, the development of content by staff with appropriate resolution of copyright and intellectual property right issues, or with ownership shared by institution and content developers.

Equally important at this stage is the consideration of the infrastructure for hosting, accessing and providing the e-learning services to users. Both on-campus and off-campus accessibility must be available and reliable, with appropriate resolution of internet and bandwidth issues, security issues etc. An important consideration here is where to host the application – on campus or off-campus on a server probably residing in another country. Several factors need to be considered here – among which are the cost, administration and security of the server, accessibility due to electricity reliability among others.

During the configuration and installation of the system, it is important to note the existing institutional processes relating to teaching and learning and their administration to be incor-

porated into the new e-learning system. This is where the level of change identified and required by the institution becomes important. The e-learning system's functionality allows the programming of the institution's teaching and learning practices as well as administrative requirements to be performed on the system. This feature allows users who may resist, believing that the new system will replace their existing work tasks and comfort zone, to be at ease with less apprehension about the system. Related to this configuration are specific institutional guidelines on how the system is to be integrated and used in the delivery of courses. The availability of these generic guidelines will ensure consistency in basic institutional requirements and will succeed if deans of schools and heads of department are actively involved in the process.

Closely related to the development, installation and maintenance of the e-learning system is the training of the users in the use of the e-learning system's functionalities and the new processes introduced along with the system. Such trainings need to cover general skills in online teaching and learning, skills in using the e-learning system, familiarization with the administration processes of the new system, as well as the institutional guidelines on the system's use for all courses. Where this direction is not provided by the institution, the desired aspirations will not be met.

**Stage description: The development, installation and maintenance of the e-learning system with configuration of the system to suit institutional requirements or modification of institutional processes to fit system, and training of institutional members in the new procedures and the new system.**

## 4.5 Initial Use stage

In this stage the e-learning system is formally rolled-out and applied as prescribed by the institution by its members in teaching and learning. A systematic approach to the system's application in the delivery of course objectives would enable the rapid integration of the e-learning system into the institution's traditional environment. In other words, rather than leaving instructors to decide on which functionalities of the system to use, a basic institutional requirement of specific functionalities of the e-learning system to be incorporated in each course would ensure compliance and effectiveness in use.

The nature of this use is dependent on the institution's objectives for the introduction of the system as in whether it is intended to support existing teaching and learning, compliment traditional classroom activities, or replace the traditional classroom activities. This will equally depend on the analysis of institutional needs or opportunities that were identified and matched with the e-learning system's capabilities.

Equally important at this stage is the monitoring of the system's accessibility, reliability, security, technical and user support. The institution's IT infrastructure plays a major role in reenforcing earlier positive attitudes about the system. Where the usage experience varies from initial beliefs and perceptions about the system's usefulness etc, users may feel reluctant to continue usage. This situation can be worsened by the absence of an always available technical and user support to help users resolve problems they encounter. Any gains could immediately be eroded.

Additional trainings should be provided during this stage with the purpose of ensuring (checklist) that the basic functional requirements of the system have been incorporated in the various courses and are being used. Such trainings should include higher levels of usage of the system scheduled for a latter period in the implementation process.

As much data as possible on user experiences must be collected at this point to enable the institution gain a first-hand understanding issues that may have positively or adversely affected the intention of users to continue usage. This can facilitate the preparation of the institution for the next stage in the implementation process.

**Stage description: Institutional experience gained from first time use of the e-learning system for conducting teaching and learning activities.**

## 4.6 Acceptance stage

In this stage the institution engages in activities aimed at securing the commitment of institutional members to the use of the e-learning system. Experiences of some users with important lessons to be gained could be reported and rewarded. Users who consistently used the system in the prescribed manner could also be commended and encouraged to show management's

satisfaction and support of their achievements. Prompt technical and user support services should be available and accessible with extra-mile support provided to more innovative users.

All institutional effort must be directed at reducing complaints and challenges while encouraging frequency of use and commitment. All impediments related to the task, the technology, the individual, the institution and the environment that affects the acceptance of the new system by users must be identified and addressed.

**Stage description: The inducement of institutional members to commit to e-learning system usage.**

## 4.7 Routinization stage

This stage is characterized by the detailed embedding of e-learning practices into traditional institutional practices and processes relating to teaching and learning. This integration can be observed at two levels: general institutional planning level and actual teaching and learning levels. At the planning level, consideration for e-learning issues could be incorporated into the budgeting process, staff development requirements, quality assurance in teaching and learning, institution‘s academic calendar (training, workshops, seminars, conferences, etc), establishment of an e-learning unit and introduction of an e-learning policy.

At the second level of observation where the actual teaching and learning takes place, documented institutional requirements regarding the levels of use for delivering learning, assessing students, submitting assignments – both group and individual works – via e-mail, and reporting grading can be introduced. Policies and procedures relating to using the e-learning system for supporting, complimenting or fully delivering traditional classroom activities should be clearly specified.

Instructors may be required to detail out in their course outline exactly how the system would be used in the delivery of their courses each semester, gradually offering varied options for all types of students with varying learning needs. All forms of communication between instructors and users can be required to be conducted via the e-learning system. Booking of appointments with instructors must all be scheduled on the system.

It is also marked by increased dependence on the system by users with an increasing notion that daily activities relating to teaching and learning cannot be completed without some level of use of the system.

The advantage of this stage is that all useful academic activities that can be supported by the system but presently unavailable could be programmed into the new system gradually bringing about the achievement of institutional visions.

**Stage description: Encouragement of e-learning system usage as a normal activity through integration with institutional processes and practices.**

## 4.8 Infusion stage

At this stage all the functions on the e-learning system are in use with possible extensions of previously unanticipated uses at both institutional and individual levels. All users at this stage are fully utilising the system resulting in the anticipated efficiency and effectiveness of the institution.

All other institutional information system will at this stage be integrated into an institutional resource system. Examples of some of these information systems include student information systems (SIS), student records system (SRS), student finance, accommodation, student portal, registration etc. the integration of all of these systems into a one institutional information system with a single access will not only reduce burdens on users, but also usher the institution into a state of offering fully online programmes to interested students both local and international.

With this approach, instructors will be able to offer fully online courses for interested students while enabling physical meetings for interested students. This can potentially reduce the number of students in a class, allowing the instructor to be more effective.

**Stage description: Realization of increased institutional effectiveness attributable to the use of the e-learning system in a more comprehensive and integrated approach to support higher level aspects of institutional work.**

## 4.9 Contextual factors influencing IS implementation efforts in organisations.

A review of the empirical and non-empirical literature on organizational innovation and IS implementation by Kwon & Zmud (1987) identified five key factors that contribute to successful (or non-successful) efforts at introducing technological innovations in organisations: individual, structural (organizational), technological, task-related and environmental factors. a brief discussion of these factors as reviewed by Kwon & Zmud (1987) is presented below.

### 4.9.1 Individual:

Kwon & Zmud (1987) found that many of the innovation researches considering individual factors tended to focus on adoption behaviours. Four of the most commonly used individual variables identified included: job tenure, cosmopolitan, educational background and organizational role involvement. Findings showed that attitude towards change correlates very highly to these variables while these changes in behaviour have been observed to be invoked within innovation projects. The review also revealed that most researchers studying individual factors tend to limit their investigations to IS use-performance-satisfaction. With the job tenure variable, negative associations were found in the IS literature between it and usage and satisfaction while mixed findings have been found with performance. This is despite the positive relationships consistently found in innovation research. It is argued that this factor relates to institutional legitimacy with an individual' increasing functional or political knowledge resulting in a positive relationship while an individual' bounded capacity can result in a negative relationship. With the case of cosmopolitanism (a variable often associated with attitude towards change), it has been argued that through contacts with others outside the organisation and acquisition of a broader perspective, positive associations can result. Although evidence of this exists, negative associations have also been found with adoption with positive relationships being identified between professionalism and adoption as well as with incorporation. In the same vein, education has been identified to be related to attitude towards change. The argument has been that the higher an individual's education, the more likely the receptivity. Although positive results have consistently been found in organisational innovation studies, in the IS literature, negative results have been found with usage and satisfaction with findings in relation to performance being mixed. Kwon & Zmud also found in the case of role involvement that an individual' broad involvement in managerial can result in a positive attitude towards adoption. Other constructs such as top management and user participation have also been found to be associated with attitude towards change.

### 4.9.2 Structural (organisation):

This factor focuses on the formal and informal structural arrangements often found in organisations. Both have been identified to influence technological innovations introduced into organisations. Kwon & Zmud's (1987) review found the following variables to be often researched into especially in relation to initiation and adoption behaviours in innovation: specialization (complexity and functional specialization), centralization (concentration of decision making), and formalization (functional differentiation). The argument for specialization has been that for technical rationality reasons, it is essential and has positive effects but can also has a potential to increase social and political conflict. Although positive associations have been identified with initiation, adoption and performance, some negative findings have also been found with adoption. With centralization, when a bounded point of view exists along with a decreased autonomy, these can be viewed as a negative effect of centralization. However the positive effect tends to be seen in the form of increased efficiency. A number of relationships have been identified with negative associations found with initiation, adoption, adaptation, and performance. Positive associations have also been found with adoption and usage in some cases. In the case of formalization where the degree of functional differentiation has the potential to develop clear work definition and procedure but can also lead to less autonomy, a number of propositions or findings have been made with respect to initiation in innovation studies. That notwithstanding, consistent positive relations have also been found or proposed with adoption, adaptation, usage and performance.

### 4.9.3 Technological:

Kwon & Zmud (1987) found that the influence of the characteristics of innovation on the innovation process has been examined extensively by researchers. Variables that have consistently been identified to influence innovation behaviours include: compatibility, relative advantage, and complexity. With compatibility, the fit between the organisation and the technological innovation is an important factor in successful innovation. This fit has also been identified to be important for individual' attitude towards the change, convenience of the change, change or shifts in power, etc. basically, positive associations have been identified with adoption and adaptation. The argument with relative advantage has been that an innovation must be perceived as providing greater organisational benefits than the status quo or other innovation. Where this is not the case, the innovation may be perceived as less beneficial which can adversely affect the innovation's use. In their review, Kwon & Zmud (1987) iden-

tified general positive associations in adoption and adaptation with weak negative associations in a few studies. The complexity variable which measures the degree of difficulty experienced by users in understanding and using an innovation has been found to negatively affect adopters and users where no high need for growth and achievement exists. It has been found that lack of skill and knowledge is often behind efforts to resist organisational innovations and thus for innovations to succeed the perception of its ease of use and understanding must be high. Both negative and positive associations have been reported in the literature.

### 4.9.4 Task-related:

According to Kwon & Zmud (1987), task-related factors which stimulate change and provide a challenge and meaning to work appear to have received little attention in the innovation literature. Their review highlighted two ways in which tasks could be examined: task uncertainty and the five-key task-related attributes of Hackman & Oldham – task autonomy, responsibility (significance), variety, identity and feedback - (cited in Kwon & Zmud, 1987). Task uncertainty is viewed as a major factor influencing organisational behaviour. It is a multi-facet construct that reflects the degree of routinization, programmability, and exceptions in accomplishing organisational tasks. In their review Kwon & Zmud (1987) noted this variable to be capable of having a positive influence where the task difficulty motivates initiation and usage behaviours; and a negative behaviour where it acts as an impediment to implementation. With autonomy, the degree to which an individual exercises personal control over their assigned tasks is the focus of interest. A higher degree of autonomy is believed to be capable of increasing workers motivation, idea generation, satisfaction and performance. Kwon & Zmud (1987) noted there have been inconclusive findings for performance in the organisational literature. The case for the responsibility variable which relates to the degree of authority invested in an individual to oversee the completion of a task and to improve the existing task behaviour has been its ability to influence organisational innovation. Kwon & Zmud (1987) found in their review that positive associations have been found or proposed with satisfaction and performance. The argument for variety as found by Kwon & Zmud (1987) is that it is a common belief that simplified and routinized tasks are not likely to lead to higher performance and satisfaction where the tasks require some ‘value addition’ by the performer of the task. Positive associations have been found with adoption, adaptation, usage, satisfaction and performance while it has been argued that the routinization of tasks can divorce employees from change and further cause to resistance to change. The identity variable refers to

an individual's internalization of an assigned task. Where the individual identifies with and believes in an assigned task, it can potentially increase the individual' task involvement and result in more innovative behaviours. According to Kwon & Zmud (1987) positive associations have been found with satisfaction while inconclusive associations with performance have been identified. With the feedback variable, a mechanism is found to inform an individual of the task performance levels as it is believed that a positive association can be expected between the frequency of feedback and the level of innovation displayed in behaviour. This is based on the theories of learning and reinforcements. Although positive associations have been found generally with satisfaction, inconclusive ones have been found for performance.

### 4.9.5 Environmental:

The review also highlighted a number of environmental factors although studies in this area were observed to be rare. The two perspectives dominant in this area had to do with the environment being a source of information and the environment being a stock of resources. While the first perspective asserts heterogeneity and uncertainty as the variables of relevance, the second perspective advocates competition and resource concentration/dispersion. In other words, with heterogeneity, similarities of the entities within the environment with which the institution must interact with are good for organisational innovations. Positive associations were identified in some researches as found by Kwon & Zmud (1987). These environmental contingencies are believed to stimulate, rather than inhibit innovation as the diversity created in the environment provide opportunities for various organizational roles. With uncertainty, the variability in the environment can create situations of turbulence and instability as well as stability for an institution. It is believed where uncertainty exists, an organisation is stimulated to strive for survival and growth rather than just give in. positive associations have therefore been identified with this variable. With adoption however, there is the belief that a negative relationship will exist as the uncertainty poses a constraint on the scope and amount of innovation available to potential adopters. In the case of competition, the environment' capacity in terms scarcity of resources along with population density are the issues of concern as it is believed competition increases the likelihood of innovative activities. As observed by Kwon & Zmud, positive relationships exist between adoption and competition. With the concentration/dispersion variable, the argument is that the more concentrated resources are located in an environment, the more likely it is to facilitate organisational learning which can result in innovation in the organisational effort to compete for the limited resources. As ob-

served by Kwon & Zmud, positive associations have been found or proposed with adoption and incorporation.

## 4.10 Chapter Summary

The framework presented above depicts a rational process an institution seeking to implement a technological innovation such as the LMS for teaching and learning purposes is likely to follow. Broadly, the three main phases suggests an institution is likely to make a decision to adopt an innovation, physically introduces the innovation, and then acts to embed the innovation into its existing practices and processes. At a deeper level however, this is likely to vary from institution to institution due to contextual influences. These influences have been identified as the individual, task, technology, organisation and environment. The rest of this study sought to understand how HEIs in Ghana implemented their learning management systems using this framework as sensitizing constructs.

# CHAPTER FIVE

## 5.0 RESEARCH FINDINGS – A HERMENEUTICAL APPROACH

### 5.1 Introduction

In this section' findings from the case study are presented from a hermeneutical perspective. The hermeneutical lens is applied to the data to enable an understanding of the data to be grasped for further analysis to be made based on the data. In the following sections, the implementation of the Moodle LMS by the various cases is described.

### 5.2 University of Accra

#### 5.2.1 Initiation of LMS

At an academic board meeting, the president informed members of the institution's intention to introduce e-learning. The deans and heads of departments were asked to inform the members of their faculties about this and to discuss what courses would initially be introduced online. Upon discussion with members of their faculty certain concerns were raised. The deans subsequently brought a report to the management of the institution, highlighting the concerns of faculty members. As a result of the concerns raised, management arranged for an external facilitator to train the faculty members on how technology could be incorporated into all kinds of courses, including Engineering.

Management later held a meeting with the IT department and charged them to look into the kinds of Learning Management Platforms available.. After investigating into the different LMS platforms on the market, both Open Source and Proprietary, the IT department recommended an open source platform, Moodle LMS. The IT department had about three meetings with top management in relation to the LMS selection and deployment. In the third meeting a staff of the institution' IT department was informed about the institution's decision to have him undertake training in how to setup and deploy the Moodle LMS from the United Kingdom.

#### 5.2.2 Training and deployment of the Moodle LMS

The IT personnel was subsequently sent to the UK to study how to setup and deploy the Moodle LMS for one week. He was given the responsibility of setting up the Moodle plat-

form, training faculty in the use of the system, and assisting faculty members to populate their courses on the platform. After the one week training, the Moodle administrator returned and setup the system on a standalone PC that was converted into a server.

The Moodle LMS was originally setup on a local sever that located in the IT department. This was based on initial decision to host the LMS platform on the institution's premises and have it managed by an in-house team of IT personnel. During this same period, the country experienced severe power outages that posed several challenges to the hosting of the Moodle platform on campus. Firstly, the frequent power cuts meant the server could not always be available for the resources on the platform to be accessed by students and faculty members. Secondly, although An uninterruptible power supply (UPS) was made available, the power cuts sometimes lasted for several hours, causing the UPS to run out. It was finally decided that the Moodle platform should be hosted on an external server where the institution's web-site was being hosted. A sub-domain was subsequently created and the Moodle application downloaded and installed unto it.

#### *5.2.2.1 Training of Users (Faculty)*

After the Moodle platform had been deployed, two training sessions were organized to introduce and train faculty members to the platform and its use. Although e-mails and announcements were sent and made, the turnout of faculty members was poor. Only (5) faculty members were in attendance during the first training session that was scheduled. In the second training session, only two faculty members were in attendance. Clearly the implementation team were not making any headway. A decision was then taken by the lead IT personnel behind the administration of the platform to approach faculty members and train on a one-on-one basis.

Scheduling training periods was a challenge. All the faculty members could not be gotten to attend the training sessions on a day suitable to all of them. Equally, the one-on-one training also proved to be challenging, although a little better than the two original training sessions. Through this approach, the e-learning administrator was able to get several faculty members to be trained at their convenience. These trainings focused on the Moodle platform and its various features.

#### *5.2.2.2 Content Development (Courseware)*

The content for the Moodle platform was to be developed by faculty members. This caused delays in the uploading of materials online since faculty members were not making the materials available. At the undergraduate level, the efforts of the Moodle administrator yielded some responses from some faculty members, particularly from the Informatics Faculty to provide course materials to be uploaded unto the system. At the graduate level, the institution at that time had entered into a collaboration with a UK university to offer 28 Masters' programmes. Due to this collaboration, the course materials by way of PDFs and PowerPoint slides were available. These were subsequently uploaded for students' access. All these were undertaken by the Moodle administrator.

#### *5.2.2.3 Populating the Moodle LMS*

The populating of the system with course materials was originally to be conducted by faculty members. However this was later performed by the Moodle administrator when lecturers delayed in uploading their courseware. At the undergraduate level about (7) lecturers provided their course materials to be uploaded onto the system while at the graduate level, the materials for all the courses were made available (28). The case of the graduate programmes having their resources (especially PowerPoint) on the Moodle was due to the collaboration with an institution that had the resources already made available. The Moodle administrator complained of having to 'chase' faculty members for their course materials and indicated that some lecturers actually prepared their lecture notes a day to their meeting with the students.

#### *5.2.2.4 Faculty and Student Use of the Moodle LMS*

According to the Moodle administrator, the use of the Moodle LMS has to follow three steps: 1) Placement of course materials and resources on the platform for students to access; 2) interaction and collaboration between faculty and students, student and student, and student and content; and 3) assessment.

After the system administrator had created all courses in the undergraduate and graduate programmes on the Moodle platform, what was left was the populating of the Moodle with course materials. Faculty members and students were provided with institutional emails and passwords. The passwords however were supposed to be changed after their first access of the system. At the undergraduate level, the Moodle administrator observed that no faculty

member was accessing the system even though some had provided their course materials to be placed online. Students at the undergraduate level too were not accessing the system. On the activity logs, no activity was recorded on the system.

At the graduate level however, students were observed to be accessing and downloading materials from the platform. All students however used a single logon username and password provided by the Moodle administrator. This decision was taken by the Moodle administrator upon the realization that some of the students had certain courses in common even though they were pursuing different programmes.

For the undergraduate programmes, although some courses particularly from the Informatics Faculty had been uploaded on the system, students were not accessing it. The faculty members themselves who had made the materials available to the administrator were also not seen to be utilizing the platform for teaching and learning activities. Thus the other stages where interaction, collaboration and assessment would have taken place could not be realized.

At the graduate level, two faculty members were observed to be utilizing the system more frequently than the others. While one used the system to provide course materials regularly, the other provided course materials, interacted with students and assessed them. However, the faculty member who provided the course materials regularly later relaxed his use of the system since he could not get to interact with students on a one-on-one basis.

#### *5.2.2.5 Outcome of initial rollout*

After the rollout of the Moodle platform in 2010, the use of the LMS could best be described as no-use for the undergraduate programmes and infrequent to just a depository for graduate students. Faculty members with the exception of two (2) members used it infrequently while students accessed it mostly for their lecture notes and slides. In 2011, the Moodle administrator was further tasked to ensure that the enrolment and use of Moodle by faculty and student increased. During this period, he visited faculty members frequently offering training and other assistance, especially at the undergraduate level but still there was little interest and enthusiasm. By June 2012, no one was using the platform, not even for downloading documents.

#### *5.2.2.6 New developments*

In December 2012, an Instructional Technologist was employed to spearhead the institution's e-learning ambitions. The instructional technologist was very instrumental in the establishment of an online unit that was to oversee the development and implementation of the institution's online vision.

In January 2013, the institution organized a retreat for its faculty members outside of their familiar environment. At that meeting the head of the online unit made a presentation on the institution's e-learning unit and institutional e-learning vision. At that meeting faculty members received more clarification about what the institution meant by 'going online'. The e-learning concept and the associated benefits and different modes were explained bringing many faculty members to speed with the concept.

The recruitment of an instructional technologist, the establishment of an institutional Online Unit led to eight (8) courses being piloted on the Moodle platform. The unit provided training for faculty members on the Moodle platform and its various functionalities assisted the faculty members to develop their multimedia contents, setup their courses on the platform, collaborate with students, as well as assess students. Faculty members were provided both group training and one-on-one training. A multimedia section was setup and equipped with cameras and the Camtesia software to enable their lectures to be recorded and integrated with their lecture slides. The services of the unit were thus available to the faculties and students during opening hours from Monday – Friday, 8am – 5pm.

##### 5.2.2.6.1 Students' awareness and sensitization

An orientation was organized for new students where they were introduced to the Moodle platform and its functionalities. Students were allowed to ask questions after which they were directed to the offices of the online unit where they could have their needs supported and addressed. After this orientation, the head of the unit and her three (3) supporting staff of two (2) assistant instructional technologists and one (1) secretary/web administrator went from class to class, spending on the average between 10 – 15 minutes showing students how to use the system. Students were shown how to access the system for the first time, view courses, take quizzes and contribute to forum discussions. They were also shown how to update their profile information.

#### 5.2.2.6.2 Faculty members' use of the Moodle Platform

The eight (8) faculty members who piloted their courses online had their courses setup and populated by the online unit with content developed by faculty members. The content included lecture notes, PowerPoint slides with video embedded, links to videos on YouTube, and quizzes. The experience for the faculty members was new and interesting. Although some were sceptical from the start, they latter warmed up to the systems benefits, especially when they had to organize quizzes. Since some of the classes were large, the instant marking by the system and results generation eased the burden of marking for them. They were also able to interact with their students on a one-on-one basis, something which the traditional face-to-face could not allow. Through the use of emails, chats and notice boards, the faculty members were able to communicate more with their students on issues relating to the course, an experience which previously was challenging.

#### 5.2.2.6.3 Students' use of the Moodle platform

The number of students for the 8 courses ranged from 60 – 150. Students were required to download course materials and read before attending classes. They were also given weeks where they were required to do self-study and collaborate with other students. Assignments were also given by some of the faculty members to be downloaded, performed and uploaded back unto the system. Quizzes were set for students with specific start and end times. Some of these quizzes were open for a number of days while some were opened for just a few hours.

The experience with the quizzes showed that some students were yet to take the system seriously despite what their course lecturers and the online unit had made them aware of. The online units received several complaints from students claiming they could not access the system. Checks on the user logs however showed that some of these students had actually accessed the system on several occasions but were trying to find excuses for not haven done the quizzes or submitted their assignments on time. In some other cases, some students having probably not performed well in the quizzes wanted to redo them but the setup of the quizzes did not allow them prompting them to give an excuse of not being able to access the system, with the hope of having it reopened for them. However, since evidence of their activities on the platform is always logged, this made it difficult for them to have their way.

Overall, the students were thrilled by the opportunity to access course materials prior to going for lectures, the opportunity to interact with their lecturers and colleagues outside of class hours, and the quizzes provided to test their understanding after each topic is dealt with.

#### 5.2.2.6.4 Training and certification of Faculty members

In June 2013, a training and certification programme was organized for all faculty members in the institution. The purpose of the training was to introduce faculty members to trends in e-learning in higher education, instructional design and development, multimedia development, students' learning style and outcomes, online learning assessment, grading and reporting, learning theories and paradigms, learning and course management systems, and certify them to train online. The training lasted two weeks during which both old and new faculty members (in terms of Moodle use) were introduced to the Moodle platform and its functionalities. Members had sufficient time due to the fact that the school was on recess, to attend and actively participate in the training. The training provided both theoretical and practical insights into the LMS platform and teaching/learning. Faculty members were taken through the role of students were they were made to interact with the contents put there by the facilitators, interact with each other as colleagues posting on forums (threaded discussions) and undertaking quizzes. The participants were also shown how to link external resources on the web, like YouTube to their courses to enable students' access them. They were also exposed to the experience of faculty members where they were made to develop courses, place them online, develop quizzes, and respond to students' posts. The experienced faculty members who piloted the Moodle platform the previous semester were brought in to share their experiences with the rest. They enlightened colleagues on their challenges, successes and future intentions to use the Moodle LMS.

At the training and certification of faculty members, the top management including the president of the institution, the vice president and the registrar were in attendance and played active roles throughout the session. From their very presence as chairs to actual facilitators in the training programme, they communicated leadership and support for the programme.
During the training several issues were brought to light which threw light on the hesitation by some faculty members to get involved in the institution's vision of going online. Faculty members asked questions about the institution's infrastructural reliability in particular the old network equipment and unreliability of the internet. Other participants complained about their

operating systems and the inability of their browsers to access some websites including the Moodle platform. Issues were also raised with the security of the Moodle, the going online, accreditation, courseware development and the enrolling of students unto a course. It was evident there were a lot of unresolved and unclear issues which were acting as blockades to the successful rollout of the Moodle. These issues would be described more fully below.
The attendance of some faculty members was however irregular due to other institutional engagements like the defence sessions of graduating students at both the graduate and undergraduate levels. In particular most members of the Faculty of Informatics could not attend the training regularly. This also was not appropriately resolved by top management.

Several clarifications had to be made on exactly what management meant by going online. There were conflicting instructions being communicated among the various faculties on the courses and the number of courses that were supposed to go online. Information was being circulated that all courses had to go online by the next academic year (the next semester 2013/2014). At the training, members still could not get a clear idea of exactly what was meant. Some faculties were teaching more than two courses and so wondered whether all their courses had to go online. The actual nature of the online delivery expected by the school was still not clear.

There were issues of remuneration for courseware development which was still hanging. The top management of the institution expected lecturers to develop and make their course content available to students freely but faculty members were concerned about putting their knowledge freely out there. They were expecting some sort of compensation, but the institution had made no decision as yet on that.

The ready availability of IT personnel to resolve problems experienced by the faculty members was also raised. Many times, they could not get the IT personnel to attend to their problems. When they did, the problems often failed to be adequately addressed. This seemed to create some doubt as to the institution's real readiness to deploy teaching and learning online.

Another training was scheduled to run for the administrators providing student support services. This was scheduled for July but eventually had to be postponed to August. This eventually could not be run for the administrators.

#### 5.2.2.6.5 Conflict of LMS platforms

During the certification training for all faculties a new LMS platform was introduced. This platform was a module in a school enterprise system that management was trying to introduce. This was a proprietary system procured from an IT company in India. This enterprise system called Academia educational resource planning (ERP) consisted of administrative features including students' admission, registration, accounts and fees processing, library, procurement, students' records, human resource management, hostel management, facilities management and a LMS called WebGuru.

Both LMS applications, Moodle and WebGuru were introduced at the training and faculty members taken through them. Certain challenges were identified in the setup of the WebGuru platform which raised concerns from participants. For instance, the size of files that could be uploaded unto the platform was 2KB. The head of the online unit had limited access on the system, and all staff logged unto the ERP could see everyone's personal information. Management however was resolute that in the coming semester, the WebGuru was going to be used. It was also observed that the in-house stakeholders had not been actively involved with the requirement elicitation and specification of the new system. As such they had very little knowledge and control of the ERP and could provide very little assistance. All assistance had to be sought from India.

#### 5.2.2.6.6 Start of the 2013/2014 academic year

In August 2013, all faculty members were expected to set up at least one course online. This directive was from top management and was disseminated through the deans and heads of the departments prior to the certification training for all faculties and during the training programme. Twenty five (25) courses were mounted onto the Moodle platform including the eight (8) piloted courses.

Despite the training and certification that had been provided and the support available, the take-off of the institutional online programme did not turn out as expected. Many of the expected faculty members did not put their courses online.

Prior to the re-opening of the institution for the academic year, the head of the online unit had travelled on her annual holiday. Information however was circulating that she had left the institution.

When faculty members were questioned by management as to why they failed to comply with the instruction, members answers they had not been trained to go online. Students were also 'instigated' to complain and demonstrate that the Moodle platform was useless and inaccessible and for the platform to be scrapped.

Situations took a bad turn when management advertised the positions of all staff members in the online unit unknown to the staff. This caused some of the staff to resign from their posts since they felt insecure.

Somehow the zeal and excitement exhibited during the training programme for the certification of faculty members died down with a looming indecision about which LMS platform was being used and a number of unresolved issues.

### 5.2.3 Institutionalization

Although important steps have been taken by the management of the institution to encourage and entrench the integration of e-learning into the traditional teaching and learning practices, this appears to be far from being realized. This can be attributed to the unaddressed concerns of faculty members who happen to be the main stakeholders in this innovation. Management believes faculty should simply adopt the use of the LMS platform as a normal practice of their profession. However faculty had a different perspective with management failing to address their concerns. Without the resolution of this invisible impasse, any meaning utilization and routinization of e-learning within the institution may be faced with challenges.

### 5.2.4 Conclusion

Although the institution was determined in its ambition to go online, the entire process appears to have been challenged and facilitated by a number of manageable approaches. The nature of stakeholder involvement and participation, the reliability of the institution's infrastructure, the clarity of institutional vision and goals on going online, absence of incentives

and failure to resolve concerns of faculty limited the successful implementation of the e-learning.

## 5.3 Metropolitan University of Ghana

### 5.3.1 Initiation of LMS

A computer science lecturer and a group of his students involved in the study and programming of an open source learning management system, Moodle, decided to establish an online university in Ghana due to the glaring absence of online education in the country and the increasing demand for higher education by an increasing population. The small group of developers having been involved in the study of the Moodle application for some time were able to quickly and quite easily setup the platform with the full involvement of their lecturer who was a Professor with several years of experience in the deployment and use of similar platforms in higher education institutions in the US.

It was decided from the very onset that only open source applications would be utilized for the development of the institution's information systems for the delivery of teaching and learning, and all other administrative and support services related to their core mandate. The Moodle platform was therefore to become the central system around which other systems would be developed through the search for and integration of plug-ins.

After setting up the Moodle platform, a decision was taken to develop the courseware for all the programmes to be introduced. The courses were to contain all the relevant information both general and content specific that the students would require to successfully complete their programme. The purpose was to ensure that the standards of quality of tuition in relation to content and process were consistent across all programmes and courses.

After creating and populating the courses on Moodle which was hosted on a server outside of the geographical boundaries of Ghana, accreditation was sought from the country's national accreditation board (NAB). After series of presentations as to the nature, structure and operationalization of the online education, the institution was accredited to offer on-campus and online education at the tertiary level.

### 5.3.2 Deployment and Use of the Moodle application

Since the institution's Moodle platform had been setup, configured and populated prior to their receiving accreditation to run higher degree programmes, the system was ready for use by both academics and students before the recruitment of either of them. The platform however was intended for students who were on distant enrolment since they were only required to attend physical classes twice a month. Faculty members therefore were required to undergo training in the use of the Moodle application prior to use. Trained faculty members were also required to take an examination to certify their understanding and skill in the use of the platform for teaching and learning activities. Those who did not get the pass mark were required to retake it until they satisfy all requirements. Refresher courses are provided at the beginning of every semester to ensure that all faculties are kept up-to-date with changes and improvements in the platform.

Students are also required to undergo an orientation after which they are examined to ensure their ability to use the platform. Subsequently, the students access the system for their course materials, assignments and general information about the course and other institutional requirements. They engage in forum discussions, chats and collaborations with other students and their facilitators. They are also able to check for their grades and request for information and institutional documents through the system.

#### *5.3.2.1 Use of Moodle by on-campus students (blended)*

Not long after receiving accreditation, the management of the institution took another decision to allow on-campus students to use the course resources available on the Moodle. This it was believed would enable students to prepare before coming to class and also free time for more interaction between course facilitators and students. Again it was intended to enable students get involved in the learning process by taking charge of their learning through prior access to all their courseware on the system. The belief was that since students had access to the information, lecturers would no longer need to read in class or dictate notes to students. There were the initial concerns that students would not attend classes after gaining access to lecturers' notes prior to attending lectures. A decision was subsequently taken to award marks to class attendance. This successfully mitigated the problem of non-attendance of classes.

On-campus students were therefore required to go into the system to access their courses prior to going to class. They downloaded, read and prepared themselves to engage in discussions and other collaborations in class. Students were sometimes required to undertake some online course related quizzes or assignments which were subsequently discussed and marks awarded in class. Failure on the part of students to prepare therefore was easily identified by facilitators as a teacher had access to students' activities through the log feature on the system. Strict deadlines were also attached to the quizzes and assignments. The opening and closing of quizzes on the system is usually announced to the students on the course page. Some quizzes were created for unit practices while others were set for general course assessment reflecting in the students' final grades. Students were also able to download their assignments from the system and submit via the system or manually as required by the course instructor. The system was therefore central to the institution's teaching and learning activities. As such the temporary breakdown of the system was seen as disruptive to the performance of the institution's core mandate, to the point of even crippling it.

Each student's account is populated with the recommended core and supplementary texts at the beginning of every semester. This guarantees that up-to-date texts and other learning materials are provided at the doorstep of the students, helping to solve the age long problems of students not being able to access relevant core texts. This task is performed by the institution at a central level prior to faculties being assigned or students registered for a particular course.

#### *5.3.2.2 Use of Moodle by distance students (online students)*

The category of students enrolled on the distance programme of the institution utilized the system to access their course resources including notes, core texts, assignment details including individual and group assignments, and communication and collaboration tools including email, chat, forum discussions, announcements and notices. The students were required to meet twice a month on campus to allow for face-to-face interaction with their instructors. Providing support to enhance students' private studies out of campus was essential to the institution's learning process. Courses had end of unit assessment quizzes to test students' comprehension of core concepts and determine whether unit objectives had been met. The face-to-face sessions was to provide students the opportunity to interact with their faculty members and do some presentations where required. All other student services like viewing

of results, getting notification on important institutional and course information and other support services could be accessed via the Moodle platform.

#### *5.3.2.3 Use of Moodle by faculty members*

Faculty members teaching the various courses were required to facilitate their courses both in the online mode as well as the blended modes. In the online mode, faculty members' presence was considered as very important by the institution since distant students had to be encouraged to go online and make use of the resources. It was important for the students to interact with their faculty and fellow students so as to experience a sense of belonging to a community of learners. This was also important in the blended mode albeit there was the need to meet on a weekly basis. Students were therefore supported through the Moodle system to engage with the learning resources both before and after face-to-face meetings on a personal as well as group level to enrich their learning experiences. Since the course sites were setup by the institution's courseware development team with the involvement of the President, faculty members were required to both utilize the course sites for their teaching and update the courseware with filed developments. Initially faculty members were given the opportunity to update their course sites themselves on the Moodle. However some developments were below institutional expectations. This resulted in a decision to have faculty members recommend changes for the institution's development team to update the various course sites. At the end of every semester therefore, faculty members are asked to review their courses based on the semester's experience and recommend improvements where necessary. Through this institutional requirement, new and useful texts and strategies have been suggested and incorporated into the institutional Moodle LMS on an on-going basis.

### 5.3.3 Institutionalization (other developments)

Due to the vision to establish a strong virtual presence to enable all institutional process to be conducted totally online, and facilitate fully online education, other institutional information systems have been developed and integrated with the Moodle platform using plug-ins. This has enabled the creation of a seamless access to all institutional processes and services. The acceptance of this institutional approach to delivering teaching and learning by faculty members and students came easily as instructors and students were sensitized and made to prepare through training and orientation before being recruited into the institution. There has subsequently been on-going refresher courses for faculty and orientations for students, reinforcing

institutional structures of what it means to teach in the institution, what is available for supporting institutionally approved work and what is accepted as normal behaviour among institutional members.

The development of a digital library and its integration with the Moodle has further created a one single log-on that allows students to access important digital information (books, journals, etc.) relevant to their courses. Links have therefore been created in the Moodle that connect to the relevant resources in the library. This has made it easy for lecturers to ensure that every student has access to the relevant materials without any excuses.

The student information system has also been linked with the Moodle allowing only admitted and registered students to be populated on the LMS. After admission, and registration, students are automatically given access to the resources available on the LMS. Students are not enrolled by faculty members or allowed to undertake this on their own. Faculty members are thus provided with a list of their students via the Moodle. A human resource management system is also linked to the Moodle via a plug-in that allows all the recruited faculty members to be assigned to courses and students each semester.

Through a plug-in, the students account system has also been integrated into the Moodle. Upon the payment of their fees, students' accounts are immediately created and registration allowed before courses are populated. When a student has not paid the fees therefore he or she is denied access into the system. A student who attends classes without paying the fees is not recognized by the system and hence the institution and has no records since everything is done online.

Another plug-in has been integrated that allows an application that enables parents to view their children's performance to be integrated into the Moodle. Parents can therefore view their wards performance from lecture attendance to grades, creating an all-inclusive learning environment for students of the institution, their parents and the institutional authorities.

### 5.3.4 Conclusion

Since its establishment, the institution has committed itself to building a highly integrated online university providing one of the best online educational experiences in the world.

Through a modular development approach, the institution has been able to integrate the Moodle with other institutional systems such as the students' information system, finance system, human resource system, library information system as well as a student portal. Evidence of this integration with other institutional information systems can be seen in the reference to the system by all users for almost everything one needs from the institution. Despite the challenges with internet and electricity access and reliability prevalent in the country, more students keep enrolling for programmes offered at the institution. Provision of resources and support for students learning can only be said to be improving and getting better and in time, the institution will be able to offer Open University services to the teaming applicants both in Ghana and its environs.

## 5.4 Greater Accra University

### 5.4.1 Initiation of LMS

As part of the memorandum of understanding for an institutional collaboration to jointly offer a master's programme (MSc and MPhil) in Global Leadership, the institution was required to use the Moodle LMS since the collaborating institution was already using it. At that time however, none of the personnel in the IT department or elsewhere within the institution had the requisite training in the use and management of the platform. The requirement for LMS brought in the IT unit of the institution since three persons were required to be trained in the use and management of the Moodle application. As part of the initiative, a meeting was held to evaluate the institution's resources and infrastructure such as the internet bandwidth, human resource expertise, etc. Three members of the IT unit were subsequently enrolled into Moodle Room, a teaching platform and a certified online training centre in the US. The centre certified people who wanted to teach online and required participants to enrol first as students, then as course managers, and finally as site administrators. Two of the participants also trained in how to create courses so that they could assist in course creation and management. The entire training was done online and it was comprehensive enough, providing the participants with the needed skills. The training had two main purposes: a) to be able to enrol students and manage courses, and b) train others after receiving the training.

After the training, the IT manager responsible for the institution' website, who coincidentally was part of the three men trained in the use and management of Moodle, and had previous technical encounter with the Moodle application decided to set up the platform for the institution to use. This decision came with some challenges since the institution's website was on a

shared server therefore any additional configuration required the permission and assistance of the web host. Due to the good relationship shared between the institution and host, the IT manager was able to get the necessary configurations performed on the server which saw the Moodle platform hosted. This came as a surprise to the collaborating institution that had sent a facilitator to assist them with the course setup and additional training.

The trained personnel with the help of the facilitator from the collaborating institution setup the courses and populated them with learning resources according to the structure of the programme run by the collaborating institution from the (UK). Students enrolled in the Masters programme were required to access the courses and their resources including lecture slides, reading texts (both core and supplementary), take some quizzes, download assignments and upload them upon completion, collaborate with other colleagues and submit group assignments, and participate in forum discussions. Since the programmes were handled by experienced facilitators (faculty members) from the collaborating institution and lecturers in the Ghanaian counterpart, it was able to build the much needed capacity both in the technical management of the system and in the actual use for teaching and learning, something that was later to benefit the institution's wider implementation of the Moodle.

#### *5.4.1.1 Other developments*

Around the same time, the institution expanded its programmes by introducing Evening and Weekend schools both at the undergraduate and graduate levels. Since the nature of the programme required students to attend lectures in the evenings and at weekends, there was the need to find a way of engaging students outside of the meeting periods. Some faculty members started asking for technological solutions and at the same time, the distance unit of the Weekend school was looking for some technological solutions to use. This caused the Head of IT to do some evaluation of the available platforms. However, there were budget constraints due to the institution' investment into physical infrastructure. This was due to the increase in student enrolment due to an expansion in programmes. Convincing management to procure a technological solution was therefore going to prove challenging.

Not long after that, the head of IT had the opportunity to attend an open source conference where several of the presenters reported on their institution's use of open source applications for all their information systems' needs. With the experiences shared at the conference, the

head of IT became strongly convinced that an open source LMS was definitely the way to go in the face of budget constraints, although some members were looking at proprietary LMS like Blackboard. To justify the need for a technology to support teaching and learning in the institution, a research was conducted by the Moodle administrator, who incidentally was also a part-time IT lecturer, into the students' use of technologies and the potential for enhancing students' learning.

The final push for the institution's adoption of Moodle was when the Vice Chancellor requested the IT unit to search for a technological solution to their examination problems due to the increasing student numbers. The head of IT subsequently recommended the use of Moodle to conduct computer-based examinations which was readily accepted by the institution.

#### *5.4.1.2 Development of an ICT Policy*

During that period, an institutional ICT policy was being drafted to guide the development and use of the institution's IT resources. The development around the use of Moodle caused an inclusion to be inserted that Moodle would be utilized as the official institutional platform for all online learning deliveries. The policy was subsequently approved by the highest body in the institution, the governing council and with it, Moodle.

### 5.4.2 Deployment and use of Moodle

The Moodle application was downloaded and installed on an external server that was shared with other users. The configurations of the application had to be assisted by the server hosts. It was hosted on the institution's website as a sub domain. The installation and configuration required extensive research on the part of the IT manager who was responsible for managing the institution's website as well, and had an educational background in computer science and web applications.

After the successful installation and configuration of the Moodle platform, facilitators from the collaborating university from the UK assisted the three trained IT personnel to set up the programmes and courses on the Moodle for the Masters programme in Global Leadership. Since the use of the Moodle platform was a critical requirement in the memorandum of understanding (MOU), all the courses were set up and faculty members on the programme trained in the use of it.

The team behind the development then set about creating the much needed awareness and sensitization through the organization of workshops, training sessions, and having other formal and informal discussions with faculty members. The trainings were in three parts:

a) Introduction of Moodle to faculty members. Here Moodle and its features were introduced to faculty members with the opportunity for hands-on practice. They were shown how to use the Moodle tools to perform activities similar to those carried out in the traditional classrooms.
b) Training of technical people to assist in the development. This was necessary due to the lack of experienced IT personnel in the development of LMS. In-house assistants had to be trained, service personnel were recruited from the university of Ghana's Information Studies department to come on board and assist faculty members
c) Training in the use of the platform for examinations. This training was specific to examination conduct using computers. Since the institution had no previous experience in it, it was necessary to seek assistance from institutions with experience in its implementation. A university in Nigeria with extensive experience was contacted to assist. Members of the development team then went to Nigeria for a one (1) week training and observation. They were taken through the setup, management and crowd management among others. This institution was using a full scale computer based examination system and had deployed a commercial application for that purpose. Upon return, Moodle was used to setup the exams system with a question bank populated with questions. When the facilitating team from Nigeria visited to assist in the setup and testing of the computer based examination system, they were surprised to see that it had been done using Moodle, an open source platform.

#### *5.4.2.1 Development of online-related policy manuals*

Through the training that was conducted, three draft policies were developed and are yet to be approved for institutional adoption. These three are draft policy on question bank, draft policy on e-learning and draft policy on online examination.

After these policies were drafted, all faculty members at the diploma, undergraduate and graduate levels were required to mount their course outlines, contents and other relevant resources online for student access. This was issued as an instruction though the Heads of De-

partments and Deans of the various schools for their members to comply with. Some departments subsequently requested for specialized trainings with the emphasis on course setup and management.

Currently, every course in every programme offered by the institution has been setup on the Moodle platform. What is required now is policy on use and non-use.

#### *5.4.2.2 Use of Moodle for Teaching and learning Activities*

Active use of the institution's Moodle platform was at the graduate level and, in particular, the Masters in Global Leadership programme. Other programmes like the Finance, Accounting, Marketing, etc. also had their courses mounted on the Moodle platform and used to engage students' learning. With the exception of the Global Leadership programme where the course resources were provided by the collaborating institution, the courses of the other programmes introduced by the institution had to be developed by the faculty members and placed onto the Moodle. This was made a requirement by the Graduate School for all faculty members teaching on the various programmes.

At the undergraduate level however, faculty members were yet to use the Moodle for any serious and meaningful support of students learning. Few lecturers were observed to have put some learning materials online and did not visit the site often to interact with students. Some institutional enforcement was required to achieve the needed usage.

#### *5.4.2.3 Use of Moodle question bank for Examination*

Several pilot tests of Moodle's capability and capacity to host hundreds of students had been conducted at both the graduate and undergraduate levels. A total of almost 6000 students had been tested on different occasions using the Moodle question bank. A special laboratory was setup with over 100 computers to assist in conducting examinations. At the graduate level, the platform has been used for conducting final semester examinations while at the undergrad level it has been used for conducting interim terminal assessments (IAs).

### 5.4.3 Institutionalization

Efforts at institutionalizing online practice can be seen in the formulation of policies to guide and regulate online examinations, e-learning and the development of question banks. Alt-

hough these policies are yet to be accepted and put into effect, its formulation signals an institutional willingness to embark on an LMS integration into the traditional teaching and learning processes.

Much is still left to be done by way of integrating other information systems into an educational ERP. Currently all efforts seem to be directed at just the LMS implementation into the teaching and learning.

### 5.4.4 Conclusion

The awareness and sensitization undertaken by the e-learning development team coupled with the enthusiasm and support from management have clearly sent a signal to all stakeholders that this is the path the institution hopes to pursue more efficiently and effectively in the not too distant future. The commitment of management however still requires the effective backing of policies and some rewards to ensure the sustainability of the innovation. With the policies on e-learning, examination and question banks yet to be approved, clear policy on use may be still required along with a strategy for deployment. In time, given the current level of enthusiasm among some faculty members and management groups, the use of the Moodle LMS can become embedded into the institution's practices.

## 5.5 World University of Ghana

### 5.5.1 Initiation of LMS

After participating in an inter-institutional workshop on educational technology strategy for selected higher education institutions in Johannesburg, South Africa, in February 2010, a team was put together to plan for the institutional LMS implementation in partnership with partnership for higher education in Africa educational technology initiative (PHEA ETI) in March 2010. During the planning phase, the team set priorities and determined strategies for the implementation of the Moodle LMS. The institution's administrative structures for managing externally funded projects of this nature were setup to manage the project and ensure success. This was one of the key processes pursued in the planning phase. All the relevant equipment and software were procured at this stage. This stage was also characterized by meetings and workshops.

The implementation team decided that the project was to be carried out in three (3) phases: 1) conduct a baseline study to determine the current state of educational technology at the institution, 2) implement an LMS to enhance the quality of teaching and learning in the institution, and, 3) conduct an investigation into how academics/students use web based approaches to enhance teaching and learning.

The team was divided into three groups headed by project leaders to undertake the proposed activities in each of the three phases of the project. Each group consisted of a number of staff. Group one consisted of assistant researchers, data capturers and data analysts. Group two consisted of technical staff, instructional designers and trainers/facilitators. Group three included 2 main researchers, assistant researchers, data capturers and data analysts.

Other stakeholders like faculty members were involved through training to deliver some components of the projects, e.g. the development and delivery of online courseware. Other staffs, e.g. multimedia and Moodle specialists (from the IT department), were also brought on-board and trained to assist in the management and development aspects of the LMS implementation, e.g. Moodle setup and configuration and courseware development.
Students were also trained in the use of the Moodle LMS platform through its incorporation into their compulsory ICT course in the first year of their admission.

Other stakeholders included external collaborators with experience in the system's development and use. These collaborators provided support in the areas of technical IT and e-learning during the planning and deployment of the LMS.

#### *5.5.1.1 Institutional motivation and objectives for the introduction of the Moodle LMS*

There was a huge institutional motivation for embarking on such a project. In its bid to implement the LMS the institution saw the potential to use ICT to widen access to education for different target learners, mitigate some of the challenges of having large classes, provide enriched pedagogical experiences for distance learners and contexts in which the educator-learner relationships have been watered down through the entry of large numbers of students into HE, and the potential of using ICT to foster independent learning practices which are important to a culture of lifelong learning. These were real problems facing the nation and the institution in particular; as such it provided strong incentives for the LMS introduction.

Within the three main priorities of ensuring use of ICT by all students for academic purposes, ensuring effective use of ICT in teaching and learning amongst academic staff, and ensuring effective use of ICT to enhance management information systems, the objectives for implementing the LMS were: a) support students in the distance and sandwich programmes and improve the quality of teaching and learning within the programmes, b) improve mediation and facilitation of learning within the traditional face-to-face programmes, c) provide opportunities for individualized learning, and d) foster critical thinking and problem-solving skills through the use of technology.

#### *5.5.1.2 Planned activities for the introduction of Moodle LMS*

As part of the institutional process for the introduction and integration of the Moodle LMS into teaching and learning, several activities were planned to ensure a successful implementation. These activities were divided into three phases to ensure that the goals of the project will be attained. The activities planned for the first phase included:

- the review of literature of other higher education educational technology baseline studies and ET theory,
- conduct a two day workshop to develop study design, instruments and operationalization,
- contract a project (PHEA ETI) coordinator through the putting together of a job description,
- develop job descriptions for researchers and research assistants,
- engage 3 researchers/lecturers, one from each campus, to work on the project,
- engage 9 research assistants, three from each campus, to help with data collection,
- develop a conceptual framework for data gathering and analysis,
- collect available documents on educational technology and codify data systematically for analysis,
- develop three sets of interview instruments for administrators, technical staff and academic leadership,
- pilot interview instruments and refine them, interview 12 managers, deans and technical staff,
- develop three sets of questionnaires to collect data from lecturers, distance education tutors and students,
- pilot survey instruments and update them,
- administer and collect questionnaires,
- capture data, analyse data, write research report, internal review of report and revision of the report,
- external review of report, finalize report, disseminate research results in institution.

These activities were designed to provide a ground level basis and understanding of the institution's current educational technology environment to better introduce an intervention that would ensure an efficient and effective utilization of the institution's educational technologies. A comprehensive investigation of the institution's infrastructure and educational resources were therefore carried out by a team leader and group of researchers. The activities had strict timelines attached to them requiring their completion before other planned activities could be rolled out in the other two phases of the project.

#### *5.5.1.3 State of institutional ICT infrastructure prior to implementation*

Prior to the start of the project, an assessment showed that the institution's ICT infrastructure had been funded through its internally generated funds and donor funding. The institution had an intranet with fibre connections between all buildings on all campuses and a VPN linking all three geographical locations, an internet connectivity via VSAT with an uplink of 1.7 Mbps and 3.5 Mbps downlink, a total of 847 computers – 356 for student use, 46 available for public use at the University Café, 445 for faculty and support staff (of the Café computers, 10 are reserved for faculty use; a faculty lounge at one of the campuses equipped with 15 PCs for faculty and post graduate student use) -, scanners, printers, LCD projectors, screens and other audio visual equipment for every department, and a Video Conferencing Unit under construction. There was also an FM station on which lectures were delivered to large classes that could not be converged into a single class.

Although the existing infrastructure provided the necessary base for the implementation of the LMS, a few other types of equipment and software were required to roll-out the system. This was included in the list of types of equipment and software to be procured by the project before the installation and configuration could be done.

#### *5.5.1.4 Strategy for Roll-out*

A hybrid/blended model was adopted as the strategy for roll-out. This strategy was important for a number of reasons: i) there was the problem of large class sizes that created less lecturer-student interaction; ii) many academics did not have adequate capacity and time for effective facilitation of full online courses, and iii) the significantly underdeveloped ICT infrastructure/facilities that could not support exclusive online course delivery. Through this ap-

proach, lecturers would be able to supplement students' face-to-face meetings and practical classes with online resources.

It was decided that two courses would initially be piloted to enable lessons to be learnt in preparation for a major roll-out. Subsequently ten (10) – twenty (20) courses would be implemented to enable more experience to be gained and the LMS tested. This number was to increase thereafter until all courses offered in the institution were mounted onto the platform. Both students and faculties' use of the Moodle resources were monitored to see if there was any improvement in instructional practices and quality of learning.

### 5.5.2 Deployment and use of the Moodle LMS

This was the second phase of the project. The deployment of the LMS was systematically planned to achieve integration of the LMS into the teaching and learning. The activities planned included:

- deployment of Moodle LMS: procure an LMS server, procure antivirus software, procure Adobe CS4, download and install Moodle, develop LMS user manual;
- the provision of training for 4 technicians; provision of additional training for 20 online courseware developers;
- development of two (2) modules for online courseware PG, UG (e.g. GPD 113 Introduction to Information Technology) – Design curriculum that integrates LMS, develop a range of activities that students can perform online, and install on Moodle. This includes for example online assignments, quizzes, and course content;
- develop one topic each from the selected courses (Activity 4) to deploy purely online;
- training of multimedia design team in multimedia content development;
- adjustment of existing ICT-GPD – 113 curriculum to include training on Moodle;
- training of students through existing face-to-face programme;
- develop higher level Moodle expertise;
- recruit personnel to be trained as Moodle specialist and instructional design specialist;
- train the Moodle specialist and Instructional design specialist;
- deploy LMS into wider community;
- select 10 – 20 courses based on baseline study,
- provide training and advocacy for academics,
- train faculty members on the development of interactive course materials,

- provide on-going support to academics as and when needed,
- consolidate Moodle integration into UEW.

This phase of the implementation was divided into two parts: Part 1 consisted of the deployment of two courses onto the Moodle platform as a pilot test. These two courses were selected for a number of reasons including the testing of the installation and configuration of the platform for use by a larger population of users within the institution. The two courses were GPD 113 – Introduction to ICT (undergraduate course (level 100)) and EDI – 502 – Computer Applications in Education (postgraduate course). In Part 2, these courses were re-offered in addition to six (6) other courses, after enhancing them.

After procuring and downloading the required equipment and software (a server, an antivirus, the Moodle application (open source and free), an Adobe CS4 and a user manual) recommended for the setup of the Moodle LMS, the application was installed and configured at the network operating centre (NOC) with the support of external facilitators from South Africa. The decision to host the server on campus was to enable the implementers build institutional capacity to allow further development and support to be quickly provided to users. This decision emanated from a previous experience where an external institution in South Africa developed and hosted a LMS on the institution's behalf with little or no involvement from users (faculty and technical) and hence failing to build the much needed capacity for future implementations.

The two pilot courses set up to run in the second semester of the 2010/2011 academic year and sandwich programme (June – August) respectively at the NOC used the University's official network accounts for access control and security. Thus only registered students and faculty members for these courses could access the course resources.

#### *5.5.2.1 Courseware Development*

The courseware to be mounted onto the Moodle platform was to be developed by faculty members with the assistance of the project team members and facilitators from PHEA ET. From March 2011 to March 2012, five (5) workshops were organized for courseware developers. The main goal for these workshops was to build and improve the capacity of participating academics to design and develop online courses. Another objective for these work-

shops was to assist academic shift from teacher-centred pedagogy to learner-centred pedagogical practices and instructional strategies supported by the Moodle platform. Other workshops organized under the programme include:

Table 17: PHEA facilitated Workshops

| Workshop | Target Audience | Purpose |
|---|---|---|
| One-day Research Workshop | 3 researchers and 2 research assistants | To build the capacity of these researchers to conduct research; deliberate on research strategies and terms of reference |
| Technical support Staff workshop | 4 Network Technicians and 3 Multimedia specialists | To build the capacity of the network administrator and technicians to manage the Moodle platforms and to also assist academics in courseware design |
| Courseware developers assistants' workshop | 6 instructional technologists | To enhance the capacity of instructional technologists to assist courseware developers in the deployment of courses in Moodle |

Source: UEW Moodle report

Based on an Advocacy Workshop Survey, some academics were invited to a workshop from the 14th March – 18th March, 2011. It was facilitated by an external resource person from South Africa, with support from two project leaders from the institution. These project leaders incidentally were the ones piloting the two ICT courses. This workshop was held three weeks after the courses were set up on Moodle. The objectives of the workshop were to enhance the capacity of academics in designing online courses, to improve the capacity of academics in utilizing Moodle in teaching and learning and to increase awareness and use of Open Educational Resources in teaching and learning.

Another workshop was conducted in August 2011 as a follow up to the initial course development workshop. This was requested for by the course participants and was facilitated by the two project leaders who assisted the resource person from South Africa. The duration was five days during which the progress of course developers was assessed and technical support offered on one-on-one basis. During the workshop, the Moodle environment was reviewed along with its modules; instructional and e-learning strategies were also provided. For the most part of the last four days, the 15 academics present worked on their courses with assistance from the facilitators on a one-on-one basis.

Based on an evaluation of the August workshop, another workshop was organised from the 19th – 23rd of September, 2011. This was facilitated by the resource person from the first workshop. It was hands-on and had a total participation of 42 academic (an increase of 27). Individualized attention was provided to both new and old participants. It was an indication of growing acceptability of the innovation within the institution.

A one-day workshop was also organized to enhance the capacity of a group of technologists in courseware development and facilitation of instruction in Moodle drawn from three of the institution's campuses. These participants were already experienced online learners having used blackboard in the past. They also had previous training in instructional design, multimedia authoring and pedagogical integration of ICTs. These were being trained to mentor academics working on their online courses and to help them deploy these courses on Moodle. The workshop addressed courseware design/development principles, Moodle environment, course structure and learning pathways on Moodle, facilitating online instruction, quality assurance and evaluation of courseware for online delivery. The roles and responsibilities of these participants discussed at the workshop included:

- Assisting courseware developers to design and develop their online courses
- Assist courseware developers to upload course materials on Moodle
- Provide one-on-one on-going technical support (facilitating online instruction) to courseware developers on a faculty basis.
- Assist researchers to collate lecturers' and students' activities and experiences with Moodle
- Use a quality assurance checklist to formatively evaluate the quality of the courses mounted on Moodle.

The workshops organized to build the capacities of course developers and technical assistants appear not to have achieved the desired objectives since the progress in designing and uploading courses on Moodle was not moving at the desired pace to achieve project deadlines. Members had to be taken on a retreat away from their campuses from the 28th January – 5th February to enable an appreciable development to be made. 31 course developers and 6 courseware developers' assistants were in attendance at the retreat. The 6 assistants were from the previous one-day workshop offered to train specialists to provide the one-on-one assistance to developers. The number of courseware developers fell from 42 to 31, a situation

attributed to other institutional commitments. The vice Chancellor of the institution was in attendance at the retreat workshop which aimed at getting participants to develop 9 units at the end.

The 5th workshop that was organized brought together the external facilitator from South Africa and the participants from the retreat workshop to ascertain the progress and quality of the educational products being developed. Evaluation and facilitation of the e-learning courseware was the primary focus of the workshop. The participants learnt how to enrol students, make backups of their courses, and insert a social networking Facebook 'like' box inside their online Courses.

These workshops therefore aided in the building of the needed capacity in courseware development although the development of the courseware was slow and had to be developed alongside the attendance of lectures and other institutional responsibilities.

#### *5.5.2.2 Quality Assurance of Online Courses*

Clear procedures were instituted to ensure the quality of online teaching and learning experience through the provision of a checklist and a course structure and learning pathway rubric. Through the provision of this guide, 69 courses were subjected to internal evaluation from which 42 courses were selected for further internal and external evaluations. The levels of course development and quality were used as the basis for selection.

#### *5.5.2.3 Use of the Moodle LMS*

The nature of use was planned as was observed in the two pilot courses in the second phase of the project. There was co-operation from the faculty members and students in both courses. The first course, an undergraduate course in ICT – an introduction, had 1300 students and was conducted from February 2001 – June 2011 (one semester). The students in this category were level 100 students, freshmen. The second pilot course was also implemented for Sandwich students of the M.Ed. (Masters in education) programme from June – August 2011. 98 students were involved in this pilot. The pilot study was significant in that it enabled the implementers to refine the online components for the two courses in preparation for the development and deployment hybrid courses. It also enabled critical training needs of participating

academics to be identified and addressed during the workshops for online courseware development and Moodle use.

The EDI 502 course was rerun for the regular MPhil programme where 354 students were in attendance during the first semester of 2011/2012. Two lecturers were assigned to this course while a similar course was set up for another lecturer.

Table 18: Courses offered during Pilot 1

| S/n | Course name & Code | No. of Students | Facilitators | Period (Months) |
|---|---|---|---|---|
| 1 | Introduction to ICT – GPD 113 | 1300 | 1 | Feb. 2011 – Jun. 2011 (4 ) |
| 2 | Computer Applications in Education (M.Ed) – EDI 502 | 98 | 1 | Jun. 2011 – Aug. 2011 (3) |

Table 19: Courses offered during Pilot 2

| S/n | Course name & Code | No. of Students | Facilitators | Period |
|---|---|---|---|---|
| 1 | Introduction to ICT – GPD 113 | 1500 | 7 | Sep.2.011 – Dec. 2011 (4) |
| 2 | Computer Applications in Education (MPhil) – EDI 502 | | 3 | Sep. 2011 – Dec. 2011 (4) |
| 3 | Foundations of Educational and Instructional Technology – ICTE 113 | 35 | 1 | Sep.2.011 – Dec. 2011 (4) |
| 4 | Introduction to Distance Education and Online Learning – ICTE 114 | 35 | 1 | Sep.2.011 – Dec. 2011 (4) |
| 5 | Inorganic Chemistry – CHE 232 | 27 | 1 | Sep.2.011 – Dec. 2011 (4) |
| 6 | Mathematics in Early Years – ECB 235 | 27 | 1 | Sep.2.011 – Dec. 2011 (4) |
| 7 | Introduction to ICT Systems and Tools for Mathematics Teachers – ICTD 111 | 157 | 1 | Sep.2.011 – Dec. 2011 (4) |
| 8 | Courseware Design and Development Using Multimedia tools – ICTD 231 | 157 | 1 | Sep.2.011 – Dec. 2011 (4) |
| 9 | Introduction to ICT – GPD 114 | 35 | 1 | Sep.2.011 – Dec. 2011 (4) |

| S/n | Course name & Code | No. of Students | Facilitators | Period |
|---|---|---|---|---|
| 10 | Multimedia Authoring and Webpage Design – ICTE 234 | 25 | 1 | Sep.2.011 – Dec. 2011 (4) |

Source: UEW Moodle report

#### 5.5.2.3.1 Total number of courses as at the end of 2011/2012 academic year

By the close of the second semester of the 2011/2012 academic year, 69 courses had been mounted on the Moodle platform. Some of these were still being developed and improved. These were from eight faculties and the Institute of Educational Development and Extension. 80% of those that had embraced the LMS adoption and integration were from the Winneba campuses, and in particular from the Department of ICT Education, Mathematics Education, Science Education, Language Education, Creative Arts, IEDE, Educational Studies and Social Science/Studies Education. This may have been attributable to the fact that the proposal developers and implementation team members were largely from the Winneba campus.

### 5.5.2.3.2 Composition of teachers who taught at in the Part 2

Table 20: Composition of teachers in Pilot 2

| S/n | Department | Number |
|---|---|---|
| 1 | Mathematics Education | 3 |
| 2 | Science Education | 1 |
| 3 | Early Childhood Education | 1 |
| 4 | ICT Education | 3 |

Source: UEW Moodle report

The two lecturers chosen for the part 1 of the phase 2 were selected based on their background in the use of ICT for pedagogical rationales. It was assumed their adoption of Moodle at the pilot stage would be without much difficulty. It is interesting to note that these academics were directly involved in the PHEA-UEW ETI project and responsible for training and assisting other academics in their development and deployment of courseware on Moodle.

In the second part, two other activities were included in the EDI 502 alongside other enhancements. This included assignments and surveys. For the GPD 113 course, alongside the enhancements, an additional topic was included and the programme ran in the first semester

of the 2011/2012 academic year. The total number of students who took part in the second part of the pilot was 3200. This consisted of all first year students from all departments in the undergraduate programmes (3000) and all first year students offering graduate programmes (200). The age limits of the undergrads ranged between 21 – 25 years while the graduate students' ages ranged between 25 – 45 years. It was noted that the technology competency level of the undergrads was higher than the postgraduate students. This, it was reasoned could be attributable to the pre-university ICT experiences of the undergrads. 80% of the postgraduate were identified to possess little or no experience in ICT use prior to their admission to the programme. Both categories however were identified to have no experience in online learning, except to use the internet to search for materials on assignments.

### 5.5.3 Institutionalization

Currently most of the institutional processes have standalone applications. There is an open source software for supporting the administration of student information and record keeping, an accounting software (Topaz) for administering students fees and accounting, a Moodle application for supporting students learning, a library with access to numerous e-resources and databases that is currently being automated to provide a seamless access to the resources. The integration of these applications onto a single platform is yet to be initiated.

The integration and use of the Moodle platform required a redesign of the curriculum to incorporate the LMS use. Although this was done in the pilot study, an institution-wide redesign of all programme curriculums is required if the integration is to be successful.

### 5.5.4 Chapter Summary

The project nature of the implementation involving strict timelines and the satisfying of funders' expectation may have facilitated the successful roll-out and piloting of the Moodle LMS implementation. The true test of the sustainability however lies in the institution's continued efforts at integrating the platform into all its teaching and learning, and the building of the much needed capacity of the users. The cessation of funding from both external and internal sources however can have serious implications for the eventual outcome of the implementation. As observed, the provision of remuneration for the courseware development may have motivated some faculty members to develop their courseware. This was however funded from the project fund which arguably had a timeline. Other courseware developers to join the

process may anticipate similar remunerations absence of which could negatively affect their motivation.

# CHAPTER SIX

## 6.0 A PROCES ANALYSIS – IS IMPLEMENTATION FRAMEWORK

### 6.1 Introduction

This chapter examines the process followed by the four institutions using a modification of the IS implementation framework as discussed in Chapter 4. The chapter looks at the sequence of activities and decisions taken by the institutions and the factors that facilitate and inhibit their outcomes at each of the identified stages of the implementation process. Through this the identified similarities and differences provide insight into how institutions can implement LMS for e-learning purposes more effectively.

### 6.2 An analysis of Case 1 using an Event-decision-flow diagram description

The following descriptions highlight events and decisions that occurred in Case 1 in relation to their efforts to introduce and institutionalize e-learning using a learning management system (LMS). The decisions and events highlight a process that clearly explicates the outcomes of institutional efforts towards the introduction of innovative practices in teaching and learning. Using a modification of Kwon & Zmud's information systems' (IS) framework and Cooper and Zmud's IS framework, the events and decisions leading to the current state of e-learning implementation with Moodle are presented. Factors identified to have influenced each identified stage, facilitating and inhibiting are then identified and discussed.

#### 6.2.1 Initiation stage

At an academic board meeting of the management and heads of the various faculties of the institution, a formal decision was taken to introduce e-learning. Though this decision did not come as a surprise to many, attested as a vision of the management for the institution, this marked the official beginning of an institutional journey towards the introduction of an e-learning environment. The heads of faculties present at the meeting were directed to discuss and decide with their respective members courses to be deployed online. Although the actual mode of delivery of the courses had not been discussed and determined, the heads of these faculties including the Faculty of Informatics, Faculty of Engineering and Faculty of IT Business met with and discussed with their members as directed. The general consensus after these meetings was that faculty members felt they were not ready. In particular, many of the members of the faculty of engineering felt it was impossible to teach engineering courses via

e-learning considering its technical nature. While faculty members in the Business and IT, and Informatics could easily have complied with management directives, they felt they were also not ready. The response of faculty, contrary to the expectation of management, resulted in the invitation of an e-learning expert well versed in using online tools for delivering e-learning courses to a workshop for faculty members. The purpose of this training was to show faculty members, especially those with engineering background that technical courses could also be delivered online. The workshop and demonstration however did very little to change the attitude and response of faculty members. After a decision by management to utilize a LMS for the e-learning delivery, a meeting was held with some staffs from the IT department where directives were given to evaluate the different types of learning management systems (LMS) on the market for consideration and adoption by the institution. The diagram below depicts the flow of these events and outcomes:

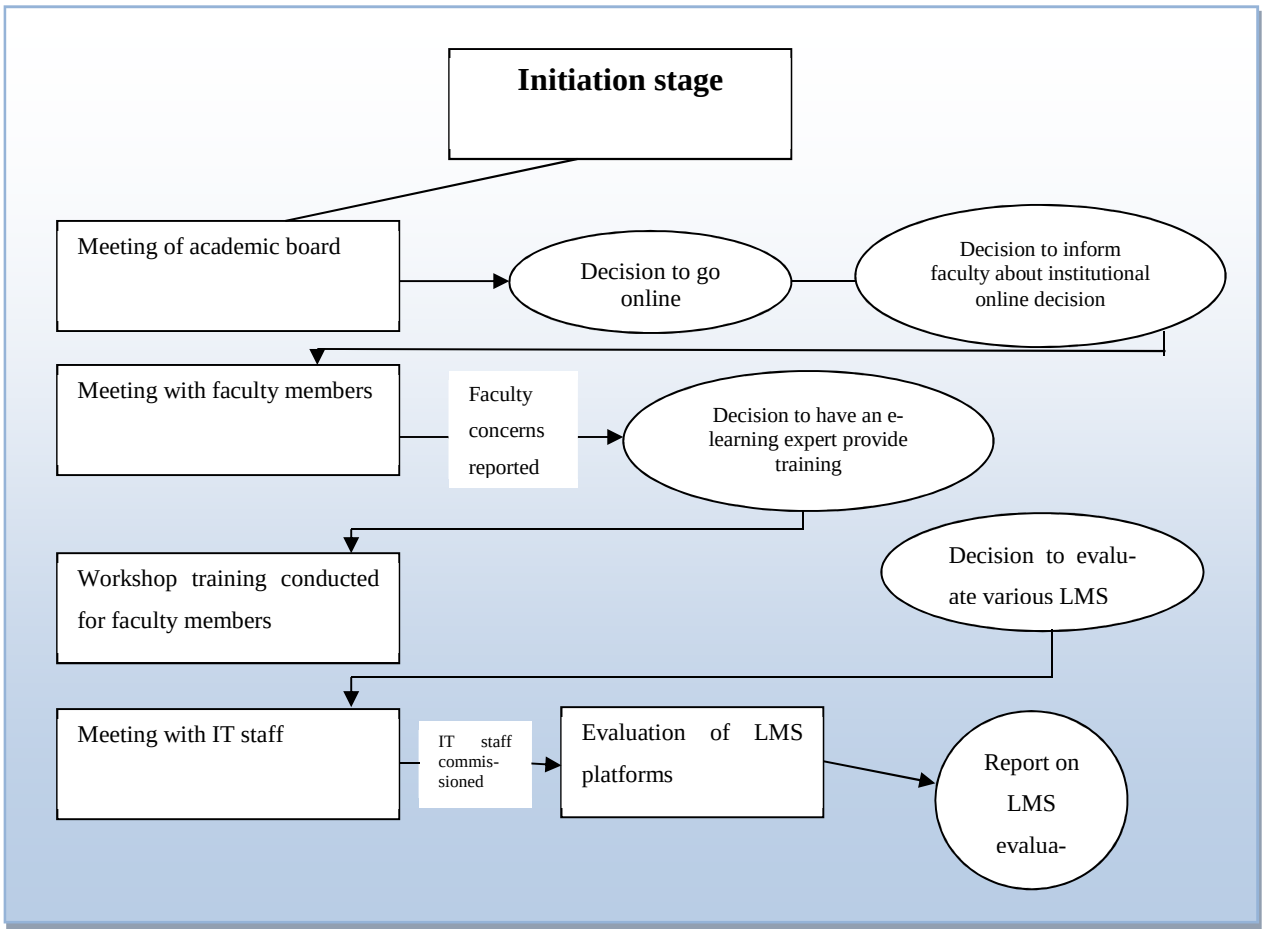



Figure 15: Institutional initiation stage

#### *6.2.1.1 Facilitating and inhibiting factors during the initiation stage*

A careful examination of available evidence shows strong managerial commitment and support for the introduction of e-learning within the institution. The president had times without number indicated in public forums the institution's intention to introduce e-learning, while the vice president was well known for referencing global developments in e-learning around the world, pointing out that it was an inevitable path for the institution to take. Their decision, therefore, to officially promote online learning did not come as a surprise to many as many perceived it as an institutional vision solidly supported by management. Subsequent events showed management's commitment to the institutional realization of e-learning as part of the day to day delivery of teaching and learning. However what was not clear from the very start was how this was going to be realized.

Optimistic IT staffs provided with an opportunity to spearhead an innovation such as the deployment of an LMS was also very instrumental in realizing the outcomes of this stage. The unit readily and quickly accepted the task of evaluating technological solutions for delivering e-learning, compared open and proprietary sources and provided a recommendation for management consideration. The period leading to this report was characterized by several meetings with management during which the unit demonstrated their preparedness to support the institution's vision in the introduction of e-learning. This corporation on the IT unit's part was instrumental in the deployment of the Moodle application.

Another important factor that facilitated management's efforts is the organization of an e-learning training workshop for faculty members to demonstrate the unlimited potentials of information technology use in education. This was in direct response to faculty's concerns that e-learning cannot be deployed for some technical courses like those in engineering. Not all faculty members were observed to have participated in this workshop as there was no strict requirement to attend.

Clearly a number of issues can be identified from the period the decision was taken at the academic board to go online. Heads of faculty were directed to discuss with their faculty members courses to be delivered online in the coming semester. What this mode of delivery meant was not clarified or clearly explained. Whether this meant the courses would be delivered entirely online without face-to-face meetings, or face-to-face meetings would be supplemented by online resources to enrich the learning experience, or that it meant there would

be a combination of face-to-face and online meetings was not clear. The institutional vision therefore did not clearly explicate what form going online or introducing e-learning was to take.

The directive also did not take into consideration the readiness of the faculty to go online or deliver instruction through online means. Considering the traditional mode of instruction in the institution which was face-to-face and judging from the background experience many of the faculty had during their educational training, this was a big shift in what they were used to. Psychologically the faculty had to be ready for this change. Judging from their response to management, they were not prepared. They had a number of issues that required clarification some of which included time spent on developing and making courseware available, skills required and time needed to familiarize themselves with the technology, their intellectual property and the issue of ownership, possible reward for their effort, availability of e-learning expert support among others. These issues were tensions that needed clarification and resolution but as at this time had not been dealt with. Also, it was clear among a segment of faculty members, e.g. those from engineering background that certain types of courses could not be delivered online. These needed to be convinced and persuaded if institutional efforts were to realize intended objectives. Clearly faculty felt they were not ready. Interestingly, the perceptions of faculty members on how ready the institution was to introduce e-learning was not determined.

From this failure to assess faculty readiness followed the glaring inability to adequately address the concerns of faculty members. This created the impression among faculty members that management was pressurizing them to engage in a new practice they were unprepared for.

Another important factor that potentially played a role in the eventual outcome of the e-learning introduction is the involvement of stakeholders. The actual teaching and learning that takes place in traditional environments is the result of direct and indirect efforts of different categories of people. From those recruiting faculty members to units admitting and registering students, conducting course allocations, developing syllabus, assuring quality, conducting examinations, to those delivering the actual teaching at the forefront, as well as those learning, all can be considered as stakeholders and important to an institution's core task of teaching and learning. Their involvement therefore is crucial to any introduction of an educa-

tional innovation as in the current case of e-learning introduction through a LMS. Those responsible for enrolling students, allocating faculty to various departments and courses, conducting examination, admitting students need to be appropriately involved to facilitate the embedding of e-learning within traditional institutional processes. This however was not clear from the initiation stage.

Another factor that was identified was the absence of an institutional readiness assessment in terms of infrastructure that could adequately support the introduction of e-learning. This included availability and reliability of internet services, a reliable local area network, computers for faculty, computer laboratories for students, user support services etc. The institution had computer labs, internet access both wired and wireless hotspots all over campus, computers in every office for faculty members and a local area network which the implementers felt were adequate. The only problem was, no official readiness assessment was conducted in connection with the e-learning introduction, as later events revealed.

In terms of coordination, no central coordination unit involving stakeholders could be identified. The appointment and training of an IT staff as Moodle administrator did very little to coordinate the institutional e-learning introduction efforts. The administrator who was responsible to an IT manager who reported directly to the president was entrusted with the task of ensuring faculty complied with management directives in a domain where the target users were over and above the rank of the administrator. The structure and nature of this coordination and those involved should have been made clear with the roles and responsibilities of members spelt out clearly. However this was conspicuously absent in the initiation stage.

It was also observed that the institution had no strategy in place to address potential resistance to change. Clearly the institution was in the process of introducing a technological solution to either supplement or replace existing mode of teaching and learning. Having been in existence for over five years, and although being a technology school, the potential for resistance by some users such as faculty who priced face-to-face above other mediums, a strategy to address this problem could have been in place. This was however absent.

An assessment of the IT unit showed that many of the staffs were network and systems administrators, with others being hardware technicians. Although the network and systems administrators selected to implement the LMS had website knowledge and development skills,

none of them had any experience in the development and management of LMSs. None of this team, comprised of three IT staff had any experience in technical e-learning development support. As such, concerning issues of learning, pedagogy or the development of courseware, these were not in the position to help. From the very start therefore, there was the issue of technology led e-learning which highlighted more of the technology than the actual teaching and learning.

| Factors in the initiation stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | 4 | 5 |
| 1. **Management support and commitment** | Organisational | | | | | √ |
| 2. **Enthusiastic IT staffs** | Organisational/Individual | | | | √ | |
| 3. **Training in Moodle administration for e-learning** | Organizational | | | | √ | |
| *Inhibiting factors:* | | 1 | 2 | 3 | 4 | 5 |
| 4. **Lack of adequate involvement of stakeholders** | Organizational | | | | | √ |
| 5. **Failure to adequately address faculty concerns** | Organisational | | | | √ | |
| 6. **Lack of clarity in institutional e-learning vision** | Organizational | | | | √ | |
| 7. **Failure to assess faculty readiness** | Organizational | | | | √ | |
| 8. **Poor coordination of people and activities** | Organizational | | | | √ | |
| 9. **Failure to assess institutional readiness** | Organizational | | | | √ | |
| 10. **Absence of change management strategy** | Organizational | | | | √ | |
| 11. **Inadequate supply of internal technical expertise in e-learning and Moodle** | Technology & Task | | | | | √ |

Table 21: Initiation – Facilitating and inhibiting factors

### 6.2.2 Adoption-decision

Several meetings were subsequently held between the IT representatives and management during the evaluation process. In one of these meetings, at the time when the evaluation committee had reached a recommendation, the heads of the faculties were present during an oral presentation of the findings and recommendations. The IT department recommended an open source LMS, Moodle, on the basis of its wide user base and international development

support. This recommendation was subsequently adopted by management. It is important to note that most of these meetings were informal and the reports presented often oral.

Following the adoption of Moodle as the institutional LMS, the members of the academic board decided there was the need to select and train a staff from the IT department who would be solely responsible for the development and management of the institutional LMS. A network and systems programmer and administrator was subsequently recommended for the training which took place in the United Kingdom. The following diagram shows the flow of events in this stage of the process.

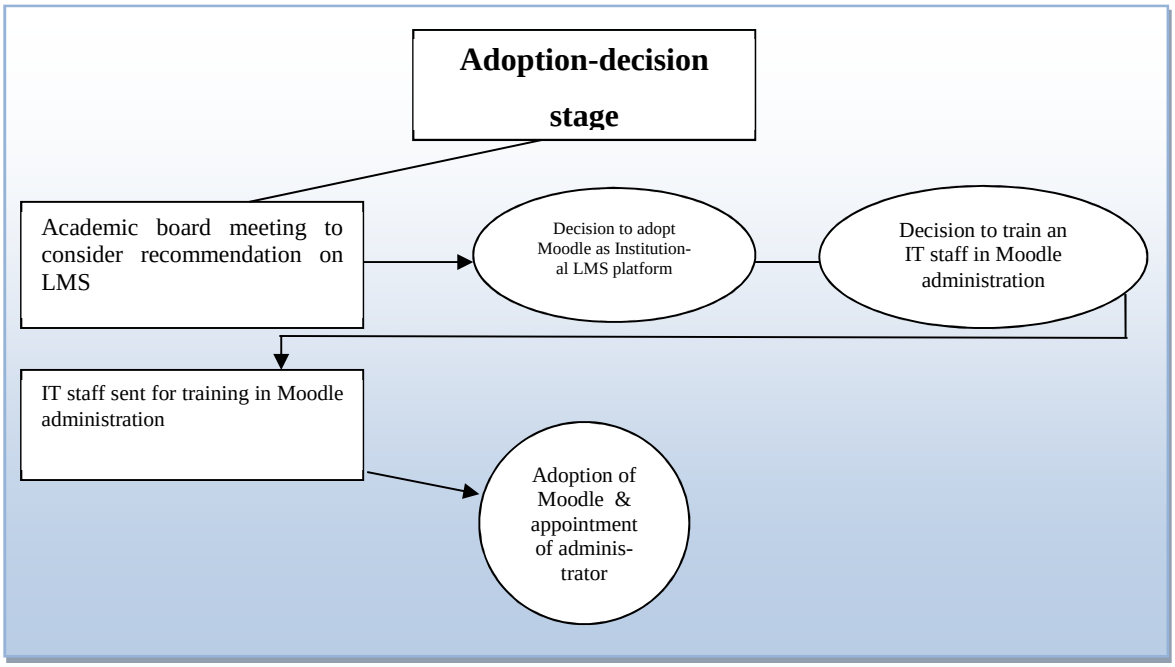



Figure 16: Institutional adoption-decision stage

### *6.2.2.1 Facilitating and inhibiting factors during the adoption-decision stage*

The acceptance of the recommendations of the IT staffs who conducted the evaluation by management and other members of the academic board was an important factor in the institutional adoption of an e-learning platform to serve the needs of the entire institution. Although the selected technological solution was an open source one, it was agreed through the approval that this would serve the institution's purpose. At this point, there was no disagreement among the members of the board, or other competing solutions. It was therefore easy to proceed with the institutional agenda for the introduction of e-learning.

Having assessed the institution's existing IT staff in terms of their expertise and competency in developing and managing the proposed technological solution, their lack was immediately highlighted and a proposition tabled to have an IT staff trained in this new area. This highlights the institution's commitment to realizing its e-learning vision as this required training abroad. Although no specific scanning of the local environment was made before this proposition, the institution felt there was the need to have its own specialist in the area. IT staff was subsequently recommended for training in the UK, a decision that was instrumental in the deployment of the LMS.

Management support and commitment was still present at this stage in addition to the positive IT staffs involved in the implementation. Management demonstrated this by committing to train an IT staff overseas while IT staffs accepted the challenge of being trained in an institutional relevant area.

Although a detailed evaluation was made by the IT team, comparing solution by solution, open and proprietary, their report did not include a physical demonstration of the recommended platform's functionalities. Demonstrating the system's functionalities as a user – student, faculty, and administrator - could have provided the decision makers an opportunity to see the potential and develop a sense of what users may require so as to incorporate that into their final decision. This demonstration was however not provided during the report and so the decision was based on the evidence provided by the IT team.

Another factor that affected this stage's outcomes is the absence of clear demonstration of the proposed system's application to proposed teaching and learning in the e-learning environment. This however would have been difficult considering the institution' failure to clarify exactly what was meant by going online. The system therefore stood as a potential repository for information as engagement with the system towards specific institutional objectives still required clarification.

Although management had promptly responded to faculty concerns that certain courses that were technical in nature could not be delivered through e-learning (online), probably attributable to their lack of knowledge on how it could be done, their hesitation to comply with management's directive in respect of other concerns was still not addressed.

In addition to faculty's hesitation in complying with the directives to select courses to be delivered online due to the concerns they had, during the entire initiation and institutional adoption, they did not get the opportunity to be exposed to the proposed solution's functionalities and how it could enhance their work as faculty. Even though they had representatives on the academic board who could have demonstrated or requested a demonstration of the proposed technological innovation in teaching and learning, this was never done.

As is indicated in the table below, some of the other factors present in the initiation stage were still present as they had not been resolved.

| Factors in the adoption-decision stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | 4 | 5 |
| 1. **Management acceptance of proposed IT solution** | Organizational | | | | √ | |
| 2. **Training of IT staff in Moodle administration** | Organizational/Technological | | | | √ | |
| *Inhibiting factors:* | | | | | | |
| 3. **Inadequate demonstration of the systems functionalities** | Technological | | | | √ | |
| 4. **Failure to demonstrate the systems application to specific learning contexts** | Technology/Task | | | | √ | |
| 5. **Absence of LMS demonstration to actual users** | Technological/Individual | | | | √ | |
| 6. **Lack of adequate involvement of stakeholders** | Organizational | | | | √ | |
| 7. **Failure to adequately address faculty concerns** | Organisational | | | | | √ |
| 8. **Lack of clarity in institutional e-learning vision** | Organizational | | | | | √ |
| 9. **Failure to assess faculty readiness** | Organizational | | | | √ | |
| 10. **Poor coordination of people and activities** | Organizational | | | | √ | |
| 11. **Failure to assess institutional readiness** | Organizational | | | | √ | |
| 12. **Absence of change management strategy** | Organizational | | | | √ | |
| 13. **Inadequate supply of internal technical expertise in e-learning and Moodle** | Technology/Task | | | | | √ |

Table 22: Adoption-decision – Facilitating and inhibiting factors

This level of adoption is very similar to top decision making in organizations. There is little to no influence of user considerations. This is what management wants. Management feels this will be beneficial to the institution and all stakeholders should understand and accept

management decisions. Up to this point users have not been required (mandatory use) to use the LMS platform. Subsequent events will however show whether management approach to introducing this educational innovation has enabled it to realize its objectives.

### 6.2.3 Adaptation

Upon his return from the one week training, the IT staff was appointed as the institution's Moodle administrator with oversight responsibilities for setting up and configuring the Moodle application, creation of course sites and population with courseware, training of faculty in the use of the LMS for teaching and learning purposes, and overall management of the system. A decision was taken by the IT team to host the Moodle platform internally. A PC was selected, set up and configured with Apache server software. The Moodle application, an open source platform, was subsequently downloaded from the Moodle official website and installed on the server. Two categories of users, faculty members and students, were subsequently determined and access accounts created for them using their staff and student emails as user names. Students were further categorised into two: undergraduate students (UG) and postgraduate students (PG). All programmes from these two categories were expected to be mounted onto the institutional Moodle platform. A password was generated for the users to be used on their first access. Upon access for the first time, users were prompted to change their password to ensure secured access and data integrity.

During an initial placement of course materials for postgraduate courses due to their immediate availability from collaboration with another university, a potential challenge with the reliability and access to the local server was identified. An erratic power supply situation due to challenges being faced by the nation's power generation authorities could potentially prevent people from gaining access to the Moodle. This was seen to be capable of leading to dissatisfaction and loss of interest in the platform's use, a situation the institution wanted to avoid. This necessitated the use of a universal power supply (UPS) to stabilize power and ensure that the server does not go off. However, this immediate solution failed to arrest the situation since the electricity could go off for long periods beyond the sustainability of the UPS. A decision was quickly taken to host the platform on an external server where the school's website was being hosted. This resulted in a more reliable and accessible LMS from anywhere and at any time.

While the system was being set up and populated, a training programme on how to use Moodle was organized and information sent to all faculty members regarding attendance dates. The aim of the training was to equip faculty members with the knowledge and skill of how to set up their courses on Moodle, engage in communication and collaboration, and finally be able to assess students. On the day of the training, which was for just one day, only five (5) faculty members attended out of 44. This necessitated a rescheduling of another training session to ensure that faculty members were adequately prepared to use the Moodle platform. When the invitation was sent to all faculty members, only two (2) showed up on the training day. After being tasked to ensure that all courses at the undergraduate and postgraduate levels were enrolled online, a one-on-one training strategy was devised by the Moodle administrator to both equip faculty skills in using Moodle and making courseware available online especially at the undergraduate level. Several private arrangements with interested faculty members enabled some progress to be made in the training. This strategy yielded much more results as faculty members were taught at the comfort of their offices and some provided their course materials to be placed online. The below diagram depicts the flow of these events.

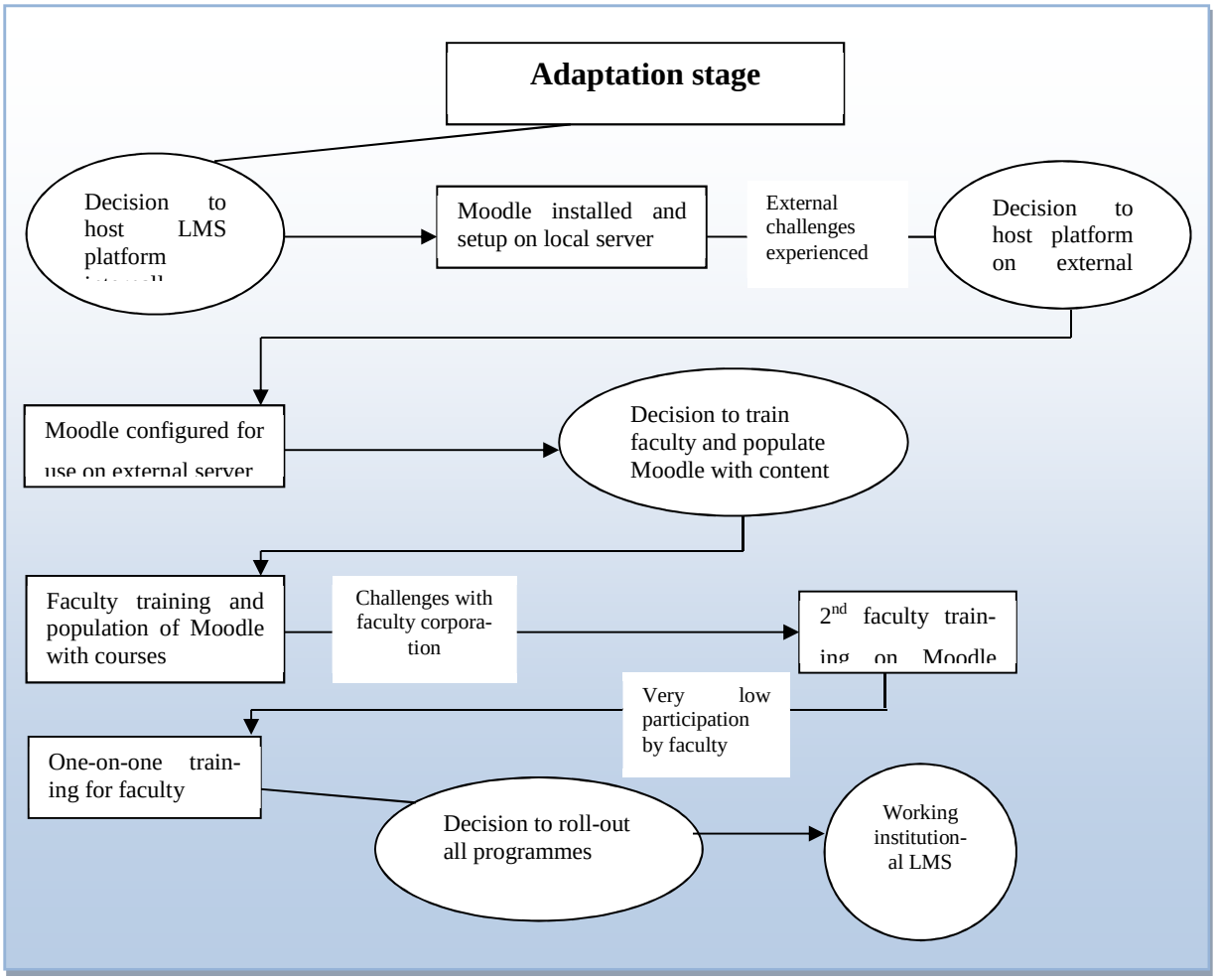



Figure 17: Institutional Adaptation stage

### *6.2.3.1 Facilitating and inhibiting factors during the adaptation stage*

Several factors facilitated the developments in this stage of the e-learning implementation process. An important factor in this regard was the off-the-shelf nature of the Moodle LMS. It was already ready to be deployed from the word go. All that was required was its installation onto a server and the configuration of user access and the system was ready to be used. It did not have to be developed from scratch and the processes could be customized to suit institutional requirements. The design could easily be customized to meet the institution's specific requirements. Time spent in downloading the application, installing and configuring for use was therefore not extended. After the server had been set up, this took a couple of hours to get done.

There was also a large community of online supporters since it was an open source with a large development community. As such there was much documentation available on the LMS

specific website and other websites searchable via google.com. This made configuration challenges easy to overcome, although much difficulty was not experienced during the configuration on the local server as well as when the platform had to be installed and configured on an external server.

Although much self-help was available online, the special training undertaken in Moodle administration was also very useful as it was tailored to issues relating to setup, administration and management. The administrator's acquired knowledge through the training was therefore very useful at this stage.

Another equally important factor that assisted the deployment was the availability of network and system administrators. These were very instrumental in the configuration of the server and user access over the network. It was important to ensure that when multiple users were online, the system would not be slowed in any way with the potential of discouraging repeated use. These technical hands were very handy and instrumental in ensuring ease of access over the network.

When external challenges were experienced which threatened ease of access to the platform, the institution's access to external hosting services provided the much needed solution to reliability and ease of access to the system. The hosting services provided access to a server where the institution's website was being hosted in the US along with other technical services. A sub-domain was subsequently created on the shared server and the Moodle application setup and configured. Fortunately, the host provided support for Moodle, making the work of the administrator much easier.

An important aspect of this stage is the population of the LMS with courseware for interaction with by students. The ready availability of course materials for postgraduate courses was most gratifying. Course sites for graduate programmes were thus populated with course materials provided by another university involved in collaboration with the institution under study. Without these courseware, students and faculty would have very little motivation to use the LMS and so this was very useful indeed as later events showed.

Despite these facilitators, there were also inherent inhibitors that limited the gains this stage's events could have contributed to the implementation efforts of the institution. One of such inhibitors was the threat of unstable power supply from the very beginning. Due to unstable

power supply resulting from challenges the nation was experiencing at that time, the initial decision to set up and manage the system internally had to be abandoned. Although a UPS was being used, the extended power cuts often drained the power in them, causing them to go off unpredictably. One of the reasons for deciding to host internally was the issue of internet bandwidth which was expensive and unreliable as there were challenges with connectivity. Thus hosting internally will reduce the pressure on the bandwidth and potential connection difficulties and enable users to access the platform with ease but external threats prevented this from being realized.

Another inhibiting factor at this stage was the uncooperative response from faculty members. Two training programmes organized to equip faculty with the skills and knowledge required to use the Moodle LMS were poorly attended. In the first session, only five faculty members attended while in the second training, only 2 members faculty attended. Although these training sessions were organized with the knowledge of management, the attendance of faculty which was low went without any consequence. In addition to this, faculty members especially at the undergraduate level were uncooperative in making their course materials available for placement on the system. The result of this was the absence of undergraduate courses on the system.

The absence of clear managerial enforcement of faculty compliance to directives on e-learning engagement was also an inhibiting factor frustrating the efforts of the Moodle administrator. Faculty failed to attend organized training sessions and there was no consequence. They also failed to make course materials available and there was no consequence. Clearly this absence of institutional consequence for non-compliance with management directives was worrying and capable of derailing any managerial efforts to sustain any e-learning development.

Visibly absent in the setup and configuration of the Moodle platform was the institutional format for teaching and learning process that the educational technological innovation was to address. There was no evidence of any of the institutional teaching and learning activities having been taken into consideration. The institutional e-learning was setup around the functionalities provided by the LMS platform. In other words, institutional format and pedagogical considerations did not underpin the setup and configuration of the system.

Institutional stakeholders whose works revolve around teaching and learning through such processes as quality assurance, curriculum development, courseware development, instruction, examination, admission, multimedia developers, faculty heads and subject experts were not involved in the activities of this stage. Involving all these stakeholders could have potentially facilitated compliance with managerial directives and integration of the LMS use into the institution's traditional practices.

The one week training in Moodle administration undertaken by the IT staff could best be described as scratching the surface of the management and administration of the application. Without adequate programming background or a team well versed in programming in such languages as PhP, very little transformation of the open source platform into a robust institutional learning platform can be achieved. This lack of programming skills in PhP may have contributed to the restriction of the configuration to the LMS's functionalities that did not incorporate institutionally designed formats. This can be attributed to the inadequate training acquired due to the urgency of need for deployment of e-learning by the institution. The table below shows the facilitating and inhibiting factors of this stage.

| Factors in the adaptation stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | 4 | 5 |
| 1. **Readily available and customizable LMS solution** | Technological | | | | √ | |
| 2. **Large community of LMS product support globally** | Technological/ Environmental | | | | √ | |
| 3. **Trained institutional Moodle administrator** | Organisational/Technological | | | | √ | |
| 4. **Available IT technical support** | Technological/Organisational | | | | √ | |
| 5. **Availability of external host services** | Technological/Environmental | | | | √ | |
| 6. **Available courseware for PG programmes** | Task | | | | | √ |
| 7. **One-on-one training strategy** | Organisational/Task | | | | | √ |
| *Inhibiting factors:* | | 1 | 2 | 3 | 4 | 5 |
| 8. **External power challenges** | Environmental | | | | √ | |
| 9. **Lack of cooperation from faculty** | Individual | | | | | √ |
| 10. **Absence of managerial enforcement of directives** | Organisational | | | | | √ |
| 11. **Lack of adequate involvement of stakeholders** | Organizational | | | | √ | |

| Factors in the adaptation stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| 12. **Institutional T&L format clearly not considered** | Task | | | | √ | |
| 13. **Inadequate training for LMS technical staff** | Technological/Organisational | | | | | √ |
| 14. **Inadequate technical staff** | Technological/Organisational | | | | √ | |

Table 23: Adaptation – facilitating and inhibiting factors

### 6.2.4 Initial Use

When faculty and students were given the green light to use the system only postgraduate courses could be accessed online. The Moodle administrator had uploaded course materials which were already available due to a collaboration relationship with another university. Lecturers were however encouraged to provide other relevant course materials for uploading onto their course sites. Postgraduate students were thus able to download course materials from the course sites. Postgraduate students who were mostly weekend students travelling from all over the country were able to access course materials for their personal studies and preparation before lectures as well as exams. With the exception of two faculty members, many of the faculties instructing at the graduate level failed to use the system. Some faculty members teaching at the postgraduate level however brought additional course materials for uploading onto the Moodle. They however personally never visited the course sites to interact with the students.

At the undergraduate level, course materials were not made available for upload onto the Moodle. The several calls made to faculty members at the undergraduate level to go online with their courses yielded no response. This led to a decision by management to increase the number of undergraduate courses with presence online. This led the Moodle administrator to populate the Moodle platform with all undergraduate programmes and courses and through persistent calls and encouragement, gradually got some faculty to make available course materials. About five (5) faculty members from the technology faculty provided course materials to be placed on their course sites. These faculties however never went online to engage with the students. Neither did they attempt to place the course materials online themselves. This was done through the Moodle administrator. At the undergraduate level therefore, there was no use of the Moodle for teaching or learning purposes. Students and faculty members at the undergrad level were not observed to be using the Moodle course sites. Subsequently a decision was taken by management and directed through the administrator to ensure that all

course materials were available for students to access online. Despite the renewed efforts of the Moodle administrator to accomplish this directive, many faculty members did not yield to the pressure to make their course materials available or even use the platform as directed. The following diagram shows the flow of events in this stage.

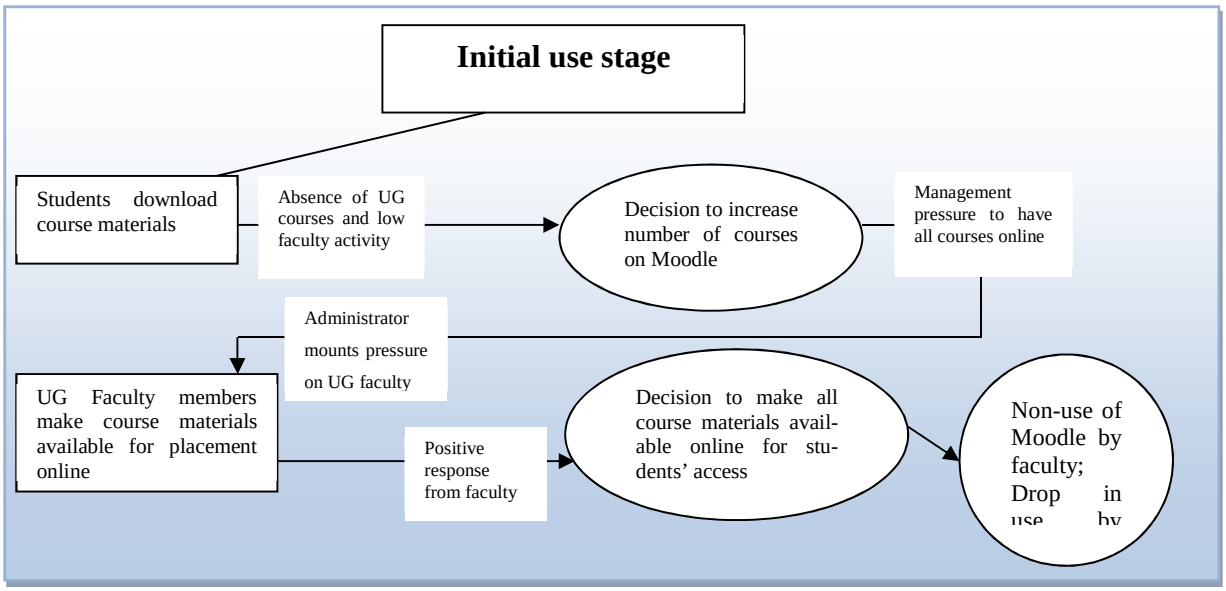



Figure 18: Institutional Initial Use stage

### *6.2.4.1 Facilitating and inhibiting factors during the initial use stage*

One of the factors that enabled some progress in terms of use by some category of users was the availability of course materials for post graduate programmes. These students who attended lectures during the weekend due to their tight schedules were able to download the courses materials made available online before and after lectures for their preparation and private studies. Their interaction with the platform was mainly to download materials. Beyond this many of the students had no further engagement with Moodle.

Again, the one-on-one training strategy adopted by the Moodle administrator due to intense pressure and directives from top management paid off as some lecturers accepted to be trained in the comfort of their offices. This one-on-one approach also enabled the administrator to encourage undergraduate faculties to make available course materials for placement online. Faculty members in this group were mostly from the Faculty of Informatics. There were however delays in accessing these materials as most faculties prepared their lecture notes just before attending lectures. This was problematic as students could not possibly get

access to them before attending lectures. However some progress was still made in getting some undergraduate courses online.

Another helpful development at this stage was the active engagement of two faculty members with their students using the platform. This was at the postgraduate level. One faculty made additional courseware available to students, conducted quizzes, had students submit assignments via the platform, and also responded to queries and questions from students. The other faculty in this category however simply posted questions on the forum section and responded to students' mails. Apart from these two, other faculty members teaching at the graduate level never went online to engage with the students.

Another factor that helped in the use of the institutional Moodle was the availability of computer labs especially for the masters' students. Downloads of materials therefore took place both on campus and outside of campus. Many of these students also had their personal laptops with which they were able to connect wirelessly while on campus to the LMS. All these enabled frequent access to the system by students which for a while allowed the platform to be used.

Despite these facilitating factors, there were a number of inhibitors. One of these includes the simple download of materials by most postgraduate students. The system appeared to have been turned into a content repository as no real learning engagement took place between them and their lecturers. This limited the potential benefits and gains that the system' use could provide to users. This simple downloading of materials from the system over time dwindled to outright none use by students.

In relation to the above factor, it was observed that faculty members teaching at the postgraduate level were not going online to interact with their students even though course materials were available online. Aside the two faculty members observed to use the platform, none of the other faculty members ever went online. The absence of faculty online could explain students' use of the platform for simply downloading course materials. Again from the beginning, faculty members were asked to sensitize their students about the platform and its use whenever they attended lectures. However this was never consistently done and over time lecturers forgot to inform students in class.

At the undergraduate level there was virtually no use by students and faculty alike. Although some faculty members had made their course materials available, they never visited the site to even glimpse what was happening there and how their courses had been organized on the platform. This was a sad development.

The none-use by faculty was made worse by the lack of enforcement by management. There was no monitoring of the system's use to ensure that directives were being followed and no evaluation and accountability requested. Oversight management of e-learning use was therefore very poor, partly explaining the poor continued usage by both faculty members and students alike.

There was also the issue of apparent lack of motivation to use the system. For instance, the faculty members who made their course materials available at the undergraduate level never once followed up by going online to interact with their students. Thus even though they eventually complied with management directives by making their materials available, it ended there. Without faculty members' active involvement, students could not be expected to engage in any meaningful use of the system.

Another factor that accounted for this was the lack of training on the part of faculty members. When training was organized for them, many of them failed to participate and as such could not acquire the relevant skills to use the system meaningfully. This of course may be partly attributable to concerns they felt had not been addressed by management up to the current time as the bigger institutional vision was still not clear to many. Below is a table of these factors.

| Factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | 4 | 5 |
| 1. **Available courseware for postgraduate courses** | Task | | | | √ | |
| 2. **Faculty one-on-one training strategy** | Organisational | | | | √ | |
| 3. **Faculty members engagement with students** | Task/Individual | | | | √ | |
| 4. **Access to computer labs and internet on campus** | Technological/Organisational | | | | | √ |

| Factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Inhibiting factors:* | | 1 | 2 | 3 | 4 | 5 |
| 5. **Students' use of system characterized by document download** | Individual | | | √ | | |
| 6. **Low usage by faculty members** | Individual | | | | √ | |
| 7. **None use by faculty at the undergraduate level** | Individual | | | | | √ |
| 8. **Management' none enforcement of use** | Organisational | | | | | √ |
| 9. **Lack of motivation among faculty** | Individual/Organisational | | | | | √ |
| 10. **Lack of adequate training for faculty members** | Organisational | | | | √ | |
| 11. **Poor preparation by faculty** | Organisational/Task | | | | √ | |

Table 24: Initial Use – facilitating and inhibiting factors

### 6.2.5 Acceptance

Around this time, the institution was considering the acquisition of a proprietary educational enterprise resource planning system (ERP). This ERP called Academia had a learning management module called WebGuru which performed similar functionalities as the Moodle that was currently being used. There was every indication that the institution was going to procure it and that it was just a matter of time. The developers were invited to give a presentation with some IT staffs present to evaluate its usefulness. Thereafter, nothing much was heard about it again for some time. Management had taken a decision to procure it for institutional use.

Later, faculty members were supplied tablets with wireless connectivity. This was based on a decision by management to support faculty's teaching activities with such devices while encouraging their use for e-learning purposes.

As many faculty members were not using the platform to engage with students, the use by graduate students to download course materials dropped after a while. After sometime, no one, faculty nor student, used the platform. During this period, the Moodle administrator left the institution for further studies, leaving a big gap in terms of technical expertise to be filled. Two of his colleagues who assisted him took over his role in the management of the system.

No one was employed to replace him. With management, still determined to realize the e-learning vision, a faculty member was directed to organize courses that were general and not technical in nature, requiring mostly reading for deployment online. However lecturers contacted in this category felt they were being victimized and hence refused to comply with the directives. This move by management to get e-learning underway also did not work out. Later, an email was sent to the dean of informatics to see if he could organize some general courses for the next semester to be delivered online. This also failed to materialize.

A decision was taken later to recruit an educational technologist with the requisite experience to spearhead the institutional e-learning vision. Having recruited the specialist, there was the need to establish a centralized institutional unit to provide the much needed support services and leadership in the delivery of e-learning. The recruitment and establishment of a specialist and centre began an institutional awareness creation that quickly spread among both faculty and administrative staff members. A couple of weeks after these events, an institutional off-campus retreat was organized to reflect over the past year's happenings and plan for the New Year. At this event, a vision of the institution's e-learning was presented to all staffs along with the potential gains to be made. Questions were asked and misconceptions clarified. For the first time, it appeared faculty members were convinced about the real purpose of the institution for the e-learning with some beginning to show signs of interest. The volume of work to be done to realize this vision however necessitated the recruitment of additional support staff. Upon request by the head of the centre, an advertisement was put out and instructional technologists recruited. This led to more intensive awareness creation especially among students. Specialized training in creating courseware, examining students online, interacting with students online, pedagogical approaches to online teaching and learning, etc. were provided to faculty members.

To enable the institution gain some experience and knowledge of the opportunities and challenges it faced, it was decided that general courses should be started before rolling out the more technical courses. Eight (8) courses were identified and selected for piloting purposes. The affected faculty members involved were informed and invited by the centre to attend some training sessions. They were also requested to bring their course materials for conversion into formats suitable for online delivery. PowerPoint slides were converted into multimedia formats with embedded videos. They were assisted to develop their courseware along with quizzes, linking of important videos on YouTube to their course sites, etc. The faculty

members were also taught how to use the Moodle platform to deliver their courses in an engaging way. This enhanced their skills and provided the needed confidence. Students taking these courses had the opportunity to access online contents, undertakes quizzes, interact with their lecturers and colleagues. This experience was an interesting one for the faculties involved as they had the opportunity to experience an entirely different approach to their course delivery. In the diagram below, the events described above are highlighted.

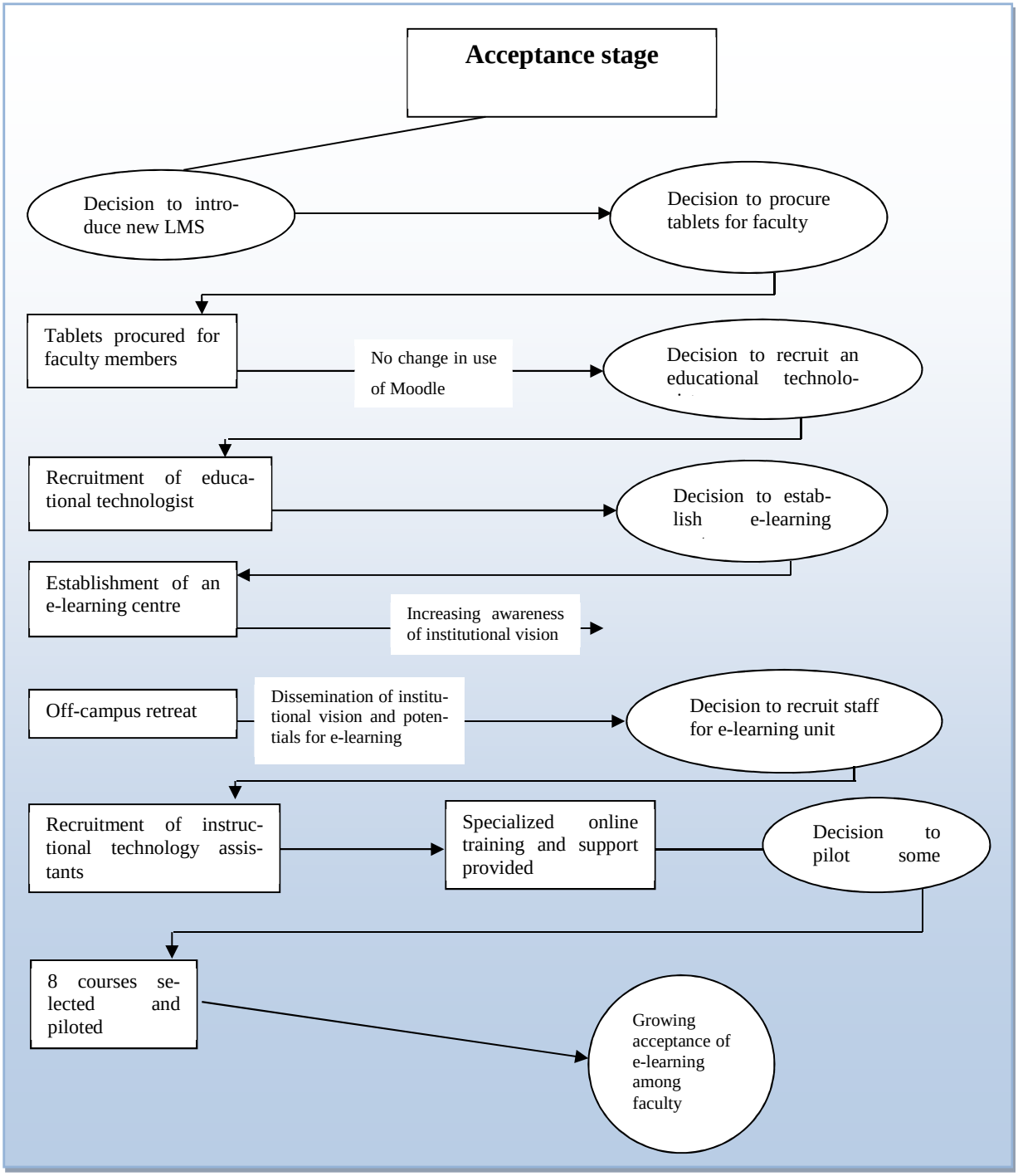



Figure 19: Institutional Acceptance stage

#### *6.2.5.1 Facilitating and inhibiting factors during the acceptance stage*

Several initiatives undertaken during this stage of the implementation can be described as management's attempt to get faculty to use the Moodle platform for e-learning delivery. One of such initiatives was the procurement of tablets for faculty members to assist them in their preparation and delivery of lectures. It was also to aid them in their e-learning environment by enabling them to connect wirelessly on campus and at home to the Moodle platform. Though faculty members were excited to receive these tables initially, their initial enthusiasm failed to match their expected use but in class and their new e-learning environment.

An important factor that positively influenced the institution's e-learning ambition was the recruitment of an educational technologist. This expert brought renewed energy through a working knowledge of e-learning and online environments, instructional design, learning theories and multimedia design for learning purposes. The recruitment of the educational technology specialist signalled management's determination to institutionalize the e-learning practice at all cost and immediately all attention seemed to focus on what difference this was going to make in the institution's e-learning journey.

The recruitment of the specialist also brought about the establishment of an online centre which is now part of the institution's organogram, reporting directly to the president of the institution. The centre provides all the technical e-learning support services like the development of courseware, training in Moodle use, development of multimedia learning materials, students support and other faculty support services that would enhance the skills, competencies and confidence of users in the e-learning environment. Together with the IT department, the centre provided user support services that sought to encourage Moodle use and e-learning integration within the institution.

Another important facilitating factor was the awareness and sensitization provided by the centre. One of such awareness creation was activities at off-campus retreat organized to discuss institutional plans for the New Year. The online centre director was given an opportunity to speak to the staffs that were present. Staffs present constituted both administrators and members of the various faculties. The concept of e-learning, learning management systems, potentials of online learning, benefits, etc were presented to all present. Many of the staffs

were impressed and had a high expectation after the retreat. Many of the fears of some faculty members were gradually dispersing, leaving them ready to give the innovation a try.
Given the tasks ahead, there was the need for additional support staff at the online centre. Upon recommendation by the head, two instructional technology assistants and administrative staff were recruited. This led to increased awareness creation, which extended to the students too.

Specialized training courses in the use of Moodle functionalities, techniques in students' engagement, development of courseware and setting up of course sites provided the much needed skills and competences required by faculty members. Faculty members with time on their hands attended many of these training sessions organized by the centre and received assistance from the centre's staffs. This was gradually changing the perceptions of some faculty members.

Another facilitating factor was the sensitization of students to the use of the Moodle platform through an orientation for both new and continuing students. Class to class visits were also organized were faculties were asked for 5 – 10 minutes sensitization for the students. All these efforts created a situation of awareness that was missing in the initial stages when of the implementation process. Both students and faculty were now aware of not only the existence of the platform, but how to use it and where to get support from when needed.

Another very important factor at this stage was the decision to pilot courses that were general in terms of not being technical and involved mostly reading. Some of these courses including communication skills, French, etc were setup with the assistance of the subject experts and delivered online. Faculties among other things were assisted to develop lecture videos and other learning multimedia, quizzes, and mounting of these unto the Moodle. Their user support needs were promptly addressed along with the concerns of students. Many of the selected participants had positive experiences which they shared with other faculty members in other training sessions. In other words, through this piloting, organizational champions with some experience were prepared to help other faculty members through their personal experiences.

Despite all these factors facilitating the stage's outcomes and providing strong foundations for future developments, there were still some concerns that were inhibiting the developments

that could be achieved at this stage. One of these factors was the absence of management's enforcement of certain behaviours regarding use of the LMS. There was still no consequence for non-use by faculty members. Thus even though more general courses in nature were identified, only eight (8) eventually got deployed during the pilot run.

In addition, the institution's e-learning vision and approach was still not clear. Faculty members piloting the general courses had the flexibility of delivery part of the courses in face-to-face sessions and part online. Much clarity was not supplied in the actual combination and some faculty members were obviously concerned with this. Some of them felt it was too abrupt, probably not in tune with their accreditation and could possibly create problems with their certificate awarding university.

It was still evident, that faculty members had other concerns which had not been satisfied. Over the period till this point, there had been no event where management could be visibly attempting to address faculty concerns so as to facilitate their adoption. Many faculty members were therefore still hesitating to comply with management's directives despite these developments.

Another limiting factor was the unstable internet access. Both students and faculty members experienced intermittent interruption with internet access. There were complaints about delays in getting pages to open sometimes resulting in frustration and discouragement of use. This could potentially lead to none use if not properly addressed. Below is a table highlighting the facilitating and inhibiting factors identified in this stage of the implementation.

| Factors in acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | 4 | 5 |
| 1. **Procurement of tablets for faculty** | Organisational/Task | √ | | | | |
| 2. **Recruitment of an educational technologist** | Organisational/Task | | | | | √ |
| 3. **Establishment of an online centre** | Organisational | | | | | √ |
| 4. **Recruitment of instructional support staff** | Organisational | | | | | √ |
| 5. **Provision of specialized training** | Organisational | | | | √ | |

| Factors in acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| 6. **Awareness creation for students** | Organisational/Task | | | | √ | |
| 7. **Piloting of selected courses** | Task | | | | | √ |
| 8. **Management support and commitment** | Organisational | | | | √ | |
| *Inhibiting factors:* | | 1 | 2 | 3 | 4 | 5 |
| 9. **Lack of management enforcement of faculty use** | Organisational | | | | | √ |
| 10. **Lack of clarity in management e-learning vision** | Organisational | | | | | √ |
| 11. **Unaddressed faculty concerns** | Individual/Organisational | | | | √ | |
| 12. **Challenges with internet access on campus** | Technological | | | | √ | |

Table 25: Acceptance – Facilitating and inhibiting factors

### 6.2.6 Routinization

In order to provide easy access to information and resources needed for effective e-learning delivery, the centre decided to create a website. This was developed by the centre with links to important information and resources for both faculty members and students. The website also provided information on consultancy services for external people and institutions requiring training and development services in the area of online teaching and learning. The centre also took the decision to develop two important documents: an institutional instructional manual and an institutional e-learning policy. The instructional manual was to streamline the format for online instructional delivery to ensure consistency and provide a basis for evaluation and improvement. All faculty members developing online courses were to follow the recommended format before going online. The e-learning policy which was also under development was to provide the policy directions and guidelines that would ensure that the benefits to be derived from the initiative would be recognized and guided by well documented provisions as a policy. Both of these documents were still under development when an online training and certification programme was organized for all faculty members. This was the first certification training programme organized for all faculty members. It was held during the long vacation period when lecturers were supposed to be on break for the academic year. This was to ensure that a majority of them would be able to participate. Another training session for administrators was to be organized after the faculty training to sensitize and show other staffs their role in a broader e-learning vision.

After the training session which lasted two (2) weeks, faculty members were assisted to develop their courseware for the next semester. A managerial decision was taken to have each faculty mount at least one course onto the Moodle platform. By the beginning of the next academic year, 2013/2014, 25 courses were ready for delivery. The teaching and learning manual had been developed and used to guide faculty members in the design of their instruction. The policy document however had been submitted to management and was yet to be approved and put into effect. Management in another communication to the e-learning centre made it clear that they wanted every course to have an online presence. This however appeared to be a somewhat slow process as faculty members' adoption of e-learning failed to match the expectations of management. Below is a diagram depicting the events of this stage of the implementation process.

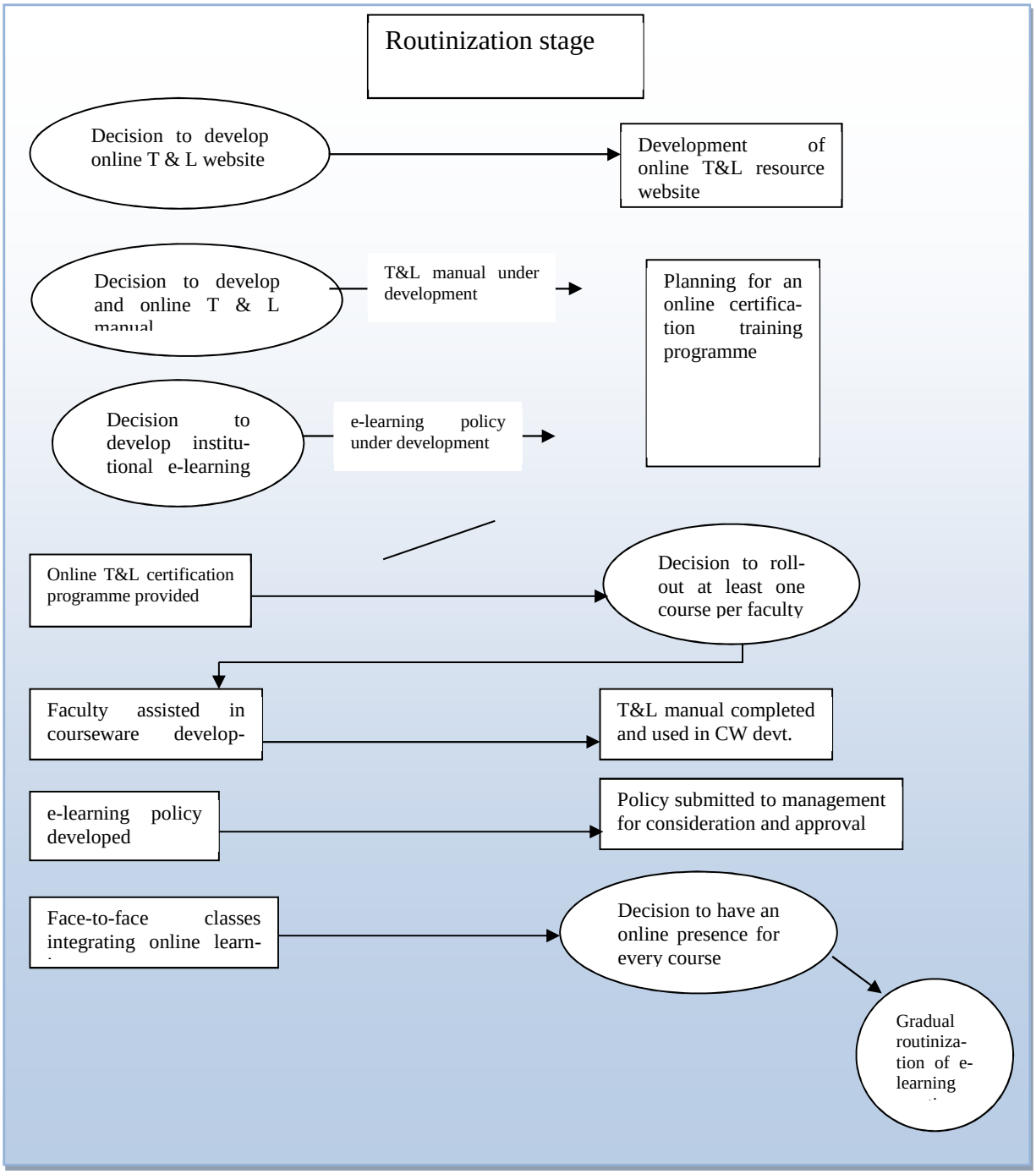



Figure 20: Institutional Routinization stage

### *6.2.6.1 Facilitating and inhibiting factors during the routinization stage*

In this stage of the institutional implementation, several factors facilitated the institutional e-learning efforts towards becoming a permanent feature of daily activities. One such factor was the development of an online resource website for the centre. The website detailed the services provided by the centre to internal and external clients of the institution, provided links to important resources for developing courseware, as well as access to support services.

The website provided access to information required by users in their use of the Moodle platform, allowing them to seek direct assistance when the support required could not be found on the website. This was a feature that previously was unavailable and signalled the institution's determination to embed e-learning within existing institutional teaching and learning practices.

Another facilitating factor was the development of an instructional manual. This manual provided a format for organizing instructional information suitable for online delivery. This previously was conspicuously missing even in the face-to-face delivery. Faculty members had the discretion to use their own format. Now however, all faculty instructional format was being streamlined through the development of this manual. The instructional manuals for courses would then be available to the institution for future revision and access to new faculties. This brought a certain level of consistency and uniformity in institutional teaching and learning delivery.

To further ensure that the institutional e-learning vision was understood, known by all stakeholders, and used as a guide to future developments, a directive was given to develop an e-learning policy. This policy was subsequently delivered to management for consideration and adoption. Although it was not made available for examination, it was learnt that a lot of recommendations had been made to strengthen current developments within the institution and ensure compliance. This was a major step towards routinizing e-learning in the institution as the operations of the university started without the introduction of such an innovation. Depending on how this policy would be disseminated and implemented, it was bound to have far reaching implications for the future of e-learning within the institution.

An important contributor to the achievements of the institution in this stage was the organization of an online teaching and learning certification training programme. This was organized to formally equip faculty members with the knowledge, skills and tools needed for successful online delivery. Faculty members were taken through an intensive ten (10) day training spanning two weeks in total where they were taught and practically made to design their own course sites. The certification was to qualify them for online training in any institution and was part of a bigger vision by the institution to train the faculties of other institutions. Over forty (40) faculty members attended this training session during which the three top manage-

ment officials in the institution partook in the training delivery. The training was significant as it resulted in 25 courses being delivered online the following semester.

The level of support and expertise provided by the unit enabled many faculty members to develop their courseware. Faculty members recorded audios, videos, developed PowerPoint's with embedded videos or voice-over, set quizzes using PowerPoint and got the opportunity to set up their course sites using the knowledge acquired from the training. This was very instrumental in getting more courses to be delivered online.

Although no official communication was provided regarding specifically what management meant by going online, the piloting period revealed much about what management had in mind. Faculty members were allowed to choose how they wanted to deliver their courses online by combining some level of face-to-face interaction so long as the courseware was available for students' access. There was no restriction on how this was to be done and although some faculty members had some concerns about this, the institutional vision was gradually becoming clearer. Although online facilitation was time involving, faculty members engaged in e-learning felt they were able to get some time off their previous compulsory weekly meetings with students for other responsibilities such as their research work and time to mark assignments whenever students were left on their own to do their self-studies. This was a motivating factor that positively influenced the developments of this stage.

Worth highlighting is the demonstration of a new LMS which some faculty members believed to be comparatively easier to use. This LMS called WebGuru was part of an Educational Resource Planning system the institution procured. This proprietary system, developed in India, enabled institutions to manage their admissions, students information, degree/classes, courses, time tables, attendances, fees, mark sheet and exams, library, certificate and documents, hostels, HR & Payroll, inventory/store, survey, maintenance and support, alumni, placement and reports. This planning system required all institutional stakeholders to be involved – students, administrators, faculty, parents, etc. to provide a truly online institution where fully online education could be delivered seamlessly. Since all processes were going online, some faculty members felt the need to participate in order not to be left out.

Nonetheless, there were a couple of factors inhibiting the gains from this stage. One of them was the ever present absence of a managerial mechanism for enforcing directives. Consider-

ing how management has always been pushing for e-learning, one would have expected some demand for accountability whenever institutional directives were not complied with. As the policy was not available for scrutiny, it is difficult to say if provisions have been clearly specified with respect to consequences for none compliance with institutional e-learning directives. The absence of this is clearly highlighted by many faculty members refusal to deliver at least one course online.

It is also worth noting that many of faculty's concerns have still not been addressed formally by the institution. Several explanations seem to offer themselves as to why but will require further clarification. However, through the many questions asked by faculty members during the training, it was evident that no attempt had been made to resolve concerns felt by faculty members. This was very critical, as at that time, new management directive was both conflicting and yet insistent that all faculty must go online at all cost. The more this issue persisted and management failed to find a way to enforce its directive, the more the e-learning vision could not be realized.

Another factor that acted as an inhibition to this stage's accomplishment is the decision to introduce a new LMS. Given that the use of the existing LMS, Moodle was still at an infantry stage where users were still being encouraged to use it, much was still required to be done for users to gain experience in online delivery of teaching and learning. To introduce a new system therefore while sufficient institutional experience had not been gained was to stress users as they would be required to go through another learning curve which would also take some time to master. This was evident during the certification training where the two LMSs were demonstrated and faculty members given hands experience in the use of the two. However, although some participants opined that the new LMS was easier to use, others were of the view that the Moodle should be continued with as the institutional platform. When certain challenges were experienced with the use of course material upload functionality on the new LMS, many participants felt the new system had to wait until it was fully functional according to institutional requirements. Thus even though management wanted the new system to be used in the coming semester, the faculty members and head of the online centre had a different view based on their immediate experience.

Again it was obvious from the training and challenges encountered during this period that IT staffs were not fully involved in the configuration of the new system. The system was being

setup by a company located in India with Skype meetings being held with users to assess requirements leading to configuration. The configuration of the new system was therefore not complete and from the look of things could take quite a while for it to be ready. Some of the participants therefore were of the view that the institution should not be in a hurry to roll out the new LMS. To resolve the immediate challenges that were experienced in the training session, a rep of the ERP in India had to be contacted via Skype, as the IT staff present could not resolve it. Later, these developments resulted in indecisiveness about which LMS to use in the new semester which was about two months away.

| Factors in the routinization stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | 4 | 5 |
| 1. **Development of an online resource website for the centre** | Organisational/Task | | | | √ | |
| 2. **Development of an instructional manual** | Task | | | | √ | |
| 3. **Development of an institutional e-learning policy** | Organisational | | | √ | | |
| 4. **Provision of online certification training** | Organisational/Task | | | | √ | |
| 5. **Support for faculty courseware development** | Task | | | | √ | |
| 6. **Clarity in institutional e-learning vision** | Organisational | | | √ | | |
| 7. **New ERP integrated with an LMS** | Technological | | | √ | | |
| 8. **Management support and commitment** | Organisational | | | | √ | |
| *Inhibiting factors:* | | 1 | 2 | 3 | 4 | 5 |
| 9. **Lack of managerial enforcement of directives** | Organisational | | | | | √ |
| 10. **Unaddressed faculty concerns** | Individual/Organisational | | | | √ | |
| 11. **Conflicting decision to introduce new LMS** | Organisational/Technological | | | | | √ |
| 12. **Lack of involvement of IT staff in development of ERP** | Technological/Organisational | | | | √ | |

Table 26: Routinization – Facilitating and inhibiting factors

### 6.2.7 Infusion

A very thin line lies between the routinization and infusion stage. Whereas issues of day to day institutional practices reflect changes taking place in traditional teaching and learning at the rou-

tinization stage, infusion requires use of the Moodle platform in more dynamic and integrated ways. When faculty and students no longer can conduct their everyday tasks without using the Moodle system, when faculty increasingly use the different features of the Moodle to deliver and support learning while appropriating the system in ways above institutional expectation, when other institutional information systems seamlessly integrates with the Moodle through the provision of and sharing of information, when the institution's vision of providing online education where learners can acquire their degrees without having to come to campus is attained, then infusion would have been achieved. This however is yet to be realized by the institution.

### 6.2.8 Summary of findings

The use of the IS implementation model as a lens for understanding how higher education institutions implement e-learning using learning management systems in Ghana is useful for understanding the processes involved and the factors that facilitate and inhibit the achievement of institutional objectives. Arguably, since the overriding objective is to institutionalize the e-learning practice, the movement from an institutional context where the targeted institutional practice is unmediated by an LMS to a context where an LMS mediates the practice requires careful consideration and planning. In particular, if the LMS to be deployed is not custom made or developed for the institution from scratch, the IS implementation framework is a useful guide to achieving institutionalization. As Cooper & Zmud (1990) note, "though there is evidence that sequential models of technology diffusion may not depict actual implementation process…, recent work suggests that such models may be more appropriate for technologies which are borrowed or adapted rather than custom made". In the current research, this framework is well suited as the Moodle is an open source LMS adopted and configured by the institution for institutional use. The various stages of the framework represent broad activities of which careful consideration can facilitate an institution' objective of getting a new technology to be used in an intended, consistent and goal oriented way.

In the current case, the decisions and activities identified in each stage can be assessed in terms of their outcomes, and their consequences for institutional structures and social contexts identified. This is due to the ability of information technology to reinforce or alter an institution's existing practices (Orlikowski & Robey, 1991).

### 6.2.9 Discussion

This section undertakes a discussion of the findings in the light of the IS implementation conceptual framework and structurational perspectives of an information system such as the LMS.

#### *6.2.9.1 Institutional Planning towards introduction of e-learning*

Planning for an institutional introduction of an innovation such as e-learning is an activity known and accepted as important among both practitioners and researchers, but in reality never fully engaged in by many institutions in their e-learning implementation effort. Institutions that implement any form of e-learning do not intend to discontinue use after a while, or seek that the innovation does not become part of their day-to-day institutional activities. On the contrary, the intention often is for the system to be integrated with other institutional processes, becoming routinized and seen by everyone as part of the institution. This however requires careful planning and consideration of the technology and the institutional processes, something many institutions fail to consider.

In this regard, therefore, it is important for an institution to clearly determine its vision for an e-learning introduction which must be clearly articulated in an e-learning strategy document. This arguably is more useful if it is already in existence before the institutional initiative as it provides a basis for discussion and clarification among stakeholders. If not in existence, an institution will do well to develop it first to enable proper planning to be made. In particular, if the institution has been in existence long before the e-learning is initiated, clarity of institutional intention is required if stakeholders are to buy into institutional decisions.

A clear institutional e-learning vision and strategy has several benefits for an institution. Firstly, it enables stakeholders to be clear about exactly what the institution means and intends to do. Stakeholders therefore can assess the institution's intentions in terms of appropriateness, adequacy and potential in order to lend their support to achieving it. In particular, it enables stakeholders to assess what is in it for them, helping them assess their personal readiness and benefits to be gained in terms of their professional practice and development.

Secondly, the institution is provided with an opportunity to assess its readiness for such an innovation. Such an assessment is very important as it provides a baseline for institutional

effort. The vision and strategic document will enable the institution determine whether its technological infrastructure can adequately support such an initiative, whether institutional support structure for user services is adequate and ready, whether users have the technological and e-learning skills required, what resources will be required over a period of time, what institutional processes would be affected and how, what external assistance would be required etc. When this is conducted on the basis of a clear vision and strategy, relevant considerations can be made that will ensure achievement of institutional objectives.

Through an assessment of an institution's readiness therefore, the technological requirements for successful deployment of e-learning using a learning management system (LMS) can be determined. Depending on whether on-campus access in a blended mode is the strategy, or a fully online mode for distance students, an institution has the opportunity to determine whether it has adequate computer labs, reliable local area or wide area network depending on its number of campuses, adequate, reliable and accessible internet bandwidth, adequate and accessible technical IT support staff for both development and support is available before deciding to go ahead. This is necessary to ensure that potential technical challenges that can discourage use are resolved and support made available to resolve future technical challenges with the potential to discourage users continued use.

In addition, the assessment will enable e-learning users to be analyzed in terms of their computer and e-learning readiness. Knowing the computer literacy skills of users is important in this direction as it potentially can allow measures to be put in place to bring users skills up to speed. This also ensures that the fundamental requirement needed to use an LMS is there as the LMS is essentially an information system accessible via computer devices. When this is satisfied along with users' specific e-learning skills assessment (i.e. ability to use an LMS to deliver teaching and learning online), an institution can minimize or remove user challenges arising as a result of this.

As indicated above, another area of critical importance in the readiness assessment is the institutional processes to be supported by the LMS processes. A good knowledge of the core institutional processes to be supported by the new system is necessary to determine potential changes or improvements to be introduced as a result of the innovation. This includes the core processes of institutional teaching and learning as well as the supportive administrative tasks as registration, examination, finance, admission, student support, time tabling, course

and staff allocation (HR), curriculum and quality assurance services. Institutional processes that need to be improved or supported can be appropriately achieved when this form of assessment is conducted.

Clearly, this assessment enables an institution to identify its strengths, weaknesses, opportunities and threats to successfully rolling out e-learning. This can therefore enable resources to be appropriately allocated and external support requirement determined to send a clear signal to all stakeholders that the institution is ready.

Thirdly, it enables planned institutional awareness to be created. An awareness and sensitization campaign based on a clear institutional e-learning vision and strategy enables institutional stakeholders, both direct and indirect, to become familiar with the e-learning agenda of the institution. It affords institutional stakeholders the opportunity to clarify all misunderstandings and issues affecting them and thus paves the way for the institution to address them and garner support for implementation. When the awareness and sensitization campaign involves an opportunity for users to try the technology, it further enhances their informed judgment to be made about the suitability of the system.

Fourthly, during the environmental scan for a technological solution to support the institution's e-learning, a clear institutional vision and strategy would create an opportunity for core users to be involved in the process of demonstration and selection as ultimately they would be direct users. This will enable an assessment of the suitability of the LMS for the proposed teaching and learning innovation.

Fifthly, the constitution of an institutional task force or committee responsible for the institutional implementation is another potential advantage to be gained from the availability of a clear e-learning vision and strategy. The committee which should be made up of technical IT and e-learning practitioners, must also constitute users and administrators who provide student support services. This will enable quick integration into institutional processes as many more organisational members would have roles to play on the new system. This however is dependent on the strategy proposed by the institution.

Sixth, strategic relevance of having a clear vision and strategy for an institutional e-learning implementation is the opportunity to clearly consider the targeted student – existing or future

students, on-campus, off-campus or part-time students – skills. Whether students are potentially technology savvy or not, their skills in the appropriate use of the LMS for learning purposes must be considered and awareness created. This can ensure that existing students are adequately prepared for the change and that new students are prepared in terms of what to expect.

An institution's preparation and planning for an e-learning introduction therefore plays an important role in the subsequent physical deployment, use and continued use of the system. Involving stakeholders, providing adequate awareness and opportunity to try the proposed system, considering potential processes to be affected and getting stakeholders to buy-in can potentially have positive influence on the institution's efforts.

It is also very important at this stage to understand how institutional members' works would be affected. Questions such as: would the new technology affect members' workload? Would positions and relationships be affected? What institutional requirements would be involved? If changes should be made to take advantage of the new system, whose role, authority, or task would be affected? What resources are required for effective deployment? Etc. A checklist guide like that below can assist an institution in its preparation to introduce e-learning through the use of a LMS.

| **Planning Checklist** | **Availability & Adequacy** |
|---|---|
| Clear institutional vision | Not available |
| An institutional strategy | Not available |
| Stakeholder involvement | Not adequate |
| Awareness creation | Not adequate |
| Technological infrastructure readiness | Not adequate |
| User readiness | Not adequate |
| Students sensitization | Not available |
| Institutional process assessment | Not available |
| User trial of technology | Not available |

Table 27: Planning checklist

An equally important consideration in the deployment of an institutional e-learning platform is the decision on courseware development. The courseware is the course materials designed

for use in a particular course. This is what the student engages with on the e-learning platform. The development of the courseware is time involving and as such needs careful consideration. An institution therefore needs to be considerate if for instance it requires it subject experts to create this resource themselves. Other options for an institution include procuring courseware from external developers or procuring rights to the courseware from their faculties that develop them. Without clear decision on this, the use of an e-learning system would be inconsistent and possibly end up in none use.

#### *6.2.9.2 A Structurational Perspective*

We now consider the institutional implementation effort through the lens of a structurational model of information technology in an organization (Orlikowski & Robey, 1991; Orlikowski, 1992). The IT structurational framework which is modelled on Giddens' structuration theory posits that IT has both subjective and an objective component that act on an organisation and is in turn act upon by the organisation. This is what is referred to as the duality of IT. According to Orlikowski and Robey (1991), "this duality is expressed in its constituted nature – information technology is the social product of subjective human action within specific structural and cultural contexts – and its constitutive role – information technology is simultaneously an objective set of rules and resources involved in mediating (facilitating and constraining) human action and hence contributing to the creation, recreation and transformation of these contexts." The model identifies four relationships between IT and organisational dimensions and posits that the relationships operate simultaneously and not sequentially. The four relationships which include (a) IT as a product of human action, (b) IT as a medium for human action, (c) contextual conditions for interacting with IT, and (d) consequences of interacting with IT. Using Giddens' modalities of structuration which provides explanatory links between the subjective and objective dimensions of social reality, IT is believed to impinge on how meaning, power and norms are appropriated by developers and users, and how IT constitutes a central part in the structuration process.

In the case of the institutional LMS implementation, the historical and organizational context within which it is developed and used is important to understanding how the system is developed, deployed and used. Established in 2005, the dominant mode of teaching was face-to-face. Accredited to offer programmes in Engineering, Informatics, Business and IT, it was affiliated to a fully-fledged science-based university in the country with other international

partners accrediting their programmes. It had two campuses within 20 minutes' drive of each other and had the main campus fully networked due to the campus having been inherited from a telecoms organisation that used it for its training school. Given a background of telecommunications engineering with faculty and students used to traditional face to face and hands on practices involving equipment, introducing an online component into this mode of teaching and learning can be expected to have been potentially accompanied by some resistance. With a teaching strength of about 84 faculty members, 35 of whom were full-time and the remaining adjunct, the institution provided both undergraduate and post graduate programmes. The full time faculty had offices on campus while the adjuncts were provided a common staff room where all faculties could meet. The IT infrastructure and needs of the institution was supported by an IT department whose staff possessed systems, network and hardware educational backgrounds and experience. These staffs were responsible for ensuring the IT infrastructure of the institution was working at all times and reliable. With an internet backbone of 10 MB, a reduction from 50 MB due to change of ownership of the institution, internet access on campus was supplied by both LAN and wireless hotspots for users. A careful assessment of the IT department however showed a lack of programmers with the required experience and skills to programme or modify an institution's software requirements. Students admitted into the various programmes at the undergraduate and postgraduate levels also came from various backgrounds with very little or no experience with e-learning and whose ages ranged between 17 – 24 at the undergraduate level and 25 – 45 at the graduate level.

Against this historical and contextual background, the institution formally decided to deploy an online platform to support the e-learning plans of the institution. The institution was looking for an off-the-shelf solution to deploy rather than developing from scratch. This was possibly attributable to the numerous LMS available and the high usage by institutions of higher learning around the globe. The main issue however was which of the many LMS applications was suitable and why? Another issue that was required to be addressed was whether a proprietary or open source LMS should be adopted. The directives given to the IT department by management in 2010 to evaluate and recommend an LMS for institutional adoption was therefore aimed at selecting from competing alternatives the most institutionally aligned application that could serve the institution's purpose.

According to the structurational model of technology, the development or more appropriately in this case, the modification of an adopted LMS for institutional use by the development unit

is presupposed to be influenced by institutional structures. These institutional structures which include signification, domination and legitimation represents the meanings, power notions, and moral sanctions that staff have come to know, understand and use in the performance of their functions and interaction with other staffs. As such, the recommended LMS, which in this case was an open source application, Moodle, highlights clearly the belief by the IT staffs that the embedded assumptions, processes and rules of the LMS were in conformity with what the institution required, accepted and expected as institutional practice in terms of the teaching and learning processes in an e-learning environment. The subsequent confirmation and approval of the Moodle as the official institutional LMS for e-learning purposes was a clear signal institutional users have the full support of management in the use of Moodle to deliver their teaching and learning activities. It is important to note that the approval was given by a constitutive body made up of management and representatives of the various faculties.

A critical examination of the events leading to the evaluation and selection of the institutional LMS platform shows the nonattendance to important elements as institutional specification for the LMS which would have clearly highlighted processes and practices stakeholders within the institution consider the system should be able to support: In particular, the institutional processes relating directly to teaching, examination, students learning support and other administrative support provided in the teaching and learning process. In addition, such specifications could clearly highlight requirements for other relevant institutional processes as the roles of department heads, deans, examination officers, accounts, admissions etc as well as future developmental aspirations. In the absence of these, the evaluators simply utilize their judgement with respect to what they know about these institutional processes, as in the current case, and subsequently make decisions that eventually becomes binding on users. The IT staff who evaluated and recommended the institutional LMS did so upon the directive to search for an LMS that would enable the institution deliver its courses online. Beyond this, no other indication was provided that highlights a carefully considered e-learning introduction. The recommended solution therefore was based mostly on the technical knowledge of the staff member involved and his understanding of management requirements, cost considerations, survey of most used LMS by institutions of higher learning, online review and comparison of different LMS, availability of system support, and potential for customization.

It is also clear from the process there was no consideration for a committee or task force to specifically oversee the institutional effort. Aside the approval of the recommended system

by a high level decision making body, other essential elements required for a successful rollout were not carefully considered. Such a committee would have involved stakeholders like faculty, students, IT staff, instructional and educational technologists, multimedia staff, student support staff, and other potentially supportive staff like examination, admission and finance, etc. This committee would have broadly considered relevant stakeholders to be affected by the LMS, their needs, existing institutional capacity to handle the whole project, and determined a timeline for implementation and milestones for measurement of progress. This was clearly absent, leaving the entire project in the hands of IT staffs.

In the current case, the Moodle administrator setup the system to be used following three stages. In the first stage, faculty members were required to set up their course websites and populate it with course materials such as PDF notes on topics, PowerPoint slides and course outlines. Other relevant materials could also be included if available. Students therefore could access their course materials both before and after lectures. In the second stage, faculties were supposed to facilitate collaborations among students using Moodle's features. In the third and final stage of the use process, faculties will be required to be able to use the system for examination purposes. These stages were deployment paths introduced to him in a one week training programme in Moodle administration. Aside the homepage of the Moodle therefore which was customized with the institutional name, logo and colours, the functions of the system were set up according to the logic embedded in it with very little consideration of institutionally approved format and processes. This of course meant the users were at liberty to use their discretion in delivering their courses online, using whatever pattern and process they were convinced were appropriate.

The features of the Moodle configured for use included the following: Assignment, Chat, Choice, Database, Forums, Glossary, Label, Lesson, Quiz, Resource, Survey, Workshop (for instructors course setup), and Participants, Groups, Calendar, Roles, Blogs, Admin, Scales, Grades, Logs, Files, Help, Login, Enrolment Keys, and e-mail notification. Below a brief description of the features of Moodle and what the institution deployed is presented.

| Feature | Description | Institutional implementation |
|---|---|---|
| *Course Management Features* | | |
| Assignment | Enables the assignment of online or offline tasks, and allows learners to submit using different file formats | Configured as is. Left to faculty's discretion |
| Chat | Permits real-time synchronous communication by learners | Configured as is. Left to faculty's discretion |
| Choice | Enables instructors to create a question and a number of choices for learners. Results can be posted for learners to view. Can be used for quick surveys on subject matter | Configured as is. Left to faculty's discretion |
| Database | Enables facilitators and learners build, display and search a bank of record entries about any conceivable topic | Configured as is. Left to faculty's discretion |
| Forums | Enables threaded discussion boards for asynchronous group exchange on shared subject matter. Requiring students to participate in forums can be an integral aspect of the learning experience, enabling students to define and evolve their understanding of a subject matter. | Configured as is. Left to faculty's discretion |
| Glossary | Enables the creation of a glossary of terms used in a course. Has display formats options including entry list, FAQ, encyclopaedia, dictionary style, etc. | Configured as is. Left to faculty's discretion |
| Label | Allows descriptions with images to be added to any part of the course homepage | Configured as is. Left to faculty's discretion |
| Lesson | Enables an instructor to create and manage a set of linked 'pages'. Each page can end with a question. The student chooses one answer from a set of answers and either goes forward, backward or stays in the same place in the lesson. | Configured as is. Left to faculty's discretion |
| Quiz | Enables the creation of all the familiar forms of assessment including true-false, short answer, multiple choice, matching questions, random questions, numerical questions, embedded answer questions with descriptive text and graphics | Configured as is. Left to faculty's discretion |
| Resource | The main tool for bringing content into the course. Allows plain text, uploaded files, wikis, links to the web, rich text, and bibliography references to be included on the course site. | Configured as is. Left to faculty's discretion |
| Survey | Enables an instructor make online classes more effective through the creation of a variety of surveys, including critical incident sampling | Configured as is. Left to faculty's discretion |
| Workshop | This enables learners engage in peer assessment of documents that they submit online. The participants can assess each other' project. The teacher makes the final student assessment and can control the opening and closing periods | Configured as is. Left to faculty's discretion |
| Files | Allows all course resources to be placed in a central location for ease of access when creating new activities | Configured as is. Left to faculty's discretion |
| Enrolment Keys | Enables an instructor to require special enrolment from learners before allowing them to participate in a course. This is separate from the log in process and is often indicated in the course categories description. | Configured as is. Left to faculty's discretion |
| Help | Provides useful topics like teacher only forums where colleagues can share ideas and collaborate on tasks. | |

| Feature | Description | Institutional implementation |
|---|---|---|
| *Learner Management Features* | | |
| Participants | Enables an instructor view activities from all participants enrolled in a course. Students are able to create their personal profile including pictures, and thus help to connect students in the online learning community | Configured as is. Left to faculty's discretion |
| Groups | Allows an instructor to create group categories, assign learners, and determine how learners interact with each other | Configured as is. Left to faculty's discretion |
| Calendar | Allows events to be created at different levels – programme, course, student – and placed on course homepage or different categories of events, alerting students in the process | Configured as is. Left to faculty's discretion |
| Blogs | Enables every user to create blogs and tags to be associated with. This can be done at the admin level, course level or learner level | Configured as is. Left to users' discretion |
| Scales | Enables the creation of scales for grading Forums and Assignments | Configured as is. Left to faculty's discretion |
| Grades | This feature enables quick access to all Forum, Assignment, Quiz, Lesson, and Workshop grades. It displays the grading scales applied to learner' submission with cumulative on a single page. It also allows all assignment submissions, grading and commenting to be done from a single page displaying all students | Configured as is. Left to faculty's discretion |
| Logs | Enables instructors monitor what course resources are being accessed and when by all learners. This provides an insight into students' learning activities | Configured as is. Left to faculty's discretion |
| *System Administration* | | |
| Roles | Roles can be defined for specific participants in each course including Administrators, Course creators, Teachers, and Non-editing teachers | Configured as is. Left to Administrator's discretion.<br><br>Faculty members were assigned roles as course creators<br><br>The role of students was left to faculty members to assign |
| Admin | All learner centred management functions can be found here. Allows instructors and students to be manually enrolled or removed from a course, backup to be created and restoration configured on a single screen | Configured as is. Left to Administrator's discretion<br><br>Institution-wide restrictions could be placed here on all courses activities but is not the case |
| Login | Login allows users to access Moodle from the comfort of their personal computers. Initial account setup may be handled by the learner or administrator. | Configured as is. Left to Administrator's discretion |

Table 28: Functional Features of the deployed Moodle LMS

The table above displays the functions available on the deployed version of Moodle implemented by the institution. A brief explanation is provided as to what the function/feature ena-

bles and comments on the institution's configuration is provided. The features clearly provide system functions for managing courses through their setup to providing resources for learners' engagement. It also provides features for managing students' information, interaction and learning behaviour. Finally it provides an administrative facility where broader institutional minimum requirements for teaching and learning can be defined. This level ensures that relevant issues such as security, accessibility, backup, reliability and extensibility are addressed.

Central to the system's selection, adoption and deployment is the requirement for a platform that would enable the institution establish an online environment to enable faculty members mount their courses onto the platform, and allow students to access their courseware anytime anywhere. The Moodle platform that was selected as per the features described above provides this minimum requirement for placing courses online and allowing students' access. Clearly, aside the format of course delivery where courses are structured on topic basis weekly, every other feature configured was left to the discretion of the administrator and faculty members. Control over course setup and assignment was gradually shifting from the heads of faculty to the Moodle Administrator as he was responsible for setting up use by faculty members with no direct involvement or input from the heads. The lines of authority between faculty and their heads and between faculty and the Administrator were unclear. The Administrator was charged with getting all faculty members to use the platform but had little control over them. The heads of faculty who exercised control over the faculty members were also not actively involved, ensuring compliance from their members. Thus considering the way the system was deployed, use was going to be based on what users believed was acceptable as a normal practice and their interpretation of management's expectation.

The current configurations which required faculty members to setup their course sites, populate them with course materials and engage with students meant very little control or supervision by their heads. Without the system providing an opportunity for the faculty heads to be involved in the decisions surrounding course creation and assignment on the system, the LMS under the control of the administrator could be viewed as introducing new practices which potentially limits their authority.

Another important consideration here is the 'traditional' instructional practice where faculty members instruct their students, provide course information and resources for effective learning and engage in other learning activities with their students in the traditional environment.

The structure of the LMS incorporates this 'traditional' practice. The Moodle platform as such makes courseware available and engages students in learning activities. So although this is not clearly highlighted to the faculty members, such practices which can also be performed by the system can be seen as legitimating institutional beliefs and practices about teaching and learning. For instance, some faculty members gave access to their course materials only after class sessions; others make them available before class sessions, while others refuse to make them available. When the use of the system follows any of these patterns, they are being used to perpetuate the instructor's approach to teaching and learning. When no effort is made to correct or change such uses, institutional practices are not threatened by the LMS although opportunities abound for transforming existing practices.

Several outcomes can be seen from the initial roll-out of the Moodle for use, firstly, at the undergraduate level, no faculty or student was found to go online. No courses were created nor course content made available. During the same period, course contents for the masters' programmes were made available online and were accessed by students at the graduate level. This can be attributed to the distance and weekend nature of the masters' programme which was organized in collaboration with an international university which had courseware available for all the programmes. Two faculty members were observed to be using the Moodle system at the graduate level. While one used it to place content and topics for discussion with occasional response to students' mails, another provided extra resources, forums, quizzes and responses to mails. As indicated by the Administrator, this faculty was the only one who used the system frequently and in the expected way. When some faculty members at the undergraduate level were later convinced to bring their courses for placement on the Moodle platform, they never followed up to see how this was done, or whether students were even accessing it. One could clearly observe the lack of interest of faculty members to go online and the noncompliance with directives. Clearly the system was not being used as expected. This is quite different from the system being appropriated in ways over or below expectation.

A critical consideration of the events leading to the system's going live for first time use can explain circumstances leading to many faculties' reluctance to use the system. Firstly, faculty members felt they were not ready to go online for both personal and professional reasons. Although the institution demonstrated to them the possibility for courses considered as purely technical and practical to be deliverable online, faculty members still hesitated in choosing courses to be deployed online. When a platform was selected and deployed, training sessions

were organised to prepare faculty members to use the system. Attendance at these training sessions was however poor. The first session recorded only 5 attendants while the second attracted only 2 members. Clearly, faculty members were not adequately equipped to handle the learning platform. There were concerns by faculty members which needed to be addressed but were not.

Students' pattern of use of the deployed Moodle which can be described as non-use by undergraduate students and use only for downloading course materials by postgraduate students can be explained by lack of awareness and sensitization of how the systems is to be used. There appeared to be an implied assumption that students would be able to use the platform and so there was no need to prepare them. This erroneous assumption resulted in students not visiting the platform, or visiting and downloading course materials but failing to engage in any meaningful interaction on the system. In one case at the postgraduate level where students engaged with their instructor on the platform, it was due to the instructor's insistence and requirements. However use here only reinforced institutional structures, changing very little in how teaching and learning occurred in the institution. Overtime too, postgraduate students stopped downloading materials from the platform, leading to a period of non-use of the LMS.

During this period of non-use by both faculty and students, management continued to push for the deployment of courses online. At some point, a staff was appointed to lead a group of staff teaching courses that were non-technical in nature. The response from the selected participants was one of suspicion and mistrust. Some could not understand why they in particular were being selected to deploy their courses online and not others. This was due to the apparent resistance by many faculty members, and the obvious difficulty the institution was seen to be experiencing in their bid to get faculty to deploy their courses online. Management was however not discouraged by this response from faculty. An internal mail was sent to one of the deans to pursue the agenda of getting non-technical curses online. And although much was still not realized from these efforts, management was still determined to realize their institutional e-learning dream.

Within a month of recruiting an educational technologist, setting up and online unit and recruiting support staff, eight (8) courses were being piloted and provided the much needed support. Although there were some initial resistance from some of these faculty members,

this was later to change. These faculty members were assisted to develop courseware with some embedding multimedia. For instance some PowerPoint presentations had videos or voice over embedded. Students could therefore download and study before going for lectures. Forums for discussions were posted, quizzes were provided and interactions between students and faculty members were on-going. Several factors could explain this outcome. For instance, the faculty members were insisting in class that students go online to undertake quizzes, download courseware and assignments, and participate in forum discussions. The students were able to use the system because orientations and training had been provided to them by the online unit. General orientations were provided in addition class to class and office support. Thus given this sensitization and awareness, and the faculties' insistence that students visit the online unit for user support challenges, there was a positive response from students.

Faculty members during this pilot had the opportunity to engage with students in the face-to-face classroom as well as online. This decision was left to their discretion and was a major change in what they were used to. In their traditional experience, faculty members were required to meet students physically every week for a period of fourteen (14) weeks in the semester. However in the online experience, they could select weeks where students were required to do their self-study on the basis that the course resources were available on the course website. In addition, it was also on the assumption that faculty members would be available online to respond to their learning needs such as questions involving clarifications. Quizzes were set up and times given for their opening and closing. Marks were allocated which constituted part of students' continuous assessment. Although this was a new experience which the faculty members enjoyed, it was not without its challenges both in terms of time, resources for developing quality courseware and students' complaints about inability to access the platform and failure to undertake quizzes.

During this period of active pilot use, there was a change in the faculty members' traditional approach to teaching and learning. Whereas faculty members were used to face-to-face contact for fourteen weeks in a semester, the Moodle platform enabled a change in this arrangement to include self-study by students. Through support from the online unit, faculty members involved were assisted to setup their course site, create content, quizzes, forums, and provide an instructor presence online. During weeks where students were required to do self-study, the faculty members ensured prompt responses to questions and occasionally arranged

physical meetings when necessary. There was also a change in being able to know students individually, and provide individual learning support. Due to the large numbers of students also, the quizzes function allowed instant marking and grading. This was useful as marking usually took a long time for faculty to complete. Gradually therefore, how teachers taught and students learnt was being transformed through the appropriation of the Moodle LMS by faculty members.

To further strengthen and institutionalize this development, an online website was developed to provide instant information, access and support services to both faculty and students. An instructional manual was also developed to provide consistency and institutionally approved guidelines for deploying courses online. A list of courseware development software was also compiled to provide faculty members various alternatives for developing attractive and engaging courseware. In addition, an institutional e-learning policy was developed for management consideration, approval and implementation. These developments were being achieved alongside periodical training in online facilitation and learning. The active involvement of eight faculty members also created a stock of institutional e-learning champions who shared their experiences and provided colleague support to other faculty members.

Another event which contributed to the progress being achieved in the area of institutional e-learning development was the organisation of an online teaching and learning facilitation programme for two weeks. This was an official training programme for all faculty members to equip them with the knowledge and skills for deploying courses online. Strategically, the programme had the three top management members of the institution – president, vice president and registrar presenting various aspects of online teaching and learning requirements. Their presence was a clear indication of the backing and support management was prepared to provide in ensuring the success of the initiative. During this period, a number of concerns were raised by faculty members who highlighted concerns impinging on their hesitation to use the platform. Participation ranged between 38 and 45 for the faculty members with some not completing the minimum 10-day training and certification requirement. Many of those who participated actively were excited at the potentials offered by the platform and were already deciding to integrate it into their courses.

This was a good sign as it showed that some initial misconceptions were gradually being addressed. Two critical incidents however was to limit the gains to be gained from this raining

event. One was the introduction of a new LMS and the second was a conflicting instruction about courses that were to go online in the coming semester. The new LMS which was part of an educational enterprise resource planning system was introduced with similar functionalities as the open source Moodle. The system was demonstrated and faculties provided with an opportunity to practice with it. Information was then passed that the new system would replace the Moodle in the coming semester. However, certain challenges experienced in the use of the new system caused suggestion by some faculty members that the new system should be made to wait until al functionalities were tested and ready for use. There was divided opinion among faculty members present on the ease of use of the two LMS – Moodle and WebGuru with some asking whether sufficient institutional experience had been gained to warrant a new system. This was further complicated by management's insistence that the new LMS should be used in the coming semester, with the head of the online unit opining the use of the old LMS for a while to enable adequate preparation to be conducted on the new LMS. In the second incident, faculty members had received earlier information that each faculty unit had to deploy their courses online. Faculty members were therefore unsure as to whether all courses were to go online or members had to decide on those to go online. At the training session however, a clarification was made that at least each faculty member, in each faculty had to deploy at least one course online. This posed some concerns for members as eventually, even though there was an increase in courses from eight (8) to twenty-five (25), this fell short of what could have been achieved.

Several questions asked by faculty members for clarification showed that faculty members were not against the institutional plans to go online. Their hesitation to go online could be linked to certain concerns which have not been addressed. Dominant among them being reward for time spent and courseware development. Faculty also needed clarification on what would happen to their extra hours should entire courses be deployed online. This potentially meant loss of monetary rewards for extra hours spent on teaching. The online agenda was therefore seen as a potential threat to their financial status. These concerns should have been gathered and systematically addressed by the institution using change management techniques. However this was not the case and can be argued to have contributed to the slow uptake of the online platform by faculty members.

In concluding this discussion, the structuration perspective on a HE institution's implementation of an LMS provides a deep insight into how the core practices to be supported by the

LMS were taken into consideration, the outcome on use and institutional practices that have been affected. Further insights are provided using this lenses into how the social contexts of the institution is being influenced, providing an opportunity for institutional interventions aimed at deepening the institutionalization of new practices.

## 6.3 An analysis of Case 2 using an Event-decision-flow diagram description

In this section we describe the institutional actions and context, examining the events, decisions and factors that both facilitated and inhibited the institution's LMS implementation efforts. This processual view provides an insight into the unique institutional approach used in the deployment of an LMS that permits important lessons to be gleaned. In the following description, we present the institution' implementation effort through the lenses of the IS implementation framework by Kwon & Zmud (1987) and Cooper and Zmud (1990).

### 6.3.1 Initiation stage

The unique approach adopted by the institution' development team can be described as having been inspired by a vision to establish an open university following the model of the Open University of Malaysia (OUM) with which it was going into collaboration. Although the online resources of OUM were to be made available through the terms of agreement of the collaboration, the institution decided to develop and deploy its own online learning environment using an LMS. An initial assessment of the LMS environment showed many HEIs utilizing open source systems like Moodle which afforded an opportunity for institutional customization and integration with other institutional systems. Following an intensive testing and evaluation where the intended institutional processes in terms of what it meant to teach and learn in the institution were central to the decision on the choice of an LMS, the Moodle platform was identified to be capable of supporting the institution' business processes. Some of the important considerations at this stage included how the system could support students learning needs, its scalability and potential for integration with other institutional information systems. Other requirements like hosting services, system security, and courseware for learning engagement were also considered alongside with the technical skills required of the development team. There was therefore a systematic consideration of the tasks to be performed by the LMS, the LMS' fit with the institution' processes, opportunities for customization and resources required at managerial level of the institution. In particular, the system' suitability for the open university ambitions of the institution was paramount as students would be re-

quired to take responsibilities for their own learning outcomes while the institution provided the necessary learning support. In addition, there was an assessment of the existing environmental challenges in the Ghanaian HE system where there was an acute lack of institutionally approved courseware and instructional design templates for effective teaching and learning. The assessment highlighted the potential challenges to be experienced with courseware development and effective delivery of teaching and learning, causing the institution to take a decision to be solely responsible for courseware development. These considerations were intended to ensure that distance and online students had uninterrupted access to courseware, instructors, administrative support, and a learning community in a way that was both engaging and supportive of their learning needs. Although an on-campus section was to run alongside the distance programmes, the initial strategy and intention for the deployment of the LMS was to support distance students' learning and push the institution' agenda for the Open University system. Below is a diagram illustrating the institutional events and decisions at this stage of the implementation.

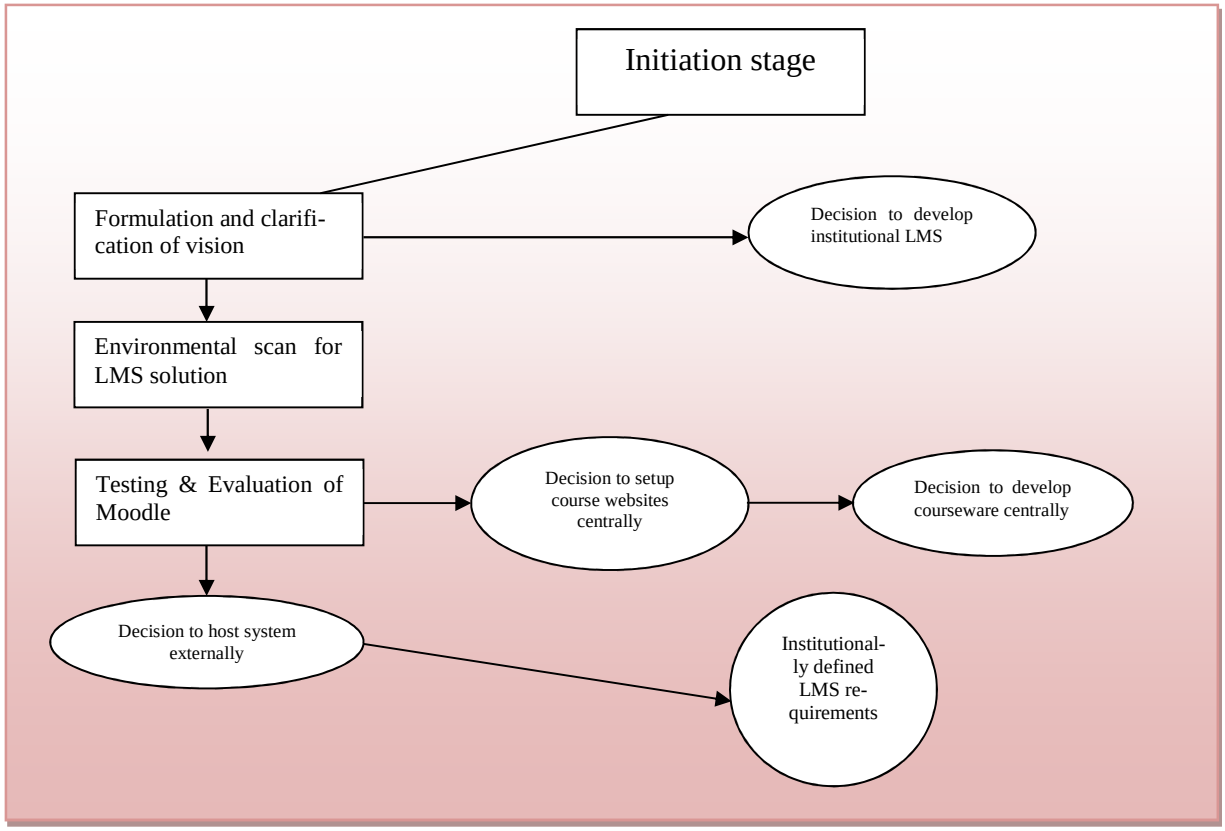



Figure 21: Institutional initiation stage

This stage was not without accompanying facilitating and inhibiting factors. Below we provide a discussion of these.

#### *6.3.1.1 Facilitating and inhibiting factors during the initiation stage*

During this stage there was a clear demonstration of leadership by the President of the institution who bore the vision of the Open University (OU). As a computer scientist who had won several awards abroad, and assisted in the deployment and use of similar systems in other HE institutions, he was clearly conversant with the functionalities and potentials of LMSs. The President, having taught for several years in institutions of higher learning, was also familiar with how such institutions were run. His acquaintance with the challenges of higher education in Ghana and the solutions possible with ICT enabled him to guide a group of developers in clearly defining the requirements for an OU, identifying, testing and evaluating a technological solution that could meet the needs of the institution. Such leadership was instrumental as it inspired the small group of developers who had only the president to look to for inspiration, direction and motivation.

The small group of developers had the backing of the institution's management. This was evident in the involvement of the President, a top management official, in the testing and evaluation of the system. The team was constantly encouraged amidst programming challenges to find solutions for meeting the institution' business process requirements. Both technical and physical resources required were provided by management to enable the developers realize their anticipated results. There was therefore no doubt in the minds of the developers that management was committed to seeing the LMS work and were prepared to provide whatever support was needed.

The team of developers had prior experience in testing and configuring the Moodle LMS. The members of the team were skilful in programming databases like MySQL and PHP, the underlying database and programming language of Moodle. This however was not adequate for the nature of development and integration with other systems the institution was planning to undertake. The developers therefore had to spend time reading, researching and testing their codes to get the business logic right. This took time, hence the time involving nature of the development. The prior experience of the team in Moodle development however proved very useful as their familiarity with the system' architecture enhanced their ability to assess how other systems could be integrated with it.

Another important factor that facilitated the developments in this stage was the support and advise received from external partners. External friends and partners of the institution provid-

ed useful advice in terms of the system's development, hosting, courseware and the role of the institution. These were valuable in strengthening the institution's vision and strategic decisions regarding the involvement of the institution in setting up the LMS.

Despite these factors facilitating the institution's initiatives aimed at introducing an LMS as the core teaching and learning delivery mechanism of the institution, other factors were identified to inhibit the institution's efforts. A major inhibitor was the number of developers involved in the project in comparison with the amount of work to be done. With a development staff strength of 5 whose skills and competencies could best be described as intermediate, the institution' vision of an OU was far from being realized within a short time frame. Given this number, the team could only focus on one system at a time, which per their skill levels often took time.

As indicated in the previous paragraph, time delays were observed in the LMS development during the testing and evaluation period. This activity was taken very seriously as it laid the foundation for institutional LMS to be developed. Though the developers could do the necessary configuration and modification to the Moodle platform to integrate with other systems, conform to expected institutional processes and generate important reports, the process appeared to take time. This was also an important factor identified to be capable of affecting not only present efforts but also other developments in the future.

| Factors in the initiation stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | 4 | 5 |
| 1. **Institutional Leadership** | Organisational | | | | | √ |
| 2. **Management support and commitment** | Organisational | | | | | √ |
| 3. **Experienced IT development team** | Technological | | | | √ | |
| 4. **External support and advise** | Environmental | | | | √ | |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 5. **Inadequate IT development staff** | Organisational | | | | √ | |
| 6. **Delays in LMS development time** | Technological | | | | √ | |

Table 29: Initiation – Facilitating and inhibiting factors

### 6.3.2 Adoption-decision stage

With the careful assessment of the Moodle' functionalities, a decision was taken to utilize the Moodle as the main institutional LMS. Moodle was seen as capable of being customized through on-going development (programming) to support the institution' online educational processes and other institutional business processes. A decision was subsequently taken to use only open source applications for the other institutional IS using plug-ins which were integratable with the Moodle system.

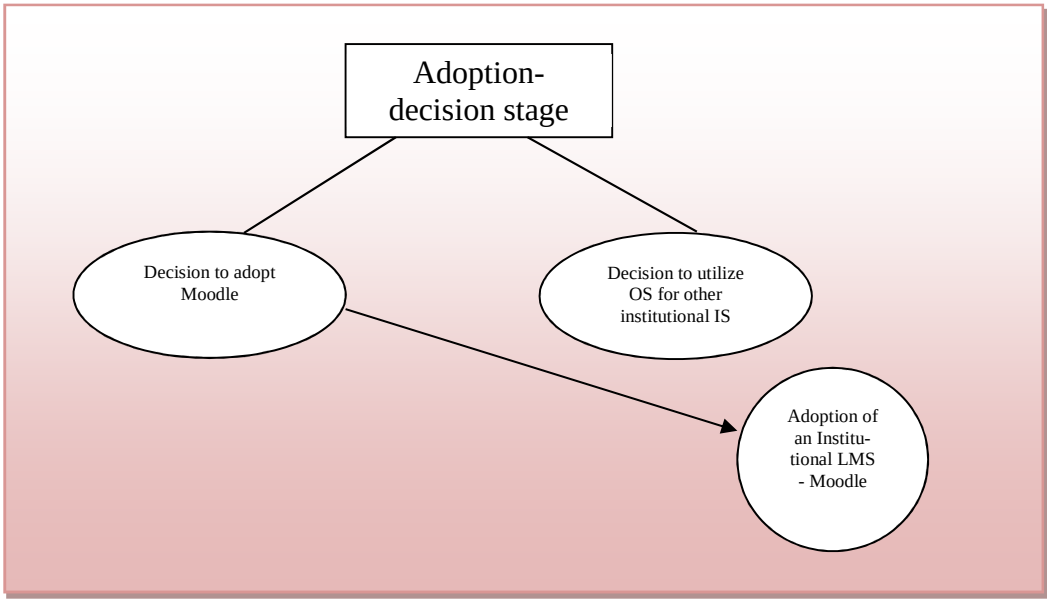



Figure 22: Adoption-decision stage

#### *6.3.2.1 Facilitating and inhibiting factors during the adoption stage*

Several factors facilitated the institution's decision to utilize an open source platform, Moodle for its OU system development. Among these was the opportunity to extensively test and experiment with the system. The prior testing and experimentation enabled an assessment of the system's ability to support the institution's vision. Having satisfied all expectations, management was prepared to go ahead with its adoption as the institutional LMS.

Another facilitating factor was the presence of a large community of supporters and documentation for the system all over the world. These supports were available to provide assistance to developers on technical as well as general issues. The institution' group of developers could solicit the help of this large community anytime any day and so provided the much needed confidence in available support for the open source system.

An equally relevant factor that facilitated the adoption of the Moodle was its open source nature and the fact that it was free. As open source software, it was not restricted to proprietary requirements that often limited the extent to which codes were visible and modifiable by a user. The user therefore was at liberty to modify the system anyway they saw fit. In addition, it was free and could be downloaded with ease from the software website. Unlike most proprietary LMS therefore, there was no cost of purchase or subscription cost including after sales cost. Thus given the system' scalability, there was no cost to be incurred with increasing number of users. This was seen as a huge advantage by the institution.

The institution was also encouraged by the fact that many institutions of higher learning had opted for the same open source LMS, Moodle, and customized them for their specific institutional requirements. Rationally, if top institutions could use it in efficient ways, then new institutions with insufficient funds could do likewise.

As indicated in the previous paragraph, the ability to customize Moodle not only in terms of setup but also in terms of coding to alter the system' functionality and look was another important facilitator. The institution' vision to introduce an OU required a system that was both ready to use and modifiable over time to suit specific institutional business process. Moodle provided these solutions and in essence emerged as the institution's choice.

Aside the factors presented discussed above, other factors discussed in the initiation stage including leadership, management support and commitment, external support and advise, and an experienced but inadequate development team were present to drive the decision to adopt the Moodle.

Nonetheless, there were concerns that inhibited the activities in this stage. In particular, the inadequate development team and their level of expertise with the Moodle meant there could be delays in the development time. This was a risk to take as there were few people specialized in Moodle development in the country.

Also, the institution had to decide to develop the courseware to be used by both students and instructors as it was realized that getting instructors to develop this would be fraught with difficulties which could eventually derail the institution' vision of establishing an OU. And although it was going to be time involving, it was nonetheless a very important consideration.

| Factors in the adoption-decision stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | 4 | 5 |
| 1. **Prior test and experimentation with the Moodle LMS** | Technical | | | | √ | |
| 2. **Large Moodle community support all over the world** | Environmental/Technological | | | | √ | |
| 3. **Open source and free** | Technological | | | √ | | |
| 4. **Popular among many prominent HEIs all over the world** | Environmental | | | | √ | |
| 5. **Customizable to institutional business processes** | Technological | | | | | √ |
| 6. **Institutional Leadership** | Organisational | | | | | √ |
| 7. **Management support and commitment** | Organisational | | | | | √ |
| 8. **Experienced Moodle development team** | Technological/Individual | | | | √ | |
| 9. **External support and advise** | Environmental | | | | √ | |
| *Inhibiting factors:* | | 1 | 2 | 3 | 4 | 5 |
| 10. **Extended system development time** | Technological | | | | √ | |
| 11. **Courseware development time** | Task | | | √ | | |

Table 30: Adoption-decision – Facilitating and inhibiting factors

### 6.3.3 Adaptation stage

Having decided that the Moodle be hosted on a dedicated server offshore in the States, a service provider was subsequently identified and a server acquired. The Moodle was setup on the external server and configured to provide a centralized control by the institution. The external hosting provided the much needed security for the institution' data and ensured anytime anywhere access as the power system in Ghana could not be relied upon. After hosting and configuring the Moodle, the course sites were setup by the developers. While this was being done, the relevant courseware was being developed by a sub team of the development team with the President as their leader. A standardised course structure providing course information and courseware was setup for each course ensuring that the institutions main requirements for teaching and learning were similar for all users. The centralized setup also enabled a monitoring and enforcing of use of the system through the checking of log activi-

ties of both faculty members and students. The institution could therefore print and view report on users' activities on the system for monitoring and evaluation purposes. The configuration of the system was therefore designed to project institutionally accepted behaviour expected of all users.

Following the course site template of the institution, instructors were required to design their courses using the institutionally provided courseware and resources and were allowed the opportunity to evaluate the course sites at the end of every semester and update the resources. This was monitored at a top level of the institution to ensure compliance, conformity consistency with institutionally required formats in which course topics were organized according to weeks, assignments and quizzes were provided, lecturer information was available, etc. Instructors were also required to submit exam results online as opposed to manually. From a central level, the system was configured to enforce institutional level requirements such as deadlines for quizzes and exam results submission, with instructors allowed to set course specific deadlines up to the institutional deadlines. The institution therefore maintained overall control and administration for the Moodle in order to ensure compliance and enable extensibility of the LMS.

Students access was also configured using a single-log on access upon registration. After registration, the system automatically populates a student' account with the relevant semester courses and enforces institutional requirements for progression across semesters. In each semester' course, a student has access to all course materials, assignments and quizzes along with deadlines. Upon accessing the system, a student can view general institutional announcements and notices as well as course specific announcements and notices from an instructor. Students were also given the opportunity to create their own personal library on the system where they could assemble a collection of books from the institution's collection of digital books. When students register, they get the opportunity to interact with the learning resources provided by the institution following their instructor's instructional design for that particular course. Though processes like the registration were done manually, there were plans to automate them in the not too distant future.

Special training manuals on the Moodle' functionalities and use were developed and used to provide training to faculty members upon employment either as part-timers or full-timers. It was compulsory and failure to comply meant no employment. Students who were admitted

into the various programmes also underwent training to ensure their ability to use the system for their learning activities.

A user and technical support were also on hand to resolve any usage and access problems users may encounter. These were both reachable physically during office hours as well as online and could only not be reached when the office was closed. Plans however were advanced to provide a 24/7 support online to all users. Below is a diagram highlighting the activities and decisions at this stage.

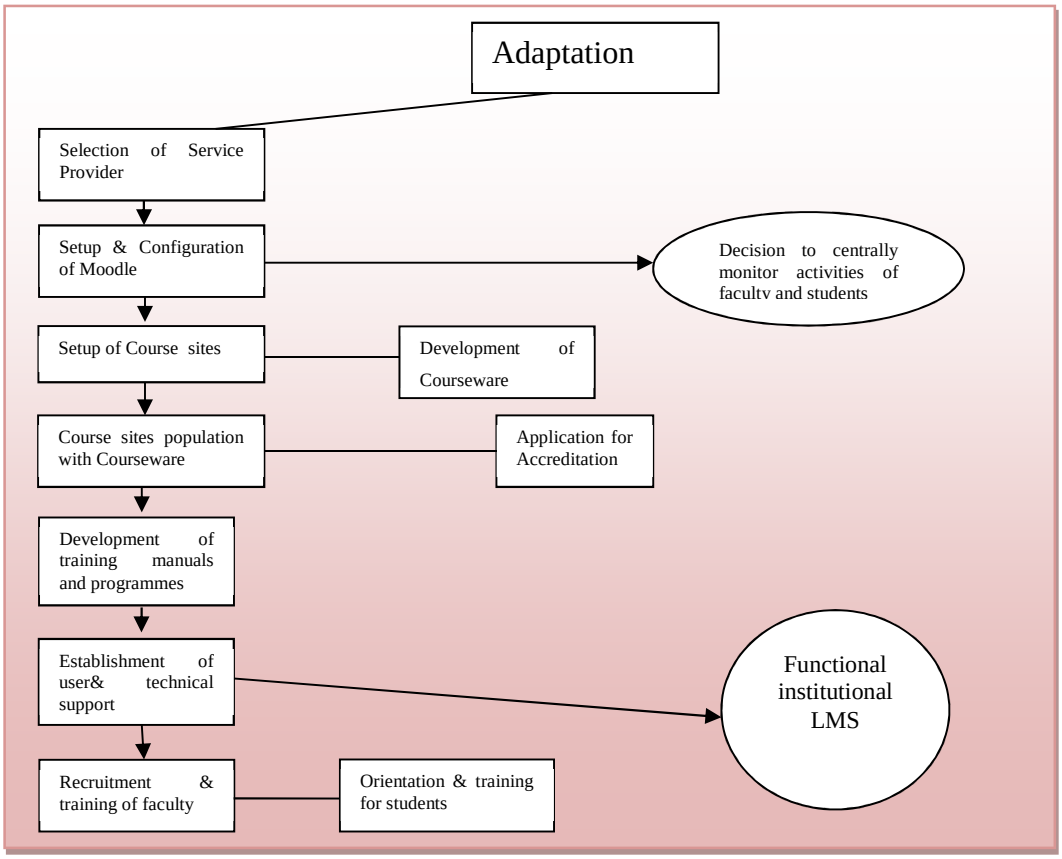



Figure 23: Adaptation stage

### *6.3.3.1 Facilitating and inhibiting factors during the adaptation stage*

During this stage of the implementation, a number of factors were identified to facilitate the institution's efforts towards making the Moodle ready for use. Prominent among these was management's support and commitment to the development process. This was demonstrated through the searching for and identification of an external host located in the states, financing of the hosting, search for external technical developer, and encouragement of the internal development team. Aside the direct involvement of the president in the implementation activ-

ities, the provision of resources needed to realize the institution's highlighted management's backing for the project' success.

Another facilitating factor here was the leadership demonstrated by the president in guiding the developers towards the acceptable institutional requirements for the Moodle. The president was instrumental in guiding the developers towards configuring the system's functionality to provide a centralized control that would enable monitoring and enforcement of compliance by users. Through his knowledge and experience with systems development, the president guided the developers to select and integrate other open source applications with the Moodle in what could be described as institutionally acceptable system development approach.

The technical staff in the development team also played a useful role in this stage as their ongoing research, testing and experimentation provided them with the skills, experience and knowledge required to configure and continue enhancing the Moodle' functionality. This was very significant since although there were many IT specialist competent in programming in the country, very few were skilled in Moodle development. The skills acquired by the development team were therefore very critical to the achievements realized at this stage.

Another factor that aided the institution' achievements in this stage was the external support received from institutional partners abroad. This included Moodle developers, university administrators, and collaboration partners. These provided advise, technical support and guidance which were used in the deployment of the Moodle. Although some of these, like the technical support from the Moodle developer was not for free, the support was necessary in deploying the institution' LMS.

Of equal importance is the knowledge of institutional processes including teaching and learning that the Moodle was required to support. In particular, since not all processes were to be deployed online immediately, it was important to specify what would be and how the automated processes would operate alongside manual processes. Fortunately these were ready on hand and provided by the president through his involvement in the development processes. These have subsequently been embedded in the system' use and recognized as institutionally accepted behaviour.

The decision to have all the relevant courseware developed by the institution was another facilitating factor. The development of the courseware saved the institution valuable time and cost as getting faculty members to develop this would have taken time and involved substantial cost to the institution. The availability of this left no room for instructors to give excuse for not using it, or students find nothing to engage with online. Subsequently, it paved a smooth way for the rolling out of the system for first time use.

In relation to the courseware development, another factor that facilitated the outcome of this stage was the decision of the institution to setup and configure each course site without initial input by faculty members. This strategy allowed the institution to require the use of the Moodle as a compulsory teaching and learning resource from the moment faculty members and students are recruited. In addition, difficulties that would have been encountered through requiring faculty members to setup their course sites were avoided. It in essence helped to ensure that the system was ready for use.

In addition to the above factors, the training programmes organized and delivered to the faculty and students recruited hugely prepared the users for engaging with the Moodle. Although many were computer savvy, the institution did not want to take chances in assuming their ability to use the Moodle. Faculty members were trained in the functionalities of the system and how to facilitate students' learning while students were oriented and provided hands-on experience in how to use the system for learning purposes. This increased their confidence level and psychologically motivated them to try the system. Nonetheless, there were some factors that inhibited the stage' activities. These inhibitors are considered below.

There were challenges with the technical team involved with the development. Aside the number being inadequate, the small grouped was affected by some of the team members leaving the group. This required new IT staff with little or no experience in Moodle programming to be recruited and trained to assist in the institution' Moodle development and integration with other institutional systems.

In addition to the inadequate IT staff that had a high turnover rate, the situation resulted in longer development times than anticipated. This was caused by the fact that the developers had to learn how to develop and fine-tune Moodle on the job, making their development output slow in the first place. when any of the team members left, the staff left with valued expe-

rience which took time to replace and so further lengthened the team' development time. Although frustrating for the management of the institution, it was difficult to address in the short term.

Another inhibiting factor which was more external to the system' development but nonetheless influential was the delays in accreditation. Several demonstration of the system' processes and functions had to be made to the accreditation board to enable them understand and the necessary accreditation or running the institution. As this was the first institution to deliver its programmes online, the accreditation body took a lot of time to understand the nature of delivery before awarding the necessary accreditation. This took a toll on the developers as they had to undertake presentation upon presentation, leaving them in a state of uncertainty.

| Factors in the adaptation stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | | 5 |
| 1. **Management support and commitment** | Organisational | | | | | √ |
| 2. **Institutional Leadership** | Organisational /Technological | | | | | √ |
| 3. **Availability of technical staff** | Organisational | | | | | √ |
| 4. **External support (technical & advisory)** | Environmental | | | | √ | |
| 5. **Knowledge of core institutional processes to be supported** | Organisational/Task | | | | | √ |
| 6. **Institutionally developed courseware** | Task | | | | | √ |
| 7. **Institutional setup of course sites** | Technological | | | | | √ |
| 8. **Provision of training and testing for all users** | Organisational/Task | | | | | √ |
| 9. **Training in Moodle management and development** | Organisational/Technological | | | | | |
| *Inhibiting factors:* | | 1 | 2 | 3 | 4 | 5 |
| 10. **Inadequate technical staff** | Organisational/Technological | | | | √ | |
| 11. **Extended system development time** | Technological | | | | √ | |
| 12. **Accreditation challenge** | Environmental | | | √ | | |

Table 31: Adaptation – facilitating and inhibiting factors

### 6.3.4 Initial use

Having deployed the Moodle, received accreditation, recruited faculty and students, the LMS was made available for use. This can be described as the first official use of the platform for teaching and learning. Students were registered and populated on the system to enable them access the resources using their user names and passwords. As faculty had been assigned prior to students' recruitment, these had setup their courses by designing their instruction to meet the course's requirements. Due to the institution' vision to establish an OU, the distance students who were recruited were given access to the system. On campus students were not allowed to use the Moodle. Students were required by their instructors to download and read the course materials, undertake some quizzes, complete and submit assignments and contribute to forum discussions The distance programmes were designed to include physical meetings on the institution' campus twice a month to enable students interact with their instructors and colleagues. Students were required to go through the course topics weekly, complete quizzes and assignments, contribute to forum discussions as required by the instructors. When they met on campus therefore, it was to provide clarification for misunderstandings and allow for important socializations among learners. Emails and chats were also exchanged between instructors and students for communication purposes.

During this period, a decision was taken to allow on-campus students the opportunity to access course sites in a blend with their face-to-face encounters. On-campus students were subsequently given access to the course sites and resources to enable them prepare for lectures and do their private studies. This was believed would eliminate the practice of dictating notes in class or instructor' selling their lecture notes to students and facilitate student's self-learning both before attending classes and during their private studies. The institution believed this would enable them provide the much needed learning support to regular students as they would be able to communicate with their instructors and colleagues out of class. Although there was the fear of students' failure to attend mandatory lectures, this was resolved through the allocation of marks to class attendance. The diagram below displays the activities and decisions taken by the institution at this stage of the implementation.

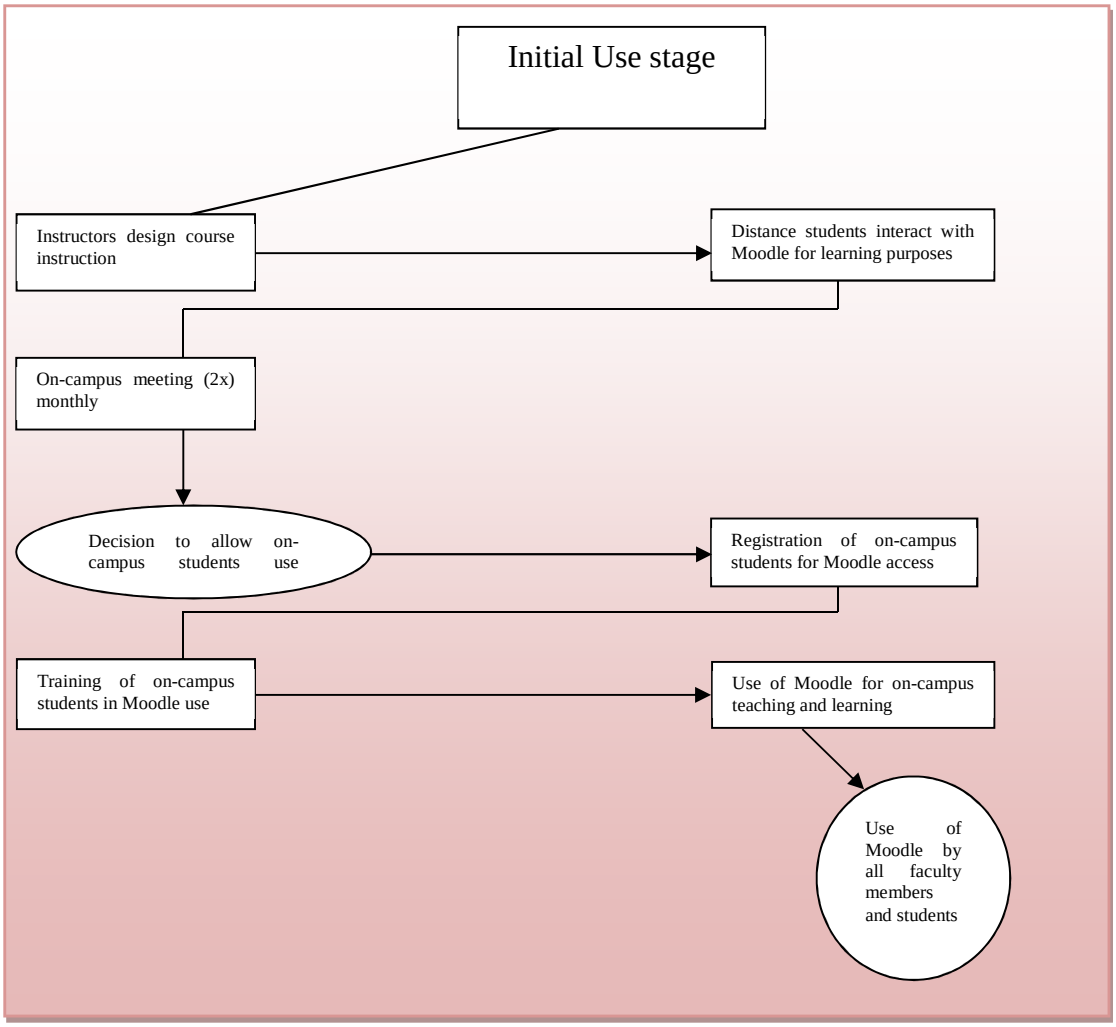



Figure 24: Initial use stage

### *6.3.4.1 Facilitating and inhibiting factors during the adaptation stage*

One of the factors that facilitated the activities at this stage was the compulsory use requirement by the institution. Faculty members and students were required to conduct their instruction and learning activities through use of the system. The course materials, quizzes, assignments for a course were to be delivered via the platform. Course information and communication had to be delivered via the platform. In other words, all course related activities had to be conducted through use of the Moodle as required by the institution. Learning by distance students was monitored on the system as there were requirements for submission of assignments and deadlines for quizzes. On-campus students' attendance were recorded on the system and monitored. This compulsory requirement ensured that use by the expected users was in conformity with institutional requirements. The institution therefore had no policy on consequences for non-use as use of the system was conditionality for employment or recruitment.

Again, the readiness of the Moodle LMS in terms of course sites and courseware placed no extra burden on instructors to setup or populate with their materials or engage in any time involving development of relevant courseware. Students therefore had ready resources for each of their courses to engage with. Through the institution taking responsibility for these aspects of the Moodle development, required users could get no excuse for not complying with institutional requirements for use. This greatly facilitated initial use of the system.

Another facilitating factor was the availability of technical and user support. Faculty and students experiencing difficulties with either access or use could both call on the support team which was available on the campus of the institution, on phone or by email. Their problems therefore were solved as quickly as possible to enable users build confidence in the system's use. Both on-campus and distance users therefore felt reassured that their technical and user needs could be catered for which facilitated their use of the system.

An equally important factor was the integration of the Moodle into all aspects of teaching and learning for both campus and distance students. Distance students had all their resources made available on the course sites as they were responsible for their own learning. The institution ensured the courses were designed to keep the students engaged through weekly structuring of the course topics that included assignments, readings, quizzes and discussions. In addition, these students were required to meet their instructors twice a month for physical interactions that satisfied the community needs of learners and provided an opportunity for clarification of issues. Campus-based students had the opportunity to both access these resources and attend face-to-face class lectures. The Moodle resources therefore provided an opportunity to prepare and acquaint themselves with course information, engage in ongoing learning outside of the classroom and allow for monitoring of their studies. Teaching and learning activities therefore were woven around the Moodle and so instructors and students could do nothing without it.

When it was decided that the on-campus students be allowed to use the Moodle, training in system' functionalities and use had to be provided them. This greatly facilitated the stage' outcome as faculty members and students for the distance programmes had been trained already. The institution recognized the importance of on-campus users' ability to use the system and so proceeded to provide the necessary training for both faculty members and students involved. Those trained were subsequently tested to ensure their skill and competency levels

were acceptable. Failure to pass the test required re-testing as use was conditioned on a user passing the test. These prepared users to use the Moodle in an institutionally anticipated way.

There were however other factors that inhibited the stage' outcomes. Among these was the turnover of the technical development staff. The deployment of the Moodle for teaching and learning was just the first stage of the institution's vision. Following this, the system was to be integrated with other institutional IS to enable a seamless flow with little human intervention during use. In addition to this, there was the need to provide technical and user support both to core users (instructors & students) and administrators by way of reports for decision making during the course of use. However with some of the few development team members leaving, this posed a serious setback for the institution as it meant delays in further development and integration.

In relation to the above factor, the leaving of these developers, coupled with other experiences raised big questions about trust. This fundamentally had to do with the nature of the institution where everything was being automated from registration to course attendance, etc. With any of the technical persons capable of registering students or giving access to some individuals for financial gains, the system required careful monitoring which was time involving. The leaving by some development team members also meant institutional information seeding out to potential competitors. In addition, as some left, new developers had to be recruited and trained lengthening further development time. These all caused concerns about use to plague this stage's development ultimately resulting in a slack in development.

Another inhibiting factor in this stage was some on-campus faculty members' failure to readily comply with the use of the Moodle. Some of these instructors were in the habit of dictating lecture notes in class when these had already been provided online and made available to students. This caused valuable time which could have been used to discuss issues and clarify misunderstandings to be wasted. This had to be constantly addressed whenever it occurred else it could undermine the system' relevance.

In addition to the above, some students were in the habit of sending threats to the institution's server. This causes activities which threaten to shut down the server to be sent to the servers. This has on several occasions caused the server hosts to send warning messages to shut down the system if the activities continue. On some occasions, these perpetrators, operating from

the campus have been apprehended and their access shut down. This constantly posed and continues to pose threats to the system' functionality.

Other technical challenges threatened and still continue to inhibit the smooth use of the Moodle. From time to time challenges to access are experienced from the server side. When this happens, users are unable to access the system for their tasks. Sometimes these problems occur when activities like quizzes, assignments and other important deadline are about to be reached. The institution is then forced to work round the clock to resolve this challenge to prevent users from developing mistrust for the system. Below are the factors identified in this stage.

| Factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | 4 | 5 |
| 1. **Compulsory use requirement** | Organisational/Task | | | | | √ |
| 2. **Ready to use LMS** | Technological | | | | √ | |
| 3. **Available technical and user support** | Technological | | | | √ | |
| 4. **Integration of LMS into all aspects teaching and learning** | Technological/Task | | | | | √ |
| 5. **Provision of training and testing for on-campus students and faculty** | Organisational | | | | √ | |
| 6. **Institutional commitment to LMS use** | Organisational | | | | | √ |
| 7. **Courseware available for programes** | Task | | | | | √ |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 8. **Turnover of technical staff** | Organisational/Technological | | | | | √ |
| 9. **Trust issues** | Individual/Organisational | | | | | √ |
| 10. **Challenges with some faculty members** | Individual | | | √ | | |
| 11. **Behavioural threats of some students** | Individual | | | | √ | |
| 12. **Technical challenges** | Technological | | | | √ | |

Table 32: Initial use – Facilitating and inhibiting factors

### 6.3.5 Acceptance stage

This stage typically involves an inducement of institutional users to commit to use of the Moodle LMS. In the current case however, this inducement began with an institutional recognition of potential resistance on the part of instructors to develop course sites including instructional manual, and courseware. This was identified to be capable of delaying use of the system as students' failure to find resources on the system to interact with may discourage repeated use. The institution' take up of the responsibility for developing course sites, instructional manuals, and courseware sought to eliminate the time and effort that would have had to be used by faculty members to develop them, removing any excuse for delays, disagreements and non-use. With these resources having been provided by the institution, the instructors were required to simply accept and make use of them.

Another strategic activity employed by the institution to induce users in particular faculty members was the provision of hands-on training. Through a systematic requirement for training, instructors and students were equipped with skills in Moodle usage. As an initial requirement for employment, instructors were made to understand that their work as faculty required the use of the Moodle for which training would be provided by the institution. Instructors who accepted were subsequently trained and provided periodical training every semester. Students were also provided orientation and training in how to use the system with periodical training provided where necessary.

Another strategy used to enforce acceptance was the institution' insistence on use whenever a faculty conducted an institutional process manually when it could have been done through the use of the Moodle. For instance, some faculty members who were in the habit of submitting exam results manually were always referred back to use the system to enter their results any time they submitted their results manually. Indirectly, the institution was reminding them that the use of the Moodle platform was the only way to conduct institutionally required processes. In addition, there was a requirement for course site assessment at the end of every semester. This was also mandatory and required instructors to recommend improvements in course site resources. Through this insistence and requirements the institution reinforced its expectations on the use of the system with users gradually recognising and abiding by these requirements.

Through an institutional requirement for students to access their course resources from the course sites on the Moodle, students' behaviour shifted from the known expectation of these resources from instructors to a demand for guidance and explanation in the use of the course knowledge for real life applications. Students no longer demonstrated the well-known behaviours of demanding lecture notes from instructors as these were already available, and lecturers in a way could not repeat what was already available but rather sought to make clear the intended meaning of the materials provided. Students are therefore provided orientation, training and examined in the use of the Moodle to ensure their ability to use the system. All learning activities including access to their assignments, quizzes and other relevant course resources like core textbooks were required via the system. Instructors also helped to enforce these requirements in their daily engagement with students both in face-to-face mode and distance mode, providing no options for opting out.

The above mentioned institutional efforts were aimed at instituting acceptance by all users. This not only enabled commitment to use, but also reinforced institutional expectations of use. With the on-going developments and integration being made to the Moodle platform, faculty members, students and administrators would be unable to conduct their tasks without use of the system in the near future. From registration to request for transcripts and other important institutional documents, the system was being designed to be an integral component. The institution therefore was seen as the system, and vice versa. Below, a diagram is used to depict the institutional efforts towards acceptance.

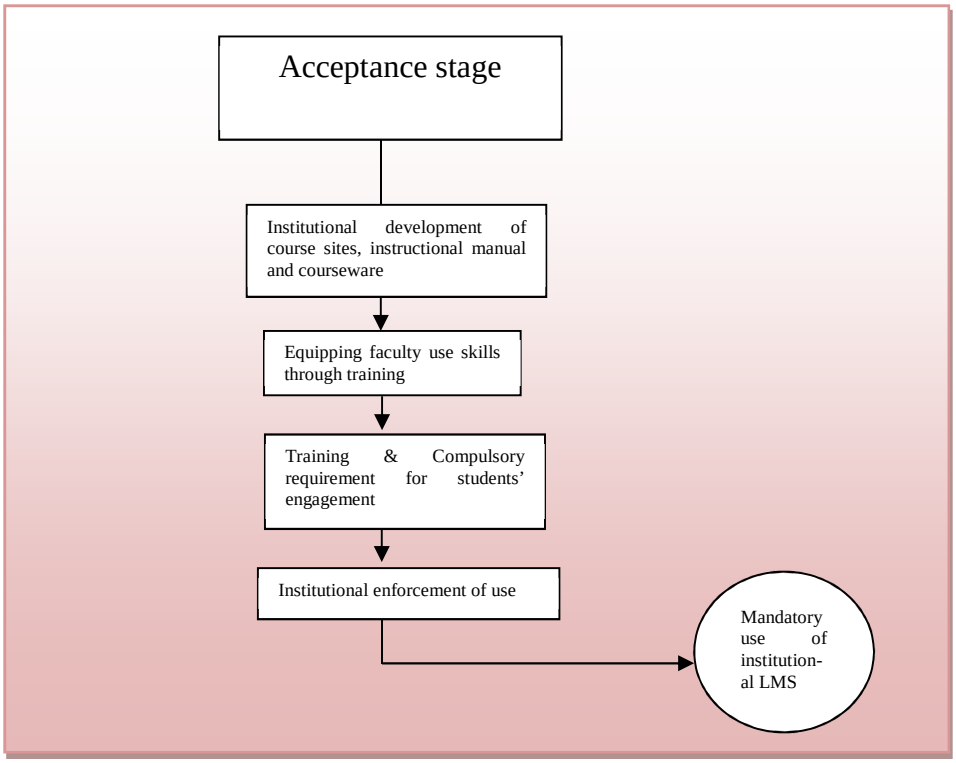



Figure 25: Acceptance stage

### *6.3.5.a Facilitating and inhibiting factors during the acceptance stage*

The activities of this stage had been carefully considered and rolled out from the time the Moodle configured and made ready for use. Having the advantage of being in existence prior to recruitment of faculty and students, the institution realized training and enforcement through monitoring could create the much needed acceptance among users. Several factors therefore were identified to facilitate acceptance after deployment and initial use. These are discussed below.

Management' support and commitment to ensuring acceptance of the system was displayed in the decision taken to setup and resource the Moodle prior to recruiting faculty and students. With a greater portion of the system setup task taken up by the institution, the core users were simply expected to use them for performing their tasks of teaching and learning. further support was also provided by management through the organisation and delivery of training to provide the much needed skills of the users with regular refresher trainings scheduled. Management was seen to be keenly interested in the availability and adequate provision of all these support mechanisms which inured to users acceptance.

In addition, advice and support from external partners and friends of the institution proved vital in getting the institution to commit to putting in place measures that would eventually lead to acceptance. These advisers provided the much needed knowledge and expertise based on their experience, to forestall delays and none-use of the Moodle by core users, guiding the institution to deploy a system that can be centrally monitored to ensure compliance and enforcement.

As indicated above, the continued provision of training to faculty members, administrative staffs and students continued to create the much needed awareness about the institution' resolve to make the system central to all institutional processes. This awareness led to committed participation in the training which enhanced their skills and provided the much needed confidence. The increased use through frequent visits to the system gradually led to users' acceptance over time.

Another facilitating factor in this stage was the compulsory requirement for employment of faculty and admission of students. As a condition therefore, no faculty could be employed or student accepted who from the onset refuses to accept training and testing in the use of the Moodle. This mandatory acceptance therefore contributed to the gradual acceptance by users and overtime is becoming a normal part of their daily activities.

Despite the achievements in terms of acceptance, there were other factors threatening to inhibit the institution's objectives. For instance, some faculty members were finding it difficult to comply with the institution' directives to use the Moodle especially in relation entering of exam results and in instruction. These challenges were mostly from some faculty members instructing on-campus undergraduate students.

The attempt by some students to send threats to the server to crash it and make it unusable was also a major inhibitor. This was one of the reasons why the system was hosted in a secure environment outside of the country's borders. The hosts could easily identify the threats and send warning messages to the institution. However the institution had to be constantly on the lookout for these threats as they could potentially disrupt use. The situation subsequently caused a daily backup of the system to enable restoration in the event of a disaster.

Aside these, there were also technical challenges that were external and uncontrollable by the institution. This involved problems with the server from time to time. For one reason or another, the server would become unavailable. Frantic calls to the host amidst attempts to resolve the problem should the cause originate from the institution often caused delays for users. This was so because the Moodle had become central to activities conducted in the institution. Eventually, a new host had to be sought for to prevent these frequent technical challenges.

| Factors in the acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Facilitating factors:* | | 1 | 2 | 3 | 4 | 5 |
| 1. **Top management support and commitment** | Organisational | | | | | √ |
| 2. **External advise and support** | Environmental | | | √ | | |
| 3. **Provision of training for users** | Organisational | | | | √ | |
| 4. **Compulsory institutional requirement for employment and admission** | Organisational | | | | √ | |
| *Inhibiting factors:* | | 1 | 2 | 3 | 4 | 5 |
| 5. **Challenges with some faculty members** | Individual | | | √ | | |
| 6. **Behavioural threats of some students** | Individual | | | | √ | |
| 7. **Technical challenges** | Technological | | | √ | | |

Table 33: Acceptance – Facilitating and inhibiting factors

### 6.3.6 Routinization stage

After the initial setup of the Moodle to deliver and support instruction and students' learning, the institution moved to support other institutional processes by developing and integrating other processes with the Moodle. The development team constantly scanned the institutional environment to identify processes that could be automated. After setting up the Moodle for teaching and learning, the next project was to integrate the Moodle with the students' registration processes (administrative processes). The students' account system which handled students' fee payment issues was subsequently integrated with the students' information system which had already been integrated with the Moodle. This was to enable registration for programmes and courses to be automatic. After a student shows evidence of payment of fees, the student is automatically registered and his courses populated into his/her student account.

Previously, students were required to pay their fees into the school' account after which they manually registered with the administration before the IT unit would activate their accounts for the semester. Administrators therefore had access to students' information for providing support services as they could easily access student' attendance, examination, fee payment, and hence provide recommendation letters, attachment letters, transcripts, semester result slips, etc. Parents were also provided with a view where their wards attendance, performance and activities could be accessed.

A human resource system for managing faculty members and other administrative staffs was also integrated with the Moodle. This system enabled instructors to be assigned to courses, calculate their hours, prepare their salaries, assess their student evaluation, and submitted exam results from a single platform. This integration of processes was aimed at both enhancing institutional processes delivery in terms of quality and speed as well as facilitating monitoring and evaluation.

After the above integrations intended to routinize the use of the Moodle and create an institution whose entire processes could be performed entirely online, a library information system (LIS) was developed. This was setup and populated with digital resources relevant to the programmes and courses being offered by the institution and integrated with the Moodle. With a single log-on access by registered students therefore, they could both read online and download materials into their personal libraries attached to their user accounts. Students could also download these digital resources onto their personal computers to enable them study offline. Due to the large size of these resources, the system had to be deployed on the campuses of the institution, unlike the Moodle system which was hosted on an external server.

The institution' next development which is yet to be completed is the development of an online help system where users could seek solutions to their technical and usage problems before resorting to call the helpdesk when no solution is found. Through a systematic logging of reported problems and their solutions categorised according to users e.g. instructors, students, administrators, technical staff, etc. an online help system will be integrated with the institutional Moodle system to provide an initial self-help for users that will further deepen their familiarity with and use of the system. As has been shown in this stage, the institution focused on strengthening integration of the Moodle with other institutional information systems. Both students and faculty members could therefore perform their functions and get ac-

cess to other institutional support through their access to the Moodle system. Through the integration, administrators could only perform their tasks through use of the system which had now come to be known as 'MassStud'. All these were geared towards being able to deliver OU services. This vision was the guiding principle for all these developments. The below diagram depicts the activities and decisions at this stage.

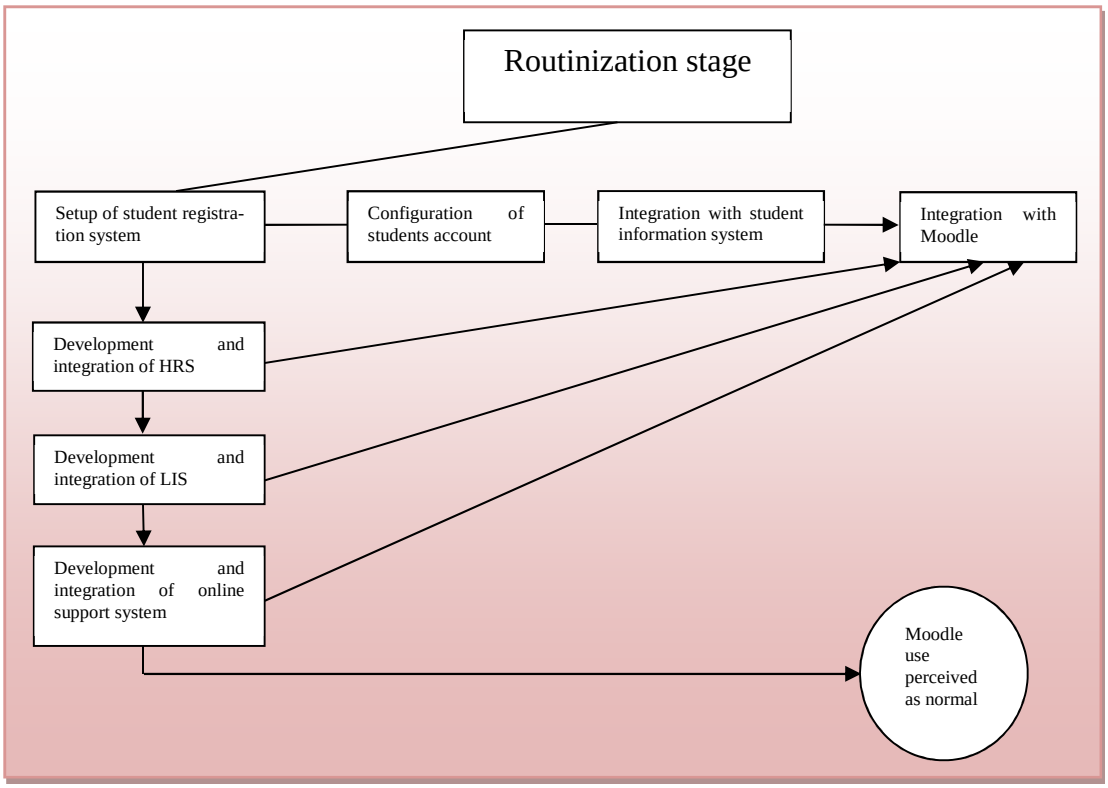



Figure 26: Routinization stage

### *6.3.6.1 Facilitating and inhibiting factors during the routinization stage*

This stage which often involves the adjustment of institutional governance systems to account for an IS saw the development and integration of other institutional processes like registration with the Moodle system. Several factors facilitated the institution's push towards routinizing the use of the Moodle. These are presented below.

The requirement for training for all users and in particular, periodic training for all faculty members at the beginning of every semester reinforced the institution's requirement for use. Through these trainings, faculty members were reminded of the importance the institution places on their effective and efficient use of the Moodle platform for their instructional tasks. Again since development was on-going, information about other inclusions and extensions of

the platform were provided and training extended to enable users exhibit the required behaviours. The training provided therefore reinforced the importance of the system' use to users and helped to ensure continued use of the Moodle.

The compulsory orientation and regular sensitization of updates to students on how to use the Moodle also helped facilitate its use and subsequent routinization. After admission, all students - regular and distance - are provided orientation and training in the use of the Moodle. After the training, they are examined and certified to be able to use the system before enrolment is completed. Update information about additions and changes are also provided to students as and when available ensuring they are kept up to date with developments. Students therefore had little challenge in using the system and overtime became conversant through regular use.

Another factor which facilitated routinization was the mandatory assessment of course sites by faculty at the end of every semester. This involved their assessment of the adequacy and relevance of the institutionally setup course site, instructional design and courseware. This was compulsory and faculty had the option of recommending chances based on the semester' experience. This also tendered to reinforce use of the Moodle.

With the integration with other institutional information systems, a single access was all that was needed to access and complete institutional processes. The institution' persistent requirement and enforcement of use of the system for performing institutional tasks in teaching and learning, as well as administrative support services caused all users to constantly use the system, reinforcing the importance placed on the system' use by the institution.

Another factor was the constant reference to the system by users. Whenever a service was needed for instruction or learning or any form of administrative support, the person would be referred to go onto the system for the solution. Only unique cases which could not be solved by the embedded processes in the system were encouraged to be brought to the offices for attention. Through this constant referencing therefore, users gradually recognized the system's centrality to their being part of the institution. Despite these facilitators, other factors threatened to inhibit the achievements made towards routinization. Some of these factors that were identified are presented in the next paragraph.

The institution' routinization successes were beset by slow development times. This was caused by the lack of Moodle development skills and turnover of development team which necessitated employment of new technical staff who also lacked the needed experience and had to begin the Moodle development learning process. This slowed the development and integration of anticipated systems. As indicated, the lack of technical IT staff skilled in programming in MySQL and PhP and conversant with development in the area as well as with the Moodle development environment limited the institution' development efforts. The technical challenges with the external hosting of the server hosting the Moodle coupled with threat by hackers to crash the system and make it inaccessible all posed threats to the smooth functioning of the system in this stage.

| Factors in the routinization stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Mandatory periodic training of faculty** | Organisational | | | | | √ |
| 2. **Orientation and regular sensitization of students** | Organisational | | | | √ | |
| 3. **Mandatory assessment of course sites every semester** | Task /Organisational | | | | | √ |
| 4. **Compulsory medium for performing institutionally mandated tasks** | Task/Organisational | | | | | √ |
| 5. **Conscious reference to the system by all stakeholders** | Organisational/Individual | | | √ | | |
| 6. **Management support and ccommitment** | Organisational | | | | √ | |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 7. **Slow development time** | Technological | | | √ | | |
| 8. **Inadequate technical expertise** | Organisational/Technological | | | | √ | |
| 9. **Technical challenges** | Technological | | | | √ | |
| 10. **Threat by hackers** | Environmental | | | | √ | |

Table 34: Routinization – Facilitating and inhibiting factors

### 6.3.7 Infusion stage

The approach adopted by the institution in its deployment and use of the Moodle can best be described as strategically integrative in nature. With the Moodle forming the main system of

importance to the institution, all other institutional processes capable of being supported by an information system to enhance the efficiency of the institution in providing OU services were subsequently identified, developed and integrated with the Moodle.

As indicated above, the institution' initial concern was to deploy an LMS which could support the teaching and learning activities of the institution. Course sites, course instructional manuals and courseware were developed and setup on the Moodle LMS. Access to the system was through institutionally created user names with passwords changeable after initial access. Instructors, students (on-campus and distance) and administrators could access the system for the performance of their daily tasks.

Following the deployment and use of the Moodle for academic purposes, the next institutional decision was to develop and integrate students' registration processes so students' would not need to come to campus to register. This led to the development of student information system and student account system. These were integrated with the Moodle to enable information about students' to be accessed and populated instantly upon receipt of fee payment notification. Depending on a student' category, year and semester, access to his or her account was dependent on the payment of fees. Students who pay their fees have their accounts populated with their semester courses and can access other institutional student support services like results, transcripts, letters of introduction, career services, etc. These previously were manually done after a student had paid his or her fees.

After the development of the student registration system, a Human Resource System that manages the institution' staff was found, developed and integrated with the Moodle. The system enabled faculty members to be assigned to courses and their other course related activities monitored and managed to ensure compliance. Instructors' lecture hours and other course related requirements like the assessment of course sites, submission of students' results, evaluation of instructors by students, attendance, online presence, etc could be observed from the system.

These integrations were subsequently followed by the development of an institutional LIS. This was to provide a variety of digital books for students' access for their programmes. Instructors could recommend books for students to read in addition to what has been included in their courseware. Students' could download some of these books onto their laptops and read at their convenience. Access to the library system was through users' Moodle access.

The next institutional development project was an online user support system. The purpose of this was to provide an initial assistance to users facing various challenges in the use of the Moodle system and the other integrated institutional systems. This development which was to be ongoing would enable reported queries and their solutions to be programmed and included in the user support system. All users therefore would be subsequently required to search for solutions on the system before addressing their problems to the support centre when no solutions are found. This was hoped to speed up time taken to respond to problems experienced by the growing number of students and instructors. Below is a diagram showing how the institution rolled out and integrated its LMS platform for increased institutional efficiency.

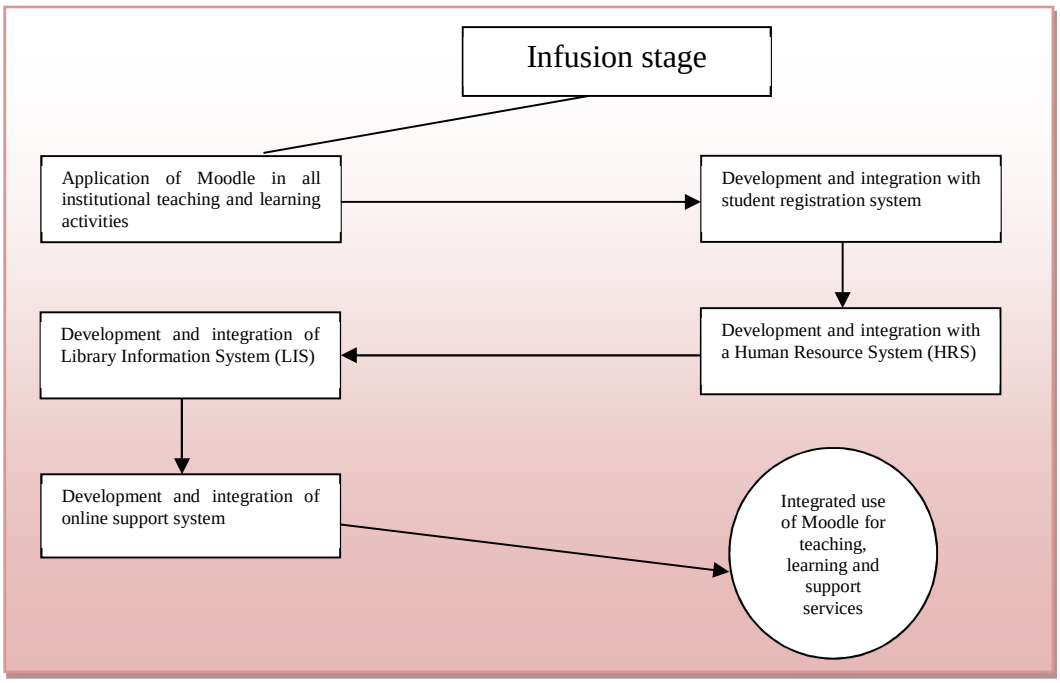



Figure 27: Infusion stage

### *6.3.7.1 Facilitating and inhibiting factors during the infusion stage*

The institution' success at infusion was facilitated by the presence of a number of factors. These factors included among others management's support and commitment. The vision to establish an OU was a driving force behind management's support and commitment to the implementation of the Moodle LMS. This can be seen from the involvement of management in every activity aimed at moving the institution closer to its vision. External advisors and support were constantly engaged with through the efforts of management, the design, setup and configuration of the system for institutional use saw management playing a strong role,

providing critical resources and project development objectives also saw management' active involvement. This ultimately helped to ensure the current level of infusion where the various institutional IS have been integrated and used to deliver teaching and learning support services for efficiently.

Another factor that also facilitated this infusion is the monitoring and enforcement of use by management. Through a centralized institutional setup of the system, management is able to monitor how faculty members and students use the various Moodle functionalities. Reports can be produced on each individual user of the system that enables their required use of the system to be monitored. Where expected behavioural patterns do not meet requirements, affected users are cautioned, reinforcing the institution's expectations of appropriate use of the system. Users who occasionally sought to conduct some tasks manually were referred back to the system. Through a conscious effort to identify, integrate and automate institutional processes, a foundation for infusion was laid from the moment a decision was taken to establish an OU.

An additional factor that also facilitated the infusion stage was the regular training provided by the institution for faculty members in particular. These trainings were meant to equip the faculty members' skills in using the Moodle to deliver their instruction and students' learning support, refresh their memories and skills periodically and update their knowledge and skills in the use of the system with any enhancements made to the system. This was important as new versions were constantly being developed by the Moodle community coupled with the institution' own IS development and integrations. With faculty members' skills in the use of the Moodle constantly being improved and increased, their use and requirement for student use also improved. The regular trainings therefore reminded and sensitized faculty members to use the Moodle' functionalities in ways that stimulated infusion.

One more factor observed to have facilitated the integration of more IS with the Moodle was the trust the users had in the Moodle' stability and security. Despite occasional technical challenges with the system, threats from students' use behaviour, power challenges and other threats from external hackers, the system showed strong resilience to these threats as the security level provided by the server host coupled with the development team' constant monitoring for threat activities safeguarded the data integrity of institutional information. The system' ability to bounce back quickly after a downtime sometimes outside of the institution'

control, highlighted a stable and trustable system. The fear that data could be corrupted or stolen was thus minimized causing users to gain increased confidence in the use of the system's functionalities. These inherently led to a more effective use of the system by all users – instructors, students and administrators.

That notwithstanding, other factors were observed to inhibit the institution' efforts achieving infusion. Trust in technical staff was an issue. Since the system provided access to the institution' resources and services once a student was registered, trust of personnel managing the system through the population with students' data during registration, updating of students' information – fee payment and exam records – were believed to be critical areas where some staff could be influenced. Since this was among the first of its kind in the Ghanaian HE environment, it was strongly felt the 'secret' of how the institution was able to achieve the level of deployment and integration should not be made public or transferred to similar institutions. This was more so as the platform was open source. The staff turnover among the technical team therefore caused feelings of mistrust which affected the institution's effort at development and integration of IS. These in the long run impacted on the institution's infusion efforts.

Another inhibiting factor was the element of cost of hosting large amounts of data online. The size of the LIS implied huge cost for the institution if it had to be hosted externally. This was caused by the size of the digital resources which ran into thousands of gigabytes. A decision was taken to host the system on the institution' campus which held implications for the frequent power outages which could pose access challenges. Thus, although the system was integrated with the Moodle, access to it was dependent on when it was available due to unpredictable power supply.

| Factors in the infusion stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Support and commitment of management** | Organisational | | | | | √ |
| 2. **Monitoring and enforcement of use by management** | Organisational | | | | | √ |
| 3. **Mandatory regular training of faculty members** | Organisational | | | | √ | |

| Factors in the infusion stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| 4. **Trust in the stability and security of the LMS** | Individual/Technological | | | | √ | |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 5. **Trust issues** | Individual/Organisational | | | | √ | |
| 6. **Technology cost** | Organisational | | | | √ | |

Table 35: Infusion – facilitating and inhibiting factors

### 6.3.8 Discussion

The process of implementation described above using the IS implementation framework of Kwon & Zmud (1987) and Cooper and Zmud (1990) highlights important considerations organisations need to be aware of in planning to use an LMS for e-learning purposes. In the current case, after taking the decision to utilize Moodle and other open source systems for developing the institution' OU, due to the central nature of the LMS' within the institution (yet to be accredited), there was the need to have a working LMS before applying for accreditation. This need, among several other concerns, pushed the institution to take responsibility for setting-up the course sites, courseware and course instructional manuals. In the following sections we discuss some important findings in their implementation.

#### *6.3.8.1 **Implementation process** – approach to initiation, subsequent development style and outcomes*

The approach to implementation used by the institution to develop and deploy its LMS can best be described as integrated and modular. Although the various concerns of the different stages in the conceptual framework are taken into consideration, they do not necessarily occur sequentially, or take a long time to be realized. This probably can be attributed to the depth of planning and consideration of intervening factors that could adversely affect institutionally anticipated outcomes. The strategic approach sought to initially make available a working LMS to enable academic work to be on-going while other systems were developed and integrated to enhance the institution' efficiency. This move was also important considering the LMS' central role in obtaining accreditation as an OU. All other institutional processes were manually conducted until the development and integration of a student registration system which integrated several institutional IS built on OS platforms. Clearly the strategy was to build the learning platform, deploy it for use, then build and integrate other systems

that will enable users to perform their tasks efficiently. This enabled the institution to identify important processes that could be automated using information systems and gradually reduced institutional processes that were previously conducted manually. The approach used embedded a mandatory requirement of use of the institutional systems for all forms of communication. This requirement may have been successful due to the system's existence prior to the recruitment of users. Users therefore had no prior experience of other patterns of use where the institution was concerned and as such could not use them as a basis for non-compliance.

Following the development of the student registration system which took care of the required registration processes from fee payment to the creation of student accounts and the population of their courses on the Moodle, an online library was developed and integrated with the Moodle to further entrench the use of the learning platform. Both students and faculty members therefore could access the library through use of their institutional accounts. Students, faculty members and other staff who were not on the school' system could not use any of the resources available on it. A further development aimed at deepening use of the institution' learning platform was the development and integration of a self-help system. This user support system is aimed at enabling users troubleshoot problems they encounter prior to contacting any support staff. Users would therefore be asked whether they had consulted the help system before calling for support. This approach is intended to get users to attempt to solve their problems in a bid to save time taken to address challenges, as well as build users confidence in the use of the platform. Problems not already on the user support system would be captured and stored on the platform, increasing the system's stock of solutions.

As has been discussed above, the integrated modular approach to implementation enabled the institution to address potential challenges with use, acceptance and routinization. Possibly, through the system' existence prior to users being recruited and the institution' mandatory requirement for use, constant monitoring and enforcement of usage, and the central nature of the learning platform for all institutional activities, the system has come to be perceived as the institution. Without it, nothing can be done making it mission critical.

#### *6.3.8.2 Implementation outcomes*

The integrated implementation approach used by the institution enabled important outcomes to be realized. For instance, as a result of the careful planning and consideration undertaken at the initiation stage, clear teaching and learning requirements for online education were identified, leading to institutionally defined LMS requirements which facilitated the testing and selection of the Moodle platform. Although it appears to be just a decision, the institution' adoption of Moodle highlights strong acceptance and commitment of management as was evidenced by their involvement and provision of resources. This was also very important as the absence of managerial acceptance and commitment could lead to an abandonment of the selected platform after a while. The commitment exhibited by management and the hard work put in by members of the development team saw the development and deployment of a functional institutional LMS. The institution took responsibility for all the important resources to be provided by the LMS, leaving users the minimal task of using the LMS to perform institutionally mandated tasks. This led to a smooth take-off in the initial use stage as all relevant resources to facilitate teaching and learning had already been provided by the institution. Faculty members and distance students involved in the distance programmes were able to use the Moodle to conduct their teaching and learning affairs. Though there were slight challenges on the part of users and sometimes with the system, the institution was able to ensure mandatory use of institutional LMS through constant monitoring of use and enforcement. Presently, the entire institution views the use of Moodle as normal. There is a strong sense of nothing can be done without the system as other institutional systems have been integrated with the Moodle. This strong integrated use of Moodle for teaching, learning and support services has advanced the institution's vision of providing OU services. Currently, students can stay in the comfort of their homes, apply, register, study, request for support, and graduate without visiting the campus' premises. This is a sign of the level of efficiency and attainment of higher institutional agenda the institution has been able to achieve.

#### *6.3.8.3 Factors influencing the implementation*

The context of the institution prior to implementation is an important consideration if the factors that facilitated and inhibited the process are to be properly understood. In the current case, before initiating the Moodle development and during the period in question, the institution had not been accredited and was still in the process of being established as a HEI accredited to offer degree programmes. There were no faculty members, no students, and very few

administrative supports. Only the core development team including the president of the institution were involved in the entire process of development. There were challenges with electricity reliability around the period, justifying the need to host platform externally as it was a mission critical system. Protecting such systems from intrusive attacks was also problematic due to little regulation of the internet in the country. Most institutions in the country were delivering their education using the traditional face-to-face approach on campus. The institution' choice of delivering education through an online medium was therefore innovative, providing an opportunity to assess how ready Ghana as a nation was to support the online delivery of education and training.

As can be seen in the case being described, the context of implementation set the conditions within which facilitating and constraining factors influenced outcomes. From the very beginning, management's support and commitment have played a major role in helping to realise the current state of development and use of the Moodle. Management has closely worked with the development team, providing guidance through the provision of the rules and procedures by which users were to engage with the system, providing resources every step of the way, as well as encouraging the developers when morale has been low. In the course of time, human as well as technical factors have influenced the implementation at different stages indicating that factors that influence implementation are not static.

#### *6.3.8.4 Influence of implementation on use*

Although the use of the system was mandatory, the institution' strategy greatly influenced the manner in which users complied with the directives given. Instructors who were recruited were required to consent to use of the system for which the institution was to provide the necessary training. This training which was assessable was in turn provided every semester to both refresh the instructors'' knowledge and update them with new information on use. Students also had to be oriented and tested on their knowledge and ability to use the system upon admission. Subsequently all their learning activities had to be performed through use of the system. Through this mandatory use, repeated use gradually led to users accepting the system as an integral part of their core functions within the institution. Improper use and non-use were monitored, 'culprits' attention were drawn and warnings given. Overtime, the system has come to be seen as part and parcel of the daily lives of institutional members without which nothing can be done.

#### *6.3.8.5 Influence of implementation on acceptance*

The institution' influence on users' acceptance was facilitated by the system's existence prior to their recruitment into the institution. An instructor or a student' acceptance of an offer of employment or admission was conditioned on the acceptance and use of the Moodle platform. Indirectly, a user should have had prior encounter with computers and be able to use them comfortably. The training provided therefore was not in computer literacy, but in the use of the Moodle and its features. The availability of training may have also played a role in users' acceptance. Whether for monetary gain, or for the opportunity of being admitted into a higher education institution, users readily accepted to be trained, examined and use the platform for all institutionally related tasks. Another factor here may have been the availability of support for technical and user challenges. These were readily at hand to ensure that user experience with the Moodle was smooth and without much problems. With time, users have become dependent on the system with anyone not using the system deemed to be strange and not part of the institution.

#### *6.3.8.6 Influence of implementation on routinization and infusion*

The institution' ability to achieve routinization and infusion can be attributed to its existence prior to users being admitted and recruited, the training provided, the monitoring and enforcement of use, and the integration with other important institutional IS. The institution' governance system was setup to manage an OU where students can stay at the comfort of their homes and still have an education. The use of an online platform like the Moodle therefore was aimed at providing a central handle on teaching and learning requirements, to ensure that students' learning needs were satisfied. Through a systematic development afterwards, the Moodle has been integrated with other institutional systems that necessitate access to the Moodle in order to receive the necessary support for teaching, learning and administrative services. Now, the institution can provide OU services and plans an expansion across the West African sub region.

### 6.3.9 A Structurational Perspective

In this section a structurational view of the institution' implementation efforts are discussed. Orlikowski & Robey' (1991) structurational theory of technology highlights the important roles played by institutional structures and human agency in shaping a technology which in turn conditions how people work within the institution. According to the theory, institutional

structures of signification, domination and legitimation represents the meanings, power notions, and moral sanctions that staffs come to know, understand and use in the performance of their functions and interaction with other staffs.

With the case under consideration, using state of the art programming knowledge, the development team configured and altered the open source application, Moodle, to embed the assumptions, processes and rules of the institution into the LMS. This ensured conformity with what the institution required, accepts and regards as institutional practice in terms of the teaching and learning processes in an OU environment. The testing, configuration and extensions to the Moodle is a clear signal to institutional users of the expectations and requirement of management regarding institutional procedures and conduct in the use of Moodle to deliver their teaching and learning activities. The Moodle therefore fully embeds the institutional expectations and is a symbol of institutional culture, norms and behaviour. Conforming to the requirements of the Moodle in performing institutionally mandated tasks is believed to be acceptable.

In achieving this level of structuration of the technology, the institution had the advantage of setting up the Moodle application prior to receiving accreditation and initial use. This enabled the incorporation of institutional requirement into the functionality of the Moodle which was to enable a virtual delivery of educational services (OU). Preconceived institutional teaching and learning procedures and practices were therefore enshrined in the learning platform, sending across the expectations of institutional management. These requirements embedded in the Moodle were subsequently enforced rigorously and monitored. Management ensured that no institutional work was done without the use of the system.

To facilitate compliance with the institutional requirement for use, the institution set up the course sites, developed the courseware and instructional manual prior to recruiting faculty members. Faculty members therefore were simply expected to use the course sites to deliver their instruction guided by institutional requirements. Faculty members were trained in the following features of the Moodle and how to apply them: assignment, chat, choice, database, forums, glossary, label, lesson, quiz, resource, survey, workshop (for instructors course set-up), and participants, groups, calendar, roles, blogs, admin, scales, grades, logs, files, help, login, enrolment keys, and e-mail notification. Upon fee payment, students accounts were populated with their courses and so had access to their course materials and could engage in

private studies. Due to the system being configured for distant programmes, when it was decided to allow on-campus students to use the platform, students could prepare before attending lectures. This freed time for discussion and application of concepts which enriched the learning experience.

The structuration model of technology also suggests that users' use of a technology would either reinforce institutional structures or modify these structures through appropriation. In the current case, the use of the Moodle by both faculty members, students and administrative support staff have tended to reinforce institutional structures. Users' engagement is with the system which to them represents the institution. Instructors deliver their instruction using the resources provided in the course sites, assess the course sites at the end of every semester, make recommendations for change, support their students' learning using the system' features, and virtually conduct all academic activities via use of the system as required by the institution. Students likewise access their learning resources, library, and academic support through use of the system. the administrative support in a similar way provide their support through use of the system, all helping to reinforce the structures of signification, dominance and legitimation as required by the institution.

Any new staff or student to the institution will therefore have no option than to conform to these practices enshrined in the use of the Moodle as the normal culture of the institution. Prior setup and on-going enhancements to the Moodle prior to first use greatly facilitated this level of structuration. As will be seen in the other cases in this research, the existence of an institutional practice prior to the introduction of a technology that demands new practices often requires a different strategy in order to be successful.

## 6.4 An analysis of Case 3 using an Event-decision-flow diagram description

As in the previous cases, the current case is analysed using a modification of Kwon & Zmud's information systems' (IS) framework and Cooper and Zmud's IS framework to enable the processes followed to be identified along with the factors. The decisions and events that occurred as a result of the institutional decision to introduce innovative practices in their teaching and learning activities highlight a process that explicates how the outcomes of the institutional efforts to integrate information technology were attained. In the following sec-

tions, we identify these decisions and events along with the factors involved in the institutional implementation of the Moodle platform for e-learning purposes.

### 6.4.1 Initiation stage

The institutional efforts at introducing e-learning into its traditional teaching and learning environment appears not to be a straightforward one in this particular case and can best be described as the result of a series of events that occurred in the life of the institution, drawing attention to the potential need for and benefits of a LMS for teaching and learning purposes.
The initial event culminating in the institution' involvement in an effort to introduce a LMS was a joint collaborative effort between it and another international university to introduce a master's degree programme in Global leadership. As a condition, the institution was to utilize Moodle, an open source LMS to support the delivery. The IT department was subsequently brought in as three (3) personnel were required to undergo training in Moodle management. An evaluation meeting was subsequently held to ascertain the state of the institution' IT resources and infrastructure. After the training, the IT manager' downloaded and setup the Moodle application, much to the amazement of the collaborating institution. The necessary configurations were done with assistance from the institution' webhosts, with the collaborating institution' facilitator providing the technical and Moodle specific as well as online learning setup knowledge and skills required.

With help from the external facilitator (collaborating institution), the course sites were setup on the Moodle platform and populated with the learning resources for use by students and lecturers on the programme. Up until now, no decision had been taken by the institution to introduce an e-learning platform for institution-wide use. Below is a diagram depicting the activities and decisions of this stage.

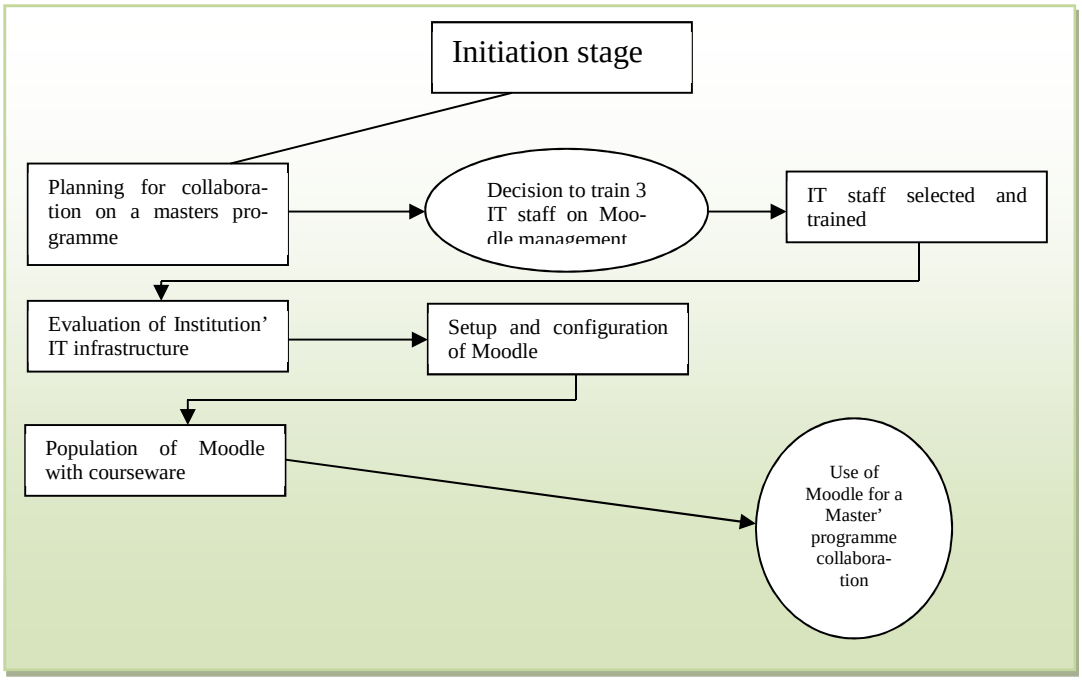



Figure 28: Initiation stage

### *6.4.1.1 Facilitating and inhibiting factors during the initiation stage*

| Factors in the initiation stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **External collaboration** | Environmental | | | | √ | |
| 2. **Enthusiastic IT team** | Technology/Individual | | | | √ | |
| 3. **External IT support** | Technology/Environmental | | | | | √ |
| 4. **External e-learning facilitator** | Environmental/Task | | | √ | | |
| 5. **Moodle Training** | Task/Technology | | | | | √ |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 6. **Lack of experienced e-learning technical staff** | Task/Organisational | | | | √ | |
| 7. **Absence of clear institutional e-learning vision** | Organisational | | | | | √ |
| 8. **Lack of experienced e-learning faculty** | Task/Individual | | | √ | | |

Table 36: Initiation – facilitating and inhibiting factors

Clearly, the opportunity to jointly offer a master' programme was the foremost factor that saw the institution embracing the concept of technology supported teaching and learning using a LMS as Moodle. It was a compulsory requirement by the collaborating institution. Without the presence of such a platform, the collaborating institution would not have agreed to enter into the agreement. Although this was not an automatic decision to introduce the system institution-wide, it was instrumental in sensitizing some institutional stakeholders about the benefits and usefulness of such a system.

Another factor that contributed to this stage' outcomes was the enthusiasm displayed by the IT unit. When the condition to use the Moodle platform came-up during the negotiations, the need to train internal staff became necessary. This saw the IT department being brought into the negotiation process. Three IT staffs were selected to train in different areas of online facilitation using Moodle. These staffs were excited at the prospects of being part of a technology supported initiative and so actively participated in the three-month long online training in Moodle use. This led to the download, installation and configuration of a new Moodle application other than the one being used by the collaborating institution.

An equally important factor that facilitated the developments of this stage includes the support provided by the IT technical team of the webhost to which the institution was subscribed. Due to the initial agreements between the institution and the host (for a shared server), hosting an institutional Moodle on such a server required access to certain configurations which only the host had the privilege to make. Ideally, a dedicated server would have been appropriate but the institution was financially constrained and so this was not an option. However, the webhost provided the necessary assistance to the IT team of the institution to enable them host the Moodle even though the server was a shared one. This support enabled the enthusiastic IT team to continue their deployment of the Moodle on the institution's website as a subdomain.

In addition, the presence of the external e-learning facilitator, sent purposefully to assist the institution setup the Moodle for the collaboration, greatly eased the institution's setup of the course websites for use by lecturers and students. After providing assistance with the setting up of the course websites, the relevant courseware along with other course activities were uploaded and organized for use. This ready and present support provided the necessary support needed by the trained IT staffs to manage and assist other users of the Moodle.

An equally important facilitating factor at this stage was the online training provided to three IT staffs in the areas of Moodle administration, courseware development and course design. This was a three months training provided to ensure the selected staffs had the requisite knowledge and experience in online teaching and learning using Moodle. With this formal training, not only were the collaborating institution confident of the effective use and management of the system, but also, the IT staffs involved were more confident of their ability to support teaching and learning processes using the Moodle. This background training was therefore instrumental in the institution's journey towards supporting teaching and learning with IT.

Despite these enabling factors, other inhibiting factors were identified to be present. Prominent among these was the clear lack of experienced e-learning technical staff. Although these IT staffs were good at managing the existing institutional information systems, and had other important IT skills such as web application development, website building etc, they were primarily inexperienced with respect to use of IT for teaching and learning purposes. This was a big limitation as they needed to be trained and probably mentored after that. However the institution lacked personnel experienced in this area and so had to rely on the external facilitator and the determination of the young IT staffs.

Another inhibiting factor identified at this stage was the absence of a clear institutional e-learning vision. As could be observed, hitherto there was no institutional plan to integrate technologies of this nature for teaching and learning purposes. Thus the introduction of Moodle was seen solely as a means to seal an agreement to collaborate on a master's programme to which the institution was committed and very eager to finalize. This lack of an institutional vision can be seen as being responsible for the absence of a holistic institutional planning involving all stakeholders for a possible institution-wide integration into all aspects of teaching and learning. as can be deduced, the use of the Moodle was largely directed by the collaborating institution that requested for its inclusion. Thus it can be argued that the institution was not in control of the strategic use of this innovative educational solution.

In addition, as the whole concept was new in the institution, the potential academic staffs to be recruited unto the master' programme were fundamentally experienced and needed some training. This training was bound to take time which essentially could delay the effectiveness of the medium. There was also the potential for these inexperienced faculty members to resist

the innovation as it was going to change their traditional approach to and perception of teaching and learning. Some prior preparation by way of sensitization and awareness creation could have greatly addressed these challenges.

### 6.4.2 Adoption-decision stage

The decision to adopt an e-learning platform to support the teaching and learning activities delivered by the institution was not a straightforward one. Different events occurred that provided the impetus to push for an institutional online learning platform to support institution-wide teaching and learning activities. Some important events that led to the decision to adopt an institutional e-learning platform include (i) an expansion in the institution' programmes to include an evening and weekend school, (ii) an evaluation of available LMS platforms, (iii) a conference on Open Source platforms attended by the IT manager, (iv) the conduction of a research into students' use of technology (especially mobile devices) for learning purposes, and (v) a request for a technology supported examination system requested for by the Vice Chancellor (VC). These events are described below.

Due to an expansion in the institution' programme offerings, the number of students grew with many undertaking weekend, evening and distant programmes. The growth in numbers and the need to support students learning effectively led to many faculty members inquiring and requesting for technological solutions. This call for a technological solution was added to by the distant education unit of the Weekend School which sought a technological platform to engage students outside of the classroom and campus.

These enquiries and requests caused the IT manager to investigate the technology market for a solution although Moodle was being used in a collaboration programme with an external University. Both open and proprietary LMS were investigated by the IT manager. Around the same period, the IT manager had the opportunity to attend a conference on open source applications where presenters reported on and demonstrated their institutional engagements with open source software. The IT manager saw the potentials in open source applications in the various institutional presentations made and was convinced about their ability to solve his institution' current milieu. This perception of the manager was instrumental in the choice of a platform for the institution.

Another central issue leading to the decision can be attributed to a research undertaken by the IT manager on students' use of technology for learning purposes. The research, necessitated by the need to better understand students' learning needs and provide suitable justification for an institutional LMS platform was further required due to major projects being undertaken by the institution, and which had constrained the limited resources in the process. The IT manager opined that convincing the institution to procure a proprietary source would be an uphill-task. The research showed students were prepared and capable of using technology for their studies.

The two other events that finally led to the institution' decision to adopt Moodle as the institutional LMS for supporting teaching and learning activities are: the request by the VC for an IT solution to the institution' examination problems and the development of an ICT policy. Due to the large numbers of students, conducting and marking examinations was becoming a challenge to lecturers and the institution as a whole. When consulted by the VC, the IT manager' knowledge and extensive research on the Moodle' functionalities caused him to proposed it as a solution to the institution and this was accepted. As a result, the IT manager included Moodle in the draft ICT policy of the institution as the institutional LMS platform. This was possible as around that time, the ICT policy was under development. This was subsequently accepted and approved, paving the way for advocacy and other initiatives to sensitize and encourage the institution-wide integration and use of Moodle.

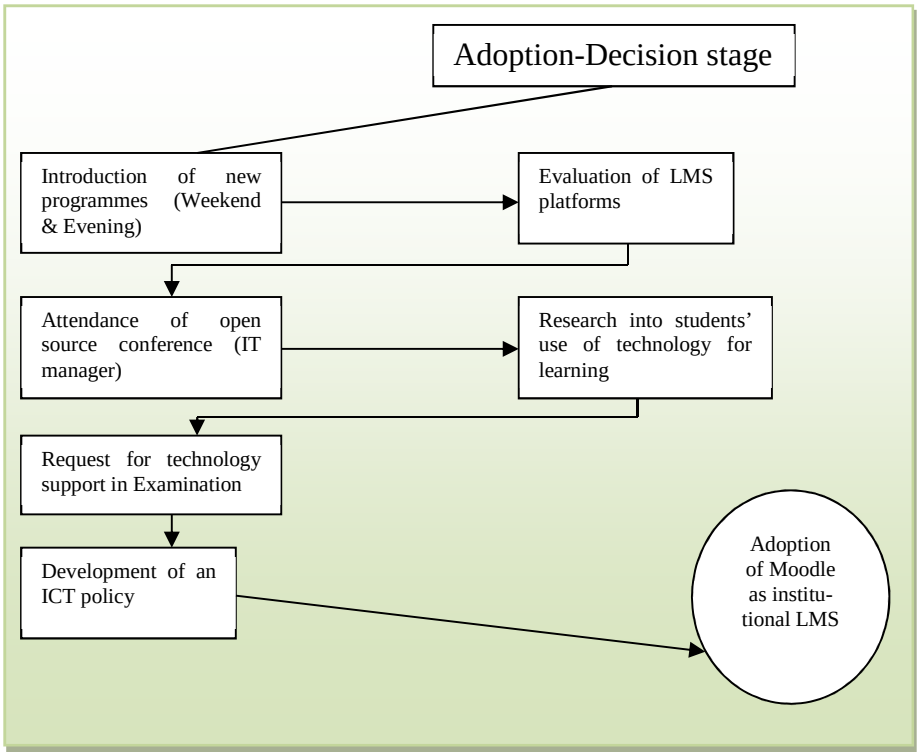



Figure 29: Adoption-decision stage

### *6.4.2.1 Facilitating and inhibiting factors during the adoption-decision stage*

| Factors in the adoption-decision stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Experienced Moodle managers** | Organisation-al/Technology | | | | | √ |
| 2. **Demand for technology support in T&L** | Task | | | | √ | |
| 3. **External community of practice** | Environmental | | | | √ | |
| 4. **Top management involvement and support** | Organisational | | | | √ | |
| 5. **Conduct of a need assessment research** | Organisational/Task | | | √ | | |
| 6. **Demand for technology supported examination** | Task/Organisational | | | | √ | |
| 7. **Development of an ICT policy** | Organisational | | | | √ | |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 8. **Financial constraint** | Organisational | | | | | √ |
| 9. **Lack of holistic institutional consideration of issue** | Organisational | | | | √ | |
| 10. **Inadequate assessment of institutional IT infra-structure** | Organisational | | | √ | | |

Table 37: Adoption-decision – Facilitating and inhibiting factors

As was observed, the path to institutional decision to adopt an LMS platform for teaching and learning activities was not a straight-forward one. It can be argued that the path to this decision was championed by the IT manager and supported by academics that understood the usefulness of the platform and the times due to their exposure to international educational issues. During this stage of the implementation, several factors could be identified to have facilitated the institution's adoption decision. Among these factors was the experience gained by the Moodle managers. Due to the collaboration and interest developed by the IT staff and in particular the IT manager, there was an on-going study of the Moodle platform which stirred further investigation. This enabled the managers to develop an interest in the Moodle beyond that required for the collaboration. As can be observed, Moodle was the LMS system recommended by the IT department for solving institutional challenges when it came to exams, and eventually incorporated into the institution' ICT policy.

Another factor that facilitated the events of this stage was the demand for technology support by some faculty members. Due to the large numbers of students and their desire for effective teaching and learning, some faculty members inquired about how technology could be used to remedy their predicaments. This further inspired the IT team to investigate into the possibilities of using IT as a solution in teaching and learning activities of the institution.

In particular, the existence of an external community of practice (open source) was very instrumental in convincing the IT manager in his choice of Moodle as the institutional platform. The challenges of finance that stared the IT manager in the face due to institutional engagements in developmental projects caused him to listen attentively to the speakers at the open source conference he attended. In no small way, the numerous presentations and praise of open source applications, coupled with actual demonstrations had an impressive effect on the IT manager. This made it easy for him to see an alternative despite the looming challenge of financial limitation.

Aside the factors enumerated above, it can be seen that the top management supported the initiative to have an institutional platform for supporting teaching and learning. The deans of the graduate school and the faculty of accounting and finance were very instrumental in this direction. The VC also provided support upon learning of the platform' functionalities. This was further strengthened by the approval of the ICT policy by the school's governing council.

The need assessment conducted by the IT manager into how students used technology for learning also provided additional justification for the system. The assessment showed that students used their smart phones to exchange lecture notes as well as discuss assignments using emails and some social media platforms as Facebook. It was also observed that some chat features of some of these media were often used in discussing and sharing ideas. These highlighted the need for the learning platform which fortunately embedded some functionality that could support these activities of students. The other side of this equation was the demand for technology supported teaching and learning by some faculty members as indicated above.

In addition, the request for technology support in examination by the VC added more force to the justification for such an institutional platform. Especially, when the Moodle was seen to be capable of providing an exam question bank from which questions could be selected and offered at will. This benefit offered by the system in addition to supporting other teaching and learning engagements was very instrumental in getting the system to be accepted as the institutional platform for supporting teaching and learning electronically.

As the final push for facilitating this adoption-decision, the inclusion of the Moodle as the institutional LMS in the ICT policy caused its consideration and adoption by the highest decision making body in the institution to be possible. Although this did not necessarily mean the institution was consciously going to make certain resources available, it made the initiatives by some enthusiasts receive the necessary management support.

However as mentioned above there were constraints in this stage that made the potential achievements difficult to realize. Prominent among these was the financial constraints due to the developmental projects embarked upon by the institution. Several buildings were under construction to support the large intake of students by the institution. This made it impossible to put in request for financial support of the Moodle implementation. Thus many of the activities of the IT unit had to depend on availability of the necessary resources that required little financial support with the hope that the successful outcome of the activities would provide the necessary justification for the commitment of financial resources by management.
Another inhibiting factor at this stage was the lack of a holistic institutional consideration of the adoption issue. As can be observed, the IT manager was very instrumental in the drive to get the institution to adopt Moodle as the institutional platform. More ideally, stakeholders

could have been brought together to consider the platform' appropriateness. This would have possibly aided in the institution-wide adoption process as stakeholders would feel a sense of ownership of the system.

The inadequate assessment of institutional IT infrastructure can also be said to be a factor limiting the stage's outcome. Ideally there could have been an assessment of the IT infrastructure based on how the platform was going to be used. If the platform was to be used on campus as well as outside by different categories of students, the access to certain supportive infrastructures should be made available. Clearly this was not done with the consequence that use would be affected in subsequent stages.

### 6.4.3 Adaptation stage

Due to the collaboration between the institution and the external international university, the IT manager had been able to download, install and configure the Moodle on the institution's server. The shared nature of the server however caused some challenges in the configuration to be experienced. However, the good relationship existing between the institution' IT unit and the webhost caused the necessary assistance to be provided to the IT manager. The platform was subsequently populated with courses for the Master's programme in Global Leadership.

Following the developments described above, advocacy and training workshops in the use of Moodle were organised for faculty members. Through this initiative, one-on-one arrangements were made by interested departments and faculty members for additional training. Some deans who were instrumental in the adoption of the Moodle (deans of the graduate school and faculty of accounting & finance) gave directives for the mandatory use of the Moodle in the teaching and learning activities of their faculty members. Courses were subsequently mounted on the platform for those faculty members who complied with these directives. The deans themselves continued to be strong advocates and users of the platform, assisting in workshops whenever the opportunity arose.

Due to challenges with technical staff, in-house assistants and a group of Information Studies service personnel from the University of Ghana had to be recruited and trained to assist in the training and provision of support to users.

Around the same period, a computer lab with over a hundred (100) computers was setup to facilitate the institution's online examination. A team was sent to a university in Nigeria to understudy their computer centre examination setup. Upon their return, the IT manager who was part of the team used Moodle to setup question banks for examination.

Unlike the Global Leadership programme where the learning resources were already developed and supplied by the collaborating institution, lecturers at the graduate school had to develop their own courseware which was mostly in PDFs and PowerPoint slides. Pedagogical use of the Moodle appeared to be very limited.

IT and e-learning support was provided by the IT department and its team trained to assist in the e-learning deployment. The support provided however were mostly IT related and lacked sufficient pedagogical alignment.

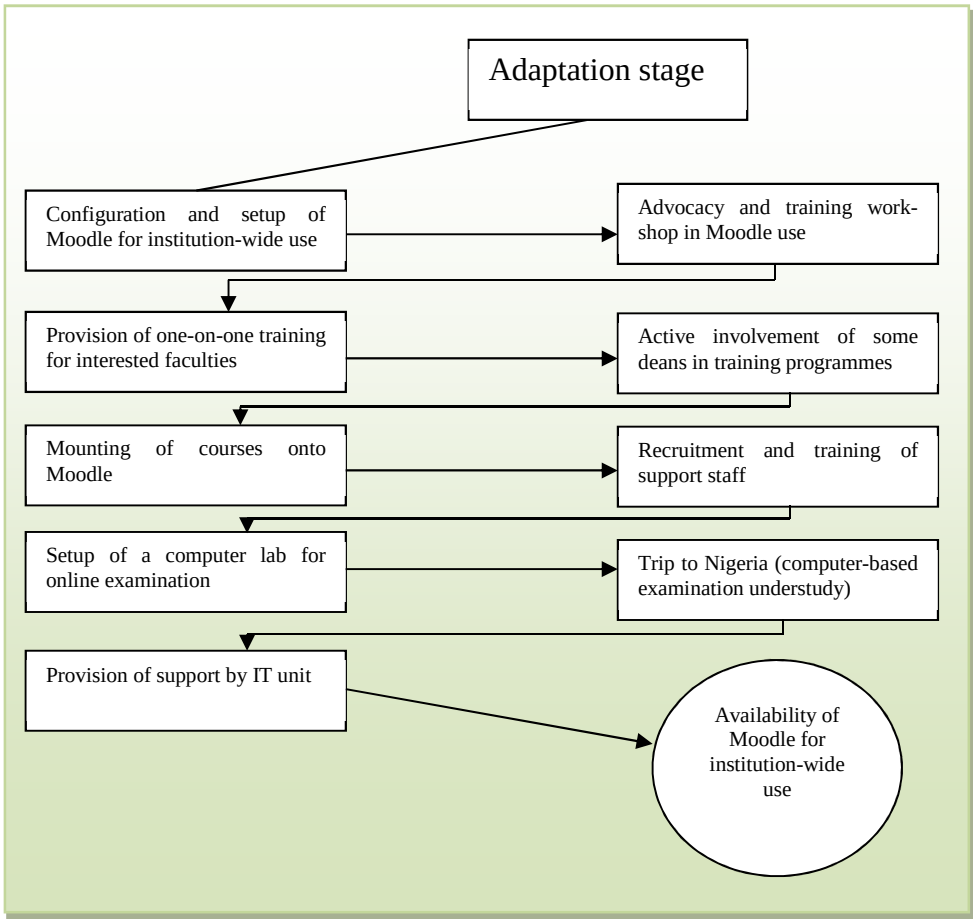



Figure 30: Adaptation stage

### *6.4.3.1 Facilitating and inhibiting factors during the adaptation stage*

| Factors in the adaptation stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Experience in web application development** | Technology/Individual | | | | √ | |
| 2. **External support from webhost** | Technology/Environmental | | | | | √ |
| 3. **Training in Moodle management** | Technology/Task | | | | | √ |
| 4. **Support from collaborating institution** | Environmental | | | | √ | |
| 5. **Top management support** | Organisational | | | | √ | |
| 6. **Available IT technical support** | Organisational/Technological | | | | √ | |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 7. **Financial constraint** | Organisational | | | | | √ |
| 8. **Lack of instructional technologists and e-learning experts** | Task | | | | √ | |
| 9. **Inadequate support staff** | Organisational/Technology | | | | | √ |
| 10. **Absence of strategy for training in Moodle use** | Organisational/Task | | | | √ | |

Table 38: Adaptation – Facilitating and inhibiting factors

The adaptation stage was chiefly facilitated by a number of factors among which was the web application development experience of the IT manager. Prior experience in developing websites and web applications using PhP and MySql provided the much needed technical skill required to setup and configure the Moodle for institution-wide use. Extensive documentation made available by the Moodle community enabled easy reference for solutions to some technical configurations. Thus with the experience gained from the initial setup for the collaboration programme, the IT manager was able to reconfigure the platform for institution-wide use. This was very important as not too many Moodle programmers could be found in the country.

As has been indicated somewhere above, the technical support provided by the webhost was also very instrumental. Without this support from an external IT organisation, the IT manager would not have been able to setup the Moodle for institutional use in the first place. Among the external support provided was security for the institution' data, backup of the data as well

as the provision of anytime anywhere access by users. These were important services required to guarantee confidence and trust in the system.

In addition, the training in Moodle management and use received by the IT staffs from the collaboration agreement provided the much needed system knowledge required to facilitate the Moodle' setup and use. The training provided covered use of Moodle as a student, as a course manager and as a site administrator. The duration which was for 3 months certified these staffs as Moodle administrators and users. They were subsequently required to train other users and assist in the management of the institutional Moodle. As can be seen, the training provided the knowledge and confidence needed to effectively manage the platform for institutional use.

Also, the support provided by the collaborating institution during the setup of the course sites and configuration for access provided the much needed experience in actual setup and use. The experiences gained from setting up the course sites for the masters in Global Leadership programmes greatly facilitated the IT manager and his team' ability to setup course sites for the entire institution.

In all of these activities, the support of top management was present. Management facilitated a team's visit to Nigeria to understudy the use of computers for institutional examination. On several occasions during training, the VC was physically present to register his support for the initiative and encouragement of participants. This was further highlighted by the issuing of a directive for all courses to have a Moodle presence.

Despite all these facilitating factors, there were still other factors that inhibited the outcomes of this stage. Prominent among these was the financial constraints evidenced by the institution's engagements in massive building projects and other activities. There was no indication of any financial commitment by the institution for the upgrading of the server, training, courseware development or any other important e-learning related expenses. This could be attributed to the use of a platform such as Moodle not being a pressing issue for management. This tended to slow down what the IT unit could have achieved were resources available.

Another inhibiting factor was the lack of instructional technologists and e-learning experts. The institution clearly lacked the expertise of instructional technologists. These personnel

could guide users of the Moodle in using appropriate pedagogical models in the development and delivery of their online teaching and learning support. The absence of these experts caused a template following the ADDIE framework to be developed by the dean of the graduate school for institutional use. However, much benefit could have been derived from the presence of an instructional technologist. Also, there were no experienced e-learning experts present to assist and guide the institutional effort. What was present was the trained IT staffs that had been trained in Moodle management and their support team. This also can be said to have inhibited the progress that could have been made at this stage.

Inadequate support staff was another inhibiting factor during this stage of the implementation. The IT department of the institution which was behind the implementation was seriously understaffed with three personnel. Given the requirements for both IT technical and e-learning specific support required for effective implementation by users, the staff strength was inadequate considering also that they had other institutional engagements to perform. This situation was further worsened by the departure of two of the trained It personnel and with no institutional plans to recruit additional IT or e-learning support, this became a major challenge for the It department. Although attempts were made by the It manager to recruit additional personnel to whom training had to be provided, these later left for better opportunities.

Another important inhibiting factor identified was the absence of an institutional strategy for training in Moodle use. Although faculty members were provided training on the Moodle functionalities and their use, there was no clear strategy on how this was being done, how frequently it was going to be done and what the expected targets were. This was very important as one-off trainings have been shown to have little impacts on the intended objectives. There was also clearly missing a strategy for training students. This was also very important as any meaningful result in terms of effectiveness was hinged on students understanding and ability to use the platform as expected.

### 6.4.4 Initial Use stage

The institution' first experience in the use of the Moodle was during the Global Leadership master's programme. This saw lecturers from two institutions facilitating students learning in a blended format. Classroom meetings were combined with online learning activities; course

resources provided by the collaborating institution were used by lecturers in their Ghanaian counterpart in addition to useful supplementary reading materials. There was no use of the platform at the undergraduate level at this stage.

Subsequently, the use of Moodle was made mandatory at the graduate level through the initiative of the dean of the graduate school. The platform was mostly used to provide course materials to students who also had the opportunity to exchange mails with each other and their lecturers, download and submit assignments, undertake quizzes as well as get notifications from their lecturers.

When top management issued a directive through heads of department and deans for all courses to have a Moodle presence, all courses offered at the undergraduate and postgraduate levels were mandated to be on the Moodle platform. This saw all the undergraduate course sites being created and populated with course outlines. This was a major development in the institution's bid to integrate online learning. Although many of the sites lacked the necessary courseware, progress had been made in getting all courses to be mounted on the Moodle.

Another important event during the initial use was the Moodle text banks setup to facilitate examination within the institution. Over 6000 students at both the UG and PG levels were examined using the platform' exam functions. At the PG level, some students had their end of semester examination being conducted using the platform; while others at the UG level undertook some internal assessments via the platform.

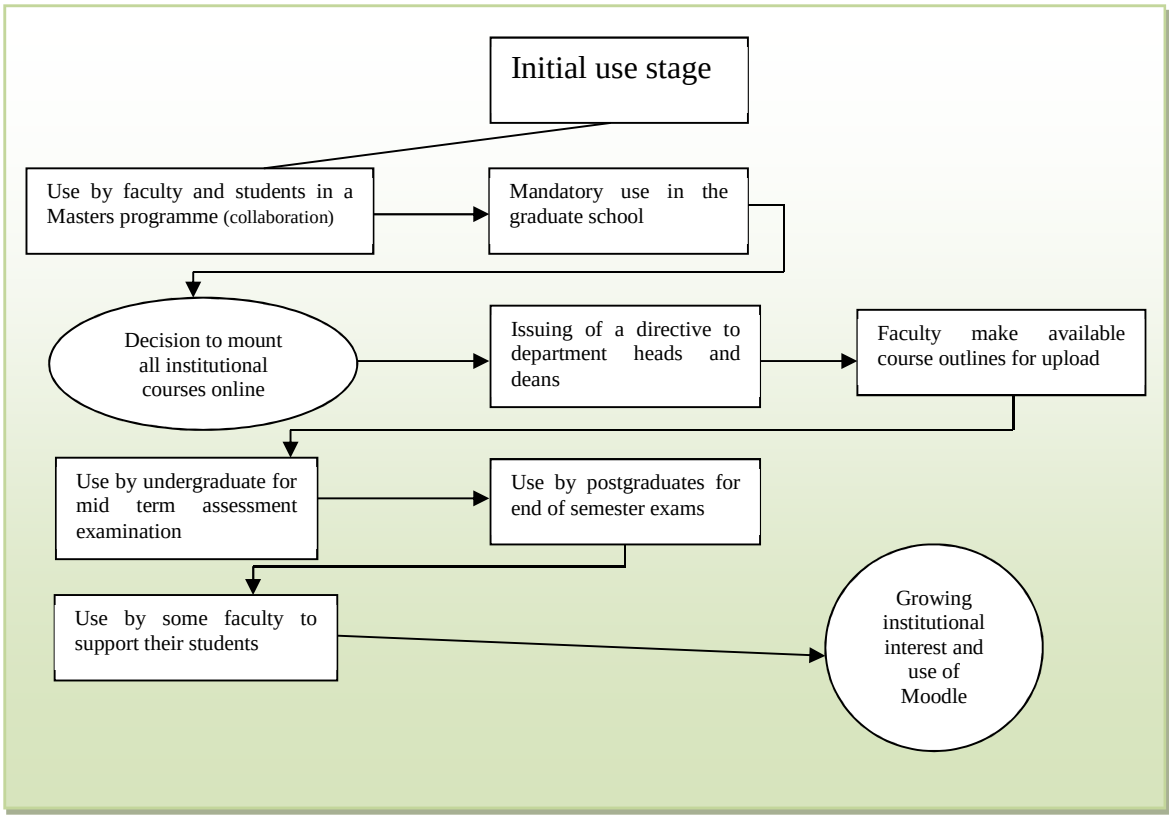



Figure 31: Initial use stage

### *6.4.4.1 Facilitating and inhibiting factors during the initial use stage*

| Factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Support and training from collaborating institution** | Environmental/Task | | | | √ | |
| 2. **Management support** | Organisational | | | | √ | |
| 3. **Available technical and e-learning support** | Organisational/Technology | | | | | √ |
| 4. **Increasing faculty interest** | Individual | | | | √ | |
| 5. **Creation of online examination lab** | Technology/Organisational | | | √ | | |
| 6. **Courseware availability for PG courses** | Task | | | | √ | |
| 7. **Training of participating faculty** | Organisational/Task | | | | √ | |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 8. **Destruction of online examination lab by fire** | Organisational/Technology | | | √ | | |
| 9. **Lack of institutional motivation to use Moodle** | Organisational | | | | √ | |

Table 39: Initial use - Facilitating and inhibiting factors

As has been observed from the previous stages, a number of factors facilitated the stage's outcome. For instance, the support and training received from the collaborating institution provided the IT staffs and those trained subsequently with the much needed hands-on experience to assist users of the Moodle. They were able to assist students and faculty members in their use of the platform to perform different activities. The importance of this support can be seen in how the IT manager personally recruited Information Studies students to be trained as support staffs.

Management support was also present here to facilitate the stage's outcomes. Clearly management provided the necessary resources for setting up and conducting examinations using the Moodle platform. It also issued directives for courses to have an online presence and for faculty members to make available their course outlines. These were complied with paving the way for management's next action towards use. Although actual use for learning purposes can be argued to be predominantly in the postgraduate programmes, many of the undergraduate faculty members participated in the training programmes. This was an indication of their interest and preparation towards future use.

The developments in this stage were also facilitated by the availability of IT technical and e-learning support provided by the IT unit. One-on-one training and support were provided to faculty members who expressed interest in different areas of the Moodle use. Users with access challenges could go to the unit or call for support whenever the need arose. Students with access problems also consulted the IT unit for solutions and directions on how to perform certain activities on the Moodle. The present help available through the enthusiasm of the IT manager and his team provided the much needed confidence in the system' potential.

As has been mentioned in the previous paragraph, there was a growing interest among faculty members. This also played a very important role at this stage. Departments were requesting for special training, institutional training sessions were actively attended, individual faculty members approached the IT unit for specific assistance, etc. This was very important as any resistance on the part of faculty could delay the achievement of institution-wide use. This would in turn cause potential benefits not to be realised. When faculty members complied with the directive to have an online presence for their courses, the response was an indication of their willingness to at least give the platform a try.

The creation of the special lab for online examination was also very instrumental in gaining some commitment to use at this stage. Many of the faculty members who had large student numbers used the platform to conduct their examinations. The platform' ability to also mark made it possible for the faculty members to avoid marking large numbers of scripts which sometimes could not be finished before the deadline for submission of scripts.

Despite these modest gains made, there were some inhibiting factors that affected this stage's outcomes. Firstly, there was no clear institutional motivational strategy to encourage and stimulate use. Those who from their own volition actively engaged with the platform could be said to be innovators and early adopters. The presence of some motivation could have further aided institution-wide use as it would have encouraged the development of courseware which often is perceived as a tough task.

Another inhibiting factor at this stage was the gutting down of the online examination lab by fire. All the computers were destroyed making it impossible for the centre to conduct exams. This eventually led to faculty resorting to the marking of scripts with no idea of when the lab would be restored. The initial interest developed in the platform as a result could eventually wane down if any further delays are not addressed. Coupled with an absence of a clear strategy and facility for use of the platform by students on campus, the developing interest by faculty could eventually diminish.

### 6.4.5 Acceptance stage

To get the stakeholders of the institution to commit to use, policies have been drafted awaiting approval. These policies include: a policy on the examination question bank, a policy on online examination, and a policy on e-learning.

The training programmes organised for faculty members have been patronised by the VC of the institution, an act intended to show that the initiative has the backing of management. Subsequently, several departments have requested for additional training, with one-on-one training provided alongside to interested faculty members.

The directive for all courses to have an online presence that was made through the deans and heads of departments yielded massive response from the lecturers as they made available

their course outlines and other course information for upload onto the platform. This also is an indicator of the growing acceptance among faculty members and top administrative members of the institution as a whole.

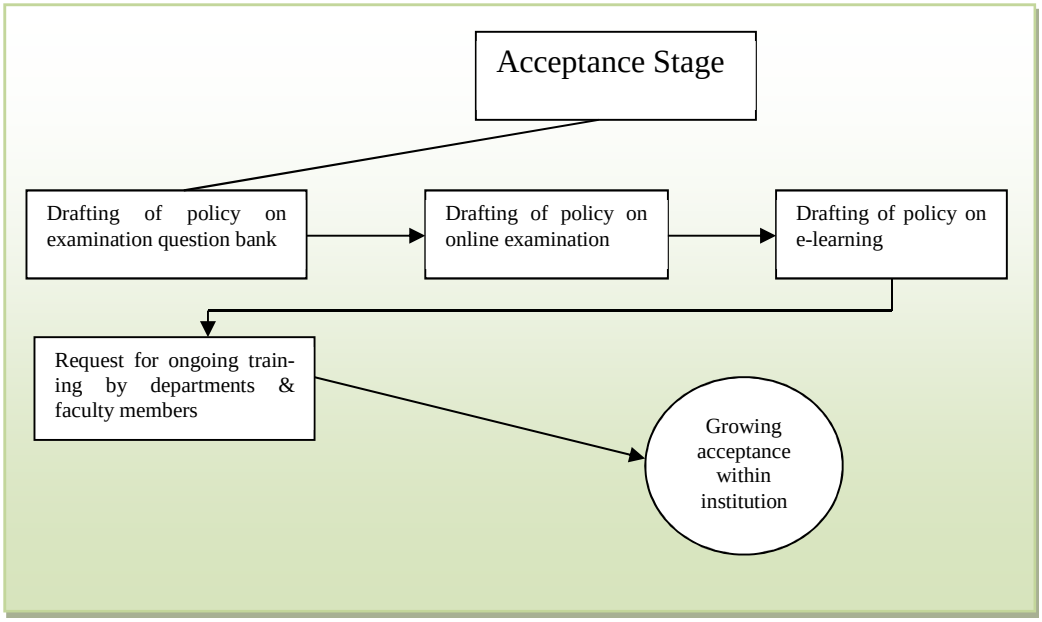



Figure 32: Acceptance stage

### *6.4.5.1 Facilitating and inhibiting factors during the acceptance stage*

| Factors in the acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Perceived usefulness of the Moodle by faculty members** | Task/Technology | | | | √ | |
| 2. **Management support** | Organisational | | | | √ | |
| 3. **Increasing faculty interest** | Individual | | | | √ | |
| 4. **Motivated IT/e-learning leadership** | Organisational | | | | | √ |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 5. **Inadequate IT/e-learning support staff** | Organisational/Task/Technological | | | | | √ |
| 6. **Delays in approving draft policies** | Organisational | | | | √ | |

Table 40: Acceptance – Facilitating and inhibiting factors

Several factors have facilitated the acceptance of the Moodle within the institution. Faculty members were beginning to see the usefulness of the Moodle platform in supporting students'

learning and their teaching responsibilities. This was evident in their active participation in training sessions and their on-going request for additional training support. In particular, it was seen to be capable of solving their annual marking problems after examinations. This perception appeared to be sustained judging from their response towards the directive instructing all courses to be mounted online.

The management support continued to be present even though sufficient resources for e-learning activities were yet to be planned for and released. This support by management was evident in management's attendance at training sessions and the continued encouragement of faculty members to go online. The compliance by heads of departments and deans to the directive to get their members to have an online presence was also indicative of the commitment and support of management. The policies relating to online examination and e-learning was also another indicator of management commitment although these were yet to be approved.

As was identified in the initial use stage, there was still increasing faculty interest at this stage despite the destruction of the lab by fire. This can be seen in the way and manner departments and individual faculty members were requesting for training assistance.

Another factor that facilitated the outcome of this stage was the motivated IT/e-learning leadership provided by the IT manager and his team of supporters. The enthusiasm and motivation was seen in his organising of training for faculty members, awareness and advocacy activities at every given opportunity, both formal and informal, and his commitment to see e-learning established within the institution. The support he received from management was a further boost to his determination and was beginning to pay off. The experience gained overtime was being used to guide the institution until more formalised planning and resources could be undertaken. This played a very important role in gaining the acceptance of the institutional community.

However there were also some factors militating against the activities in this stage. Among these are the inadequate IT/e-learning support staffs. Considering the current staff strength of the IT department which stood at around six (many of whom have left the institution) the current support staff can best be described as inadequate. The inability of the institution to

recruit dedicated staff to assist in its online initiative can greatly hamper acceptance and efforts to integrate it into their traditional environment.

Another inhibiting factor is the delays in the approval of draft e-leaning and online examination policies. Although some activities have been successfully carried out with many stakeholders gradually buying into the innovation, the policies will introduce another level of enforcement where management is bound to provide the necessary resources to ensure compliance. Perhaps, this consideration is what may be delaying the passing of the policies into effect.

### 6.4.6 Routinization stage

Although faculty members are being encouraged through advocacy and training workshops to commit to the Moodle and increase their use of by integrating them into their traditional courses, clear institutional efforts are yet to be observed in this direction. A number of occurrences however have the potential to mitigate even the slight gains that have been made if the institution fails to act swiftly. Among these is the gutting down of the 100-sitter computer laboratory for online examination by fire which destroyed all the computers along with other equipment, and the delays in approving the e-learning policy which would enforce the necessary regularisation of the use of the Moodle platform in teaching and learning activities.

No activity or decision has also been observed around the existing governance structures of the institution aimed at strengthening the institutional resolve to introduce and institutionalize the use of LMS. With the current levels of efforts demonstrated in the introduction and participation by stakeholders, current observations highlight the institution to be still at its infancy stages in the introduction and integration of the online platform.

#### *6.4.6.1 Facilitating and inhibiting factors during the routinization stage*

Since no observations had been made regarding this stage, factors facilitating or inhibiting the activities of the stage could not be identified. That is not to say that potential factors could not be identified since the past events that had occurred in the institution could be used to identify potential factors that could facilitate or hinder expected outcomes.

### 6.4.7 Infusion stage

The current level of implementation appears to focus entirely on getting the use of the Moodle platform to be integrated into the traditional teaching and learning environment of the institution. No document, or event, or decision so far seems to highlight future intentions to achieve increased institutional effectiveness or support higher institutional work through the deployment and use of the platform. This however may be catered for in the draft policy which is yet to receive managerial approval for enforcement.

#### *6.4.7.1 Facilitating and inhibiting factors during the infusion stage*

In this stage, as in the routinization stage, no observation could be made revealing activities, decisions, etc. that had been carried out by the institution. Similarly, no facilitating or inhibiting factors could be noted.

### 6.4.8 Summary of findings

The current case highlights an institutional journey of e-learning introduction and integration that involves a series of related activities occurring at different times and giving rise to the need for a LMS to support institutional teaching and learning activities. Clearly sufficient detailed planning for the introduction of the Moodle was never engaged in. Stakeholders were never fully involved in the institutional planning nor were adequate resources ever provided by the institution. Nevertheless, through the inspiration and determination of enthusiasts (e-learning champions), the institution was gradually brought to a point of acknowledgement of need for an institutional LMS. With growing interest among faculty members, it is believed with appropriate resourcing, the potential benefits from LMS usage can accrue to the institution over time. In the subsequent sections, a detailed discussion of the institutional implementation is presented.

### 6.4.9 Discussion

In this institutional implementation, the events and decisions leading to the current level of Moodle implementation for e-learning purposes cannot be described as having followed a carefully planned approach. The planned approach highlights a distinct institutional intention and commitment with resource allocated for the realization of the intended objective(s). In the current case however, this intent and commitment is not present from the very onset. What can be observed however is the occurrence of an event, collaboration with another uni-

versity on a master's programme, which stimulated the interests of those involved, leading to efforts to introduce this innovation in teaching and learning institution-wide. The use of the critical hermeneutical approach brought clarity to the whole institutional process which enabled a recreation of the events and decisions to be made.

As can be observed in the initiation phase, the activities that eventually led to the introduction of Moodle into the institution were focused on the requirements of a collaboration to which the institution was highly committed. Although the institution had no expertise in the use of Moodle, it was prepared to commit its human resources in so far as it would ensure that the collaboration terms are met. The introduction of the IT unit into this stage' activities also clearly highlights the belief of the institution that 'e-learning' connotes IT and as such only IT technical people are eligible. This is particularly relevant considering that the collaborating institution requested for three people (not necessarily IT staff) to be trained in Moodle management. This was to enable them provide support to users (faculty and students). There was therefore no institutional plan or strategy to introduce this form of technology for supporting teaching and learning activities even though there were plans to expand educational access through weekend and evening programmes. Those involved in the planning therefore were those directly or indirectly involved in the collaboration programme and as such did not have an institution-wide stakeholder coverage where the views and concerns of stakeholders could be brought on board. The outcome of this initial effort was a working system accessible only to those involved in the Masters programme. It can be noted here too that the institution did not as of this time intend to roll usage throughout the entire institution.

The decision to adopt the Moodle platform as the institutional LMS did not go through a formal procedure as would have been expected of an educational institution in matters that concern one of their core businesses – teaching and learning. As can be seen in the adoption stage, the events leading to the identification and selection of the Moodle cannot be said to formal and following institutional procedures for decision making of such importance. Rather than an institutionally sanctioned inquiry to justify the need for a technological support in teaching and learning, the effort was undertaken on the initiative of the IT manager to provide justification for a technological support. The two critical events that pushed the adoption decision cannot also be described as constituting part of a formal institutional decision making process on the choice of an LMS. The request for a computer-based exam system due to challenges with large classes and the development of an ICT policy both of which contributed to

the Moodle resurfacing into the broader institutional context can be described as a good opportunity that came up at the right time. In other words, the decision to adopt the Moodle as the institutional platform for supporting teaching and learning could have received a higher level of attention befitting such an innovation.

At the adaptation stage where the system is developed, programmed and made available for usage, a movement from the initial setup for the collaboration is seen in the intention to make the system available to the entire institution. This intention is made possible through the assistance provided by the webhost company due to the good relations existing between the two. Additional programmes and courses from the graduate school are then populated on the system. There is however no observation of the system having been configured taking institutional requirements into consideration. Although training and awareness are provided at this stage, none of these is focused on courseware development or pedagogical considerations. Rather, the emphasis was on the system' functionality. Very little financial resources was provided at this stage considering the numerous projects the institution had embarked on. Even upon realising the need for more support staff, service personnel had to be recruited upon the initiative of the IT manager for them to be posted to the institution. These however were not motivated to stay and over time left the institution. The set-up of the Moodle exam bank was executed on a standalone Moodle platform not connected to the internet. This was done on a server located within the 100-seater lab set up to solve the perennial problems of marking large students' numbers. The institution was thus set up for institution-wide usage of the platform but was yet to test for full capacity usage by all users.

In the initial use stage, the previous experience of the IT team from the collaboration programme was very instrumental in aiding faculty members and students in their use of the Moodle. Although this was mostly at the graduate school due to the mandatory requirement for use as a result of many of their students being distance students, the interest in the Moodle by users was increasing. Management could be seen now to be responding to the need to get all courses and programmes in the institution to be mounted online. The first initiative here saw a directive issued for course outlines to be mounted on all course websites. This was immediately enforced by the heads of department and deans with little resistance, an indication of the willingness of faculty to use the system. More one-on-one training was also being provided by the IT unit along with the much needed support. This was all good for the institution-wide agenda.

Gradually it could be observed that acceptance of the system' use was growing. Several useful policies had been developed and were under consideration for approval. It was believed this would further strengthen and entrench use of the Moodle as the institutional LMS platform.

Although not much resource (finance, personnel) had been committed to the implementation process, huge gains had been made by the institution towards institution-wide usage. This could be attributed to the efforts and determination of the IT manager and the support gained from other e-learning enthusiasts like the deans of graduate school, and finance and accounting. The current achievements made in introducing e-learning could be harnessed to strengthen the system's presence and usefulness within the institution. Much more commitment can be observed to be required by management especially in putting in place structures like committees and centres, policies and guidelines, as well as visible enforcement of use requirement. With the current support being received from management and interest shown by faculty members, little time should be wasted in strengthening these gains.

Again, much detailed planning could have benefitted the institution if all relevant stakeholders had been involved and resources provided. Arguably this was not the institution' main focus at that time and so implementers had to do with what little support and resources they could mobilize. Worth noting is the participation of the VC in the training and awareness programmes. This was important in sending reinforcement signals to participating faculty members of the institution's support for the initiative. Once it was mentioned that the VC remarked he would check the attendance of faculty members and use it in their promotion award. This is important although much evidence of subsequent action to this effect has not been observed.

### 6.4.10 A structurational perspective

As discussed in the other cases, the structurational theory of technology provides a useful lens for understanding how the e-learning implementation of the institution is undertaken and how it is responded to by the users. The institutional structures and human agency play important roles in shaping the technology which in turn affects people within the institution. The structures of signification, domination, and legitimation influence how people perform their functions and interact with others within the institution.

In the current case, not much could be observed in the configuration of the Moodle to suggest that the institutional assumptions, processes and rules have been embedded into the Moodle. The traditionally observed institutional practices could not be observed to have been considered in the configuration and set up of the Moodle system. This suggested that the Moodle therefore was introduced as an IT innovation that could provide immediate solutions to the institution's need to support teaching and learning activities both on and off-campus. The initiative of the IT team therefore can be seen as the introduction of a technological innovation into the institutional domain without much consideration of institutional practices and procedures that could be enhanced with the use of the system. What is very clear however is the taking into consideration of the much needed support for students' learning and the need for a solution to marking the scripts of large student numbers. In particular, engaging students in the learning process even when they were outside campus was an area of necessity to many faculty members as the current arrangement did not enable that. The Moodle therefore was seen as providing a solution to these challenges and as such was readily embraced. It is important to note that this was mostly at the postgraduate level. At the undergraduate level which was predominantly campus based, the traditional face-to-face medium maintained its dominance. The configuration of the Moodle therefore is in response to this inherent need for a teaching and learning support for which the Moodle' functionality was deemed to adequately cater for. The Moodle therefore provides an opportunity for faculty members to perform one of their most important instructional functions – supporting students' learning activities. The use of the Moodle therefore in performing teaching and learning support duties was seen to be acceptable.

Considering the fact that the institution had been in existence prior to the Moodle introduction, the progress in its acceptance and use by a section of the faculty members can be attributed to their perceived usefulness of the Moodle in meeting important teaching needs. Clear institutional requirements could not be observed to have been incorporated into the Moodle's configuration, leaving the faculty members to use their discretion. What appeared to be of major concern was the use of the Moodle and not along any particular institutional requirements. Enforcement therefore focused on faculty members having a presence online for their courses. No clear involvement of the heads of department, deans etc. as observed in the traditional teaching and learning requirements could be observed in the system. This could potentially lead to faculty members using the system in ways they deemed appropriate to them possibly resulting in an underutilization of the system.

Due to the prior existence of the institution and traditional approach to teaching and learning, the institutional consideration to set up all course websites enabled all courses to have an online presence within a relatively short period. What was however left was the development of a courseware and populating the sites with the courseware. This was however left to the faculty members with heads of departments and deans expected to enforce their requirements. This clearly had not received adequate institutional consideration and could potentially stifle any progress that could be made. Faculty members were trained in the following features of the Moodle and how to apply them: assignment, chat, choice, database, forums, glossary, label, lesson, quiz, resource, survey, workshop (for instructors course setup), and participants, groups, calendar, roles, blogs, admin, scales, grades, logs, files, help, login, enrolment keys, and e-mail notification. However they are at liberty to select and use any believed to be suitable to their needs. There is therefore no institutional shaping of this use in a way that ensures uniformity and standardisation. The potential benefits that could be derived from the deployment of an LMS can thus be limited.

The current use of the Moodle was gradually reemphasising the institutional expectations of supporting students learning engagements such as provision of tutorials, exercises after lectures, etc which were inadequately catered for due to large classes and insufficient tutors. A much more centralized and focused institutional control will enable huge gains to be made from the use of the system. In the current case, it can be observed that the use of the Moodle is providing opportunities for the institutional expectation of adequate students' learning support to be provided. The Moodle is currently perceived as tools that can enable them provide support to students' learning in the area of assessments, course information and other learning engagements.

Although the Moodle now hosts all programmes and courses offered by the institution, use is made of the system's functionality by enthusiasts. Even at the graduate level where use is mandatory, observation can be made of those who use the system as a form of document repository for their students while those enthusiastic about the system' potential engage in the use of more of the system' functionalities. Clearly, the system is yet to be institutionalized in such a way as to send clear signals to all stakeholders about the unavoidable necessity of the system' use in the institution.

## 6.5 An analysis of Case 4 using an Event-decision-flow diagram description

In this section, an analysis of the events and decisions involved in the introduction and deployment of the Moodle LMS for e-learning purposes by Case 4 is presented. The analysis seeks to explicate the process that was followed in order to provide an understanding of how institutions in Ghana, a developing country undertake such initiatives. A modification of Kwon & Zmud's (1987) and Cooper & Zmud's (1990) frameworks is used to perform this analysis. In addition, the factors influencing each of the stages are also identified, highlighted and discussed to enable a grasp of how the processes and contextual factors influence desired outcomes.

### 6.5.1 Initiation stage

The institution' e-learning experience can be said to have started with a window of opportunity for assistance through the partnership for higher education in Africa (PHEA) Educational Technology Initiative (ETI). This was a large scale African university e-learning support initiative funded by a consortium of American Foundations and managed by Saide (South African Institute for Distance Education). From the second half of 2009 through to March 2010, SAIDE and the centre for educational technology (CET) supported Case 4 in the development and finalization of their Educational Technology Strategy document and the accompanying project proposals and budgets for the funders' considerations. This was as a result of funds made available for 7 universities in Africa by the Neil Butcher & Associates. Following an inter-institutional workshop for training support in the implementation of LMS and research projects held at the Wanderers Club, Johannesburg in which four delegates from Case 4 attended, actual planning for implementation began in March 2010.

The planning for implementation of the PHEA ETI programme saw the formation of a programme management team and setting up of management structures (administrative) in accordance with institutionally laid down requirements. The management team consisted of four researchers, six research assistants, three multimedia specialists and four Moodle technicians. Four (4) preliminary meetings were held in relation to the planning during which the implementation plan/Gantt Chart for the various projects were developed and the required equipment and software procured and setup. By December 2010, the Moodle platform was setup and ready to use. A decision was taken during the planning phase to divide the actual Moodle implementation into two stages: phase one would involve two pilot courses while

phase two would see an increase of courses up to 20. This was to enable lessons to be learnt to inform institution-wide deployment.

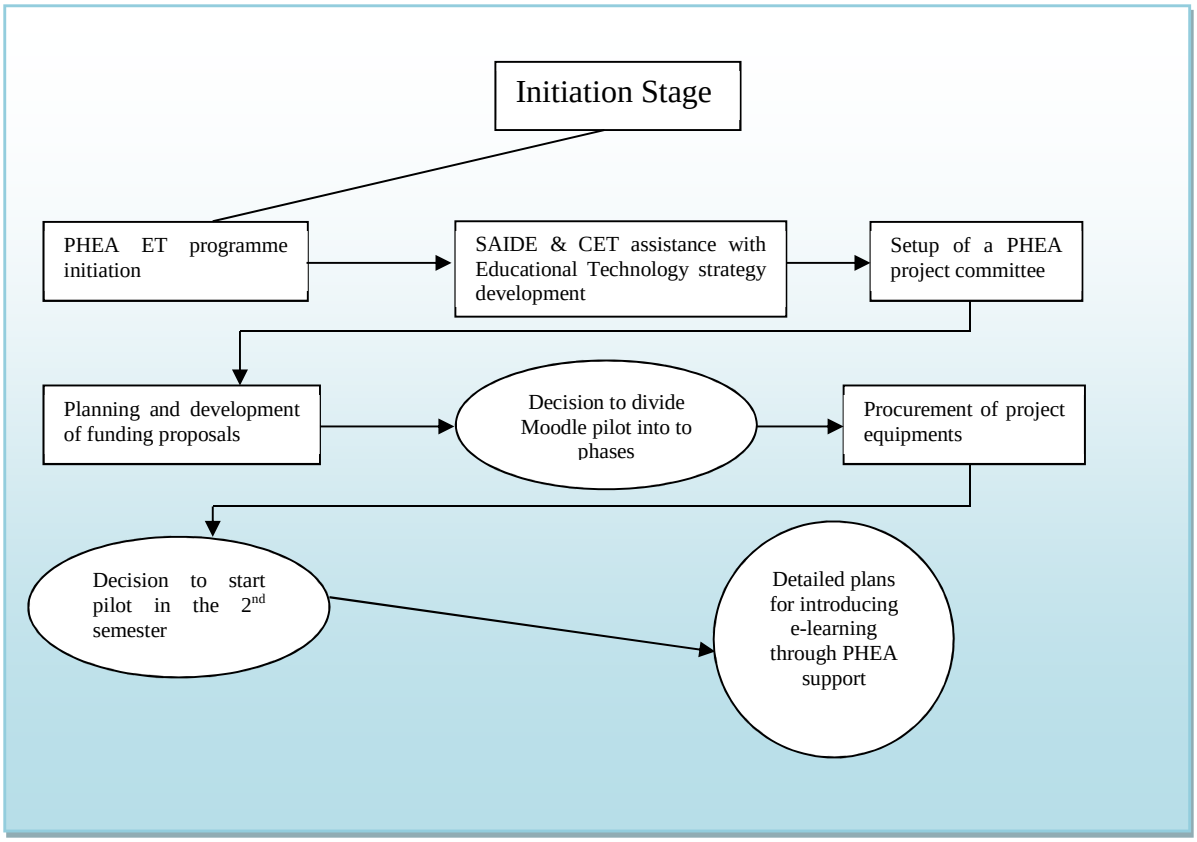



Figure 33: Initiation stage

### *6.5.1.1 Facilitating and inhibiting factors during the initiation stage*

| Factors in the initiation stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **External programme support** | Environmental | | | | | √ |
| 2. **Management support** | Organisational | | | | | √ |
| 3. **Experienced e-learning coordinators** | Organisational | | | | √ | |
| 4. **Existing IT infrastructure** | Technological | | | √ | | |
| 5. **Detailed planning** | Organisational | | | | √ | |

| Factors in the initiation stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Inhibiting factors:* | | 1 | 2 | 3 | 4 | 5 |
| 6. **Cumbersome procurement laws** | Environmental | | | | | √ |
| 7. **Numerous institutional activities** | Organisational | | | | | √ |

Table 41: Initiation – Facilitating and inhibiting factors

A number of factors facilitated the institution's ability to roll-out the Moodle platform in support of teaching and learning. Chief among these factors is the external programme support received from the PHEA ETI programme. This was a comprehensive programme designed to assist the institution develop and utilize an educational technology (ET) policy. Both technical and financial assistance were included in the package, relieving the institution of these critical but scarce resources. Through the guidance of SAIDE and CET, the institution was able to develop an e-learning integration programme for funding through the project. This window of opportunity was very instrumental in the institution' journey of e-learning integration into traditional campus programmes.

Another facilitating factor was the management support offered by the institution. According to one report, the whole project was first brought into the institution by the VC. From that point onwards, the formation of a management team and structure, preparation of funding documents, attendance at PHEA ETI workshops was known to and facilitated by top management. Clearly the institution was determined to make the most from the opportunity provided.

In addition, the experience of the project coordinators also played an important role in realising the outcomes of this stage. These coordinators had at one point in time researched into e-learning issues and used some information technology in their teaching and learning activities. Their selection to pioneer the project was therefore aimed at bring their personal experiences to bear upon the success of the project. One of the coordinators actually had his PhD in the field of educational technology and was very instrumental in the entire project.

The initial assessment of the institution' IT infrastructure showed that although the institution could boast of appreciable internet infrastructure, computers, projectors, FM station, etc., these were woefully inadequate considering the total number of students and other stakehold-

ers. This initial assessment among other things enabled a decision to pilot some courses to be arrived at. The number of online courses was subsequently to increase with the belief that on-going experience and lessons learnt will enable sufficient infrastructure to be put in place over time. The assessment of the IT infrastructure therefore sensitized the institution to how inadequate their IT resources were and what was potentially required for institution-wide implementation.

An equally important facilitating factor was the detailed planning undertaken by the project committee. This was done with assistance from SAIDE. The planning covered initial research to be conducted into the state of the institution, actual implementation of the Moodle and an investigation into its use by faculty and students. This planning required on-going monitoring by both institutional mechanisms and external institutions to ensure milestones were being achieved. The planning catered for critical elements in the implementation such as motivation of participants, development of courseware, procurement of relevant equipment and the development of open learning resources. Although challenges were experienced along the way, this was an important factor.

Despite these facilitating factors, two inhibiting factors were identified to impede the progress being made: cumbersome procurement laws and numerous institutional activities.
The procurement laws of the state (Ghana) requires that items purchased by state institutions exceeding certain amounts go through specified processes before their acquisition. The process has been identified to be fraught with cumbersome requirements which sometimes delay the items procurement. This was no different in the current institution as these laws were applied to the procurement of some specified items as server, antivirus, Adobe CS5, etc. this delays caused unnecessary inconvenience for the programme' start, subsequently causing other earmarked activities to be delayed. This was not only troubling for the institution, but similarly caused some upset for the funding organisation as the delays were unanticipated.
Another factor which inhibited the institution' activities in this stage was the numerous institutional activities engaged in by those involved in the project. Other activities including meetings, committee assignments, teaching, research, etc., some of which were organised at short notices caused some of the project members to be unavailable for important project meetings. This also caused delays which almost marred the project's outcomes.

### 6.5.2 Adoption-decision stage

The decision to adopt an e-learning platform like Moodle for e-learning support in the institution was taken upon the initiative of the vice chancellor (VC). Coincidentally, he is a strong advocate of online learning and was very instrumental in the achievement of the PHEA ETI programme. Upon the initial contact with the PHEA programme representatives, the VC set-up a committee to look into the project. It subsequently became apparent that the project was in line with the institution's strategic plans for educational technology and IT use for teaching and learning enhancements. The committee worked with SAIDE and CET to develop the ET strategy and relevant proposals for the PHEA ETI support. Although the need to support teaching and learning with educational technology was a core component of the institution' 2003 – 2008 and 2009 – 2013 strategic plans, the availability of external support from the PHEA ETI programme was very instrumental in pushing the institution' agenda forward.

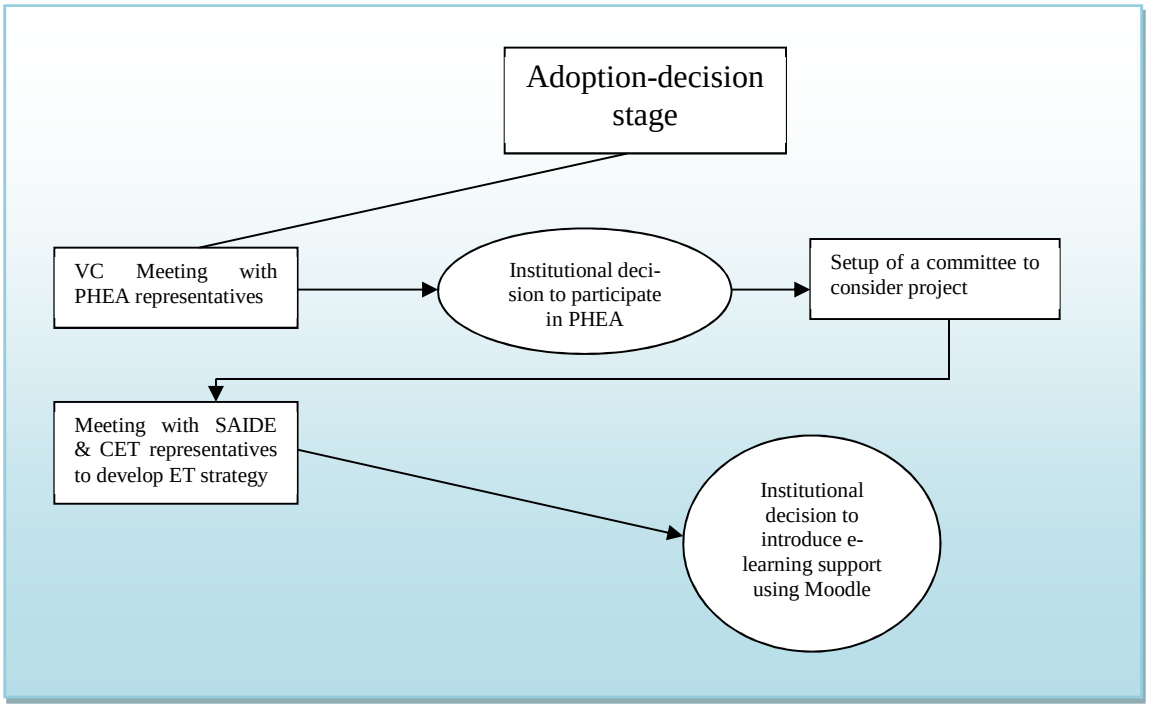



Figure 34: Adoption-decision stage

### *6.5.2.1 Facilitating and inhibiting factors during the adoption-decision stage*

| Factors in the adoption-decision stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Management support** | Organisational | | | | | √ |
| 2. **Supportive institutional structures** | Organisational | | | √ | | |
| 3. **Existing institutional ET strategic agenda** | Organisational | | | | √ | |
| 4. **External support** | Environmental | | | | | √ |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 5. **Inadequate computer facilities** | Technological | | | | | √ |
| 6. **Inexperienced online tutors and students** | Individual | | | | | √ |

Table 42: Adoption-decision – Facilitating and inhibiting factors

During this stage of the implementation process, a number of factors appeared to be very instrumental in facilitating the decision to adopt. One of these factors was management support. From the moment the PHEA ETI programme caught the attention of the VC, every effort was made to meet the necessary criteria to merit the support to be provided. In addition, upon realisation that the objectives of the programme were directly in sync with the institution' strategic plan for integrating IT into teaching and learning, the decision was made to use the opportunity provided as a platform to realize the goals of the institution. This was totally supported by top management.

The institution also had a well-established structure for managing external funding and projects. This was very instrumental as they guided the project committee in meeting the institutional requirements for approval. The unit was also to monitor project milestones to ensure deadlines are met and appropriate reports submitted to internal and external assessors. This provided a further boost to the institution's credibility and guaranteed management's support for the initiative.

As mentioned above, the already existing institutional strategic plan for developing an educational technology for showing how IT was to be integrated into teaching and learning facilitated the almost immediate adoption of the proposed LMS, Moodle. Due to this existing intent, it was easy to see how the opportunity offered by PHEA ETI matched the planned strategy of the institution. It guaranteed continued management attention and support as it was an essential area for institutional development.

Another important factor that facilitated the decision at this stage was the availability of external support. Although the development of an ET strategy and integration of IT into teaching and learning was part of the institution' intended strategy, funding was an issue. In addition to this, expertise appeared to be a problem. The appearance of the PHEA ETI on the scene therefore provided a big opportunity to get the much needed resource for realising the institution' objectives in this direction. Although the institution would have found a way to do this, it may have taken far longer to realise any meaningful gains.

Other factors however mitigated the outcomes of this stage. Firstly, the issue of inadequate computer facilities, among others, made it impossible to select more than two courses for pilot study. These computers which were mostly located in the ICT centre, Mathematics department and a few other places posed a big challenge for the implementation of the project. Unfortunately, the funding did not cover the creation of more computer laboratories and acquiring of more computers. The initial pilots could have used more courses in different fields.

Another inhibiting factor was the inexperienced online tutors and students. Many of the faculty members in the institution had little or no knowledge of the use of a platform such as Moodle. As such many could not be brought on board for the implementation trials. There was the need to train and sensitize both faculty members and students for the use of the platform to be effective. This also contributed to limiting the pilot to only two courses to be delivered by faculty members with some knowledge and experience in the use of similar platforms.

### 6.5.3 Adaptation stage

The adaptation of the Moodle for supporting teaching and learning was in two parts: the first part focused on the installation and setup of the Moodle platform, while the second part concentrated on the development and setup of the two pilot courses for the initial pilot testing.

In the first part of this stage, the required equipment and software which included a dedicated server, Adobe CS5 suite, an antivirus and Moodle application were setup at the school's network operating centre. With help from facilitators from SAIDE in South Africa, the Network administrator of the institution setup and configured the Moodle website for access by lecturers and students using their institutional account names and passwords. By the time the site was ready, it was almost the end of the semester. This caused the commencement to wait until the second semester of the 2010/2011 academic year.

The second part of the adaptation stage involved the development of two courses for pilot purposes. Two IT related courses were selected and courseware developed using a course structure and learning pathway rubric along with a quality checklist provided by SAIDE. The two courses included an undergraduate course in ICT (GPD 113: Introductions to ICT) and a postgraduate course in Computers Applications in Education (EDI: 502). These were selected because the team involved in the design and delivery of the courses were already competent and conversant with computer usage, and were also believed to be capable of handling Moodle usage with ease. The courses were developed using the requirements of the current curriculum as a guide.

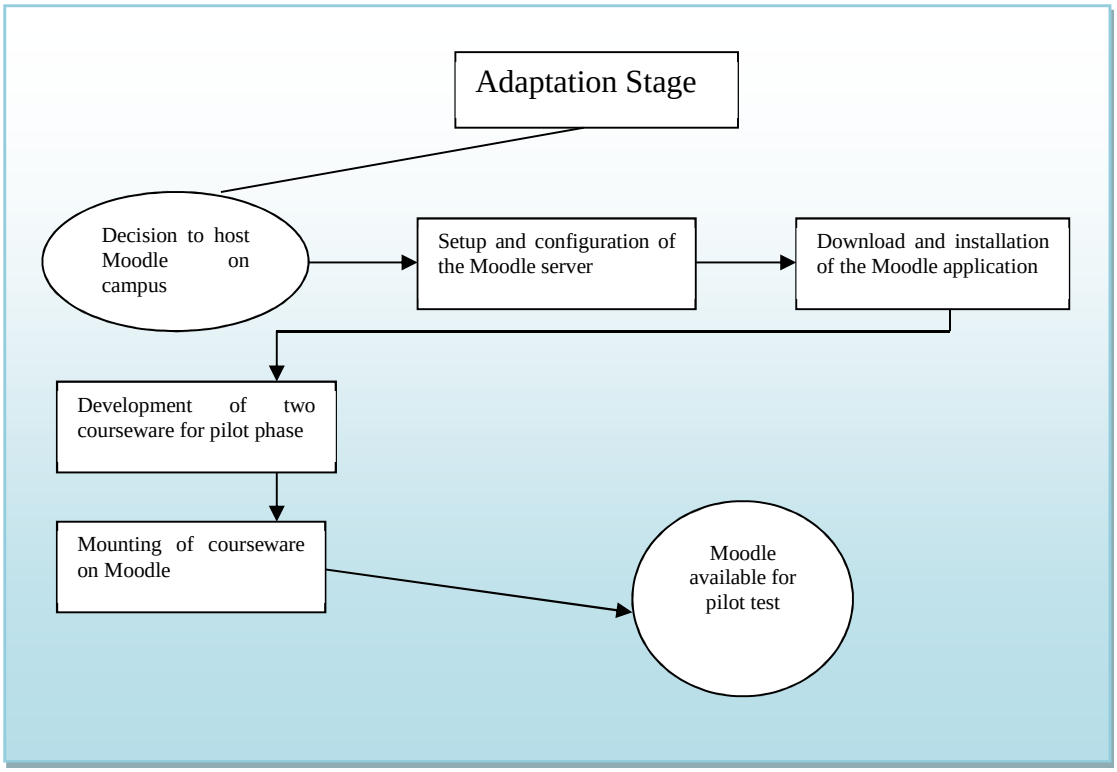



Figure 35: Adaptation stage

### *6.5.3.1 Facilitating and inhibiting factors during the adaptation stage*

| Factors in the adaptation stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **External support** | Environmental | | | | | √ |
| 2. **Capacity building workshops** | Organisational/Task | | | | | √ |
| 3. **Courseware development** | Task | | | | | √ |
| 4. **Pre-determined roll-out strategy** | Organisational | | | | √ | |
| 5. **Availability of IT technical staff** | | | | | | |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 6. **Procurement barriers** | Environmental | | | | √ | |
| 7. **Delays in courseware development** | Task | | | | | √ |

Table 43: Adaptation – Facilitating and inhibiting factors

The external support provided the SAIDE facilitator has been very instrumental in getting the Moodle implementation underway. Not only did the programme provide the needed funding for procuring the server and other software, a facilitator was also made available to guide the institution from installation to configuration to setup of course sites. Very practical assistance and guidance were provided to enable the implementers make headway in their implementation efforts. In some instances, improvements in actual use of the platform for teaching were recommended by the facilitator upon observing one instructor.

Another facilitating factor here was capacity building. Several training sessions were provided to enable faculty members develop courseware for the various courses. Hands-on sessions enabled courseware development to be observed and support provided. Instructional technologists and multimedia experts were also trained and appointed to provide the necessary assistance to course developers. External help was also available to provide the necessary guidelines for developing the courseware and mounting the courses online. Faculty members selected to participate in this process got the opportunity to develop the skills in using Moodle to support students' learning and teaching.

As noted above, the courseware development was another big facilitator to the outcomes of this stage. Courseware are a very important aspect of LMS as without them, the student would have very little to engage with. The development of courseware is thus very critical to the successful use of LMS in HEIs especially in developing countries like Ghana. This took centre-stage in the support provided by the PHEA ETI programme. Although there were challenges in getting them to be developed on time, their presence was very useful in getting students to engage with the Moodle.

Due to the detailed planning undertaken by the institution prior to rolling out the project with the assistance of SAIDE, a pre-determined strategy for rolling-out the Moodle use had been agreed upon. This was very important as the existing infrastructure, competency levels of faculty members and students, etc were bound to pose some challenges. The strategy which was to pilot two courses initially from which lessons could be learnt to improve upon ten additional courses appeared to have worked quite well.

Several other factors inhibited the outcomes of this stage. For instance, as indicated above during the initiation, procurement barriers caused unnecessary delays in the procurement of

the necessary equipment. This made it impossible for the system setup and configuration to be made in the first semester of the 2010/2011 academic year. It resulted in the dalliance of other scheduled activities.

Another inhibiting factor was the delays in courseware development. The courseware development took far longer than anticipated. This caused the expected number of courses to be rolled-out in the second phase (10) to be reduced by two (2). These delays were attributed to the many other activities engaging the faculty involved in the project. This was a serious concern for the project managers as they called for management intervention from time to time for the release of these faculty members from other duties.

### 6.5.4 Initial Use stage

Actual use of the Moodle platform for teaching and learning purposes was in two phases. In the first phase, two lecturers and 1398 students (1300 undergraduate (UG); 98 postgraduate (PG). The experiences of the lecturers and students were very insightful as it enabled the benefits and challenges of using a Moodle platform within the institutional context to be identified. The UG course was offered at the start of the second semester of the 2010/2011 academic year, while the PG course was offered during the sandwich session of the same academic year. The curriculums of the courses were both refined to include topics on internet and Moodle use so as to provide students with the necessary competencies to facilitate their use of the platform. Both courses were used to supplement face-to-face class meetings in a blended/hybrid mode.

In the second phase, the two pilot courses were refined and rerun along with eight (8) new courses. The new courses were included so as to gain new insights into how other courses offered in the institution would perform. This was also because the first two pilot courses were IT based and involved faculty members with extensive IT experience. There was therefore the need to test the Moodle use on other not too ‘IT-centric’ courses. This would enable important changes to be made that would facilitate institution-wide deployment.

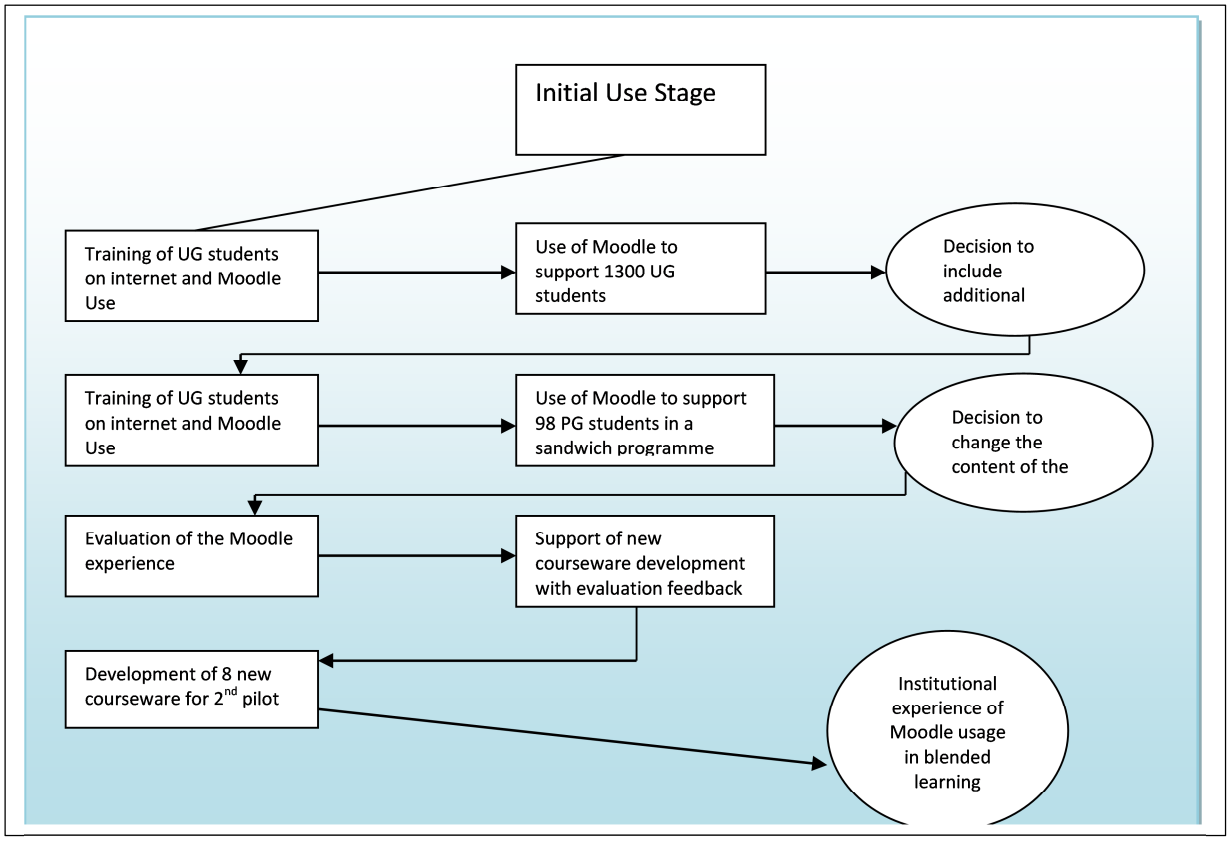



Figure 36: Initial use stage

### *6.5.4.1 Facilitating and inhibiting factors during the initial use stage*

| Factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Motivated instructors** | Individual | | | | √ | |
| 2. **Lessons from pilot phase** | Task | | | | √ | |
| 3. **Modification of curriculum** | Task | | | √ | | |
| 4. **Internal support** | Organisational | | | | √ | |
| 5. **External support** | Environmental | | | | | √ |
| 6. **Courseware available for courses** | Task | | | | √ | |
| 7. **Training in Moodle management and use** | Technological/Organisational | | | | | |

| Factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| *Inhibiting factors:* | | 1 | 2 | 3 | 4 | 5 |
| 8. **Inadequate consideration of pedagogical principles and models** | Task | | | | √ | |
| 9. **Lack of adequate computer resources** | Technology | | | | | √ |
| 10. **Low technology competencies among students** | Individual | | | | √ | |
| 11. **Low technology competencies among academics** | Individual | | | | √ | |
| 12. **Inadequate motivation** | Organisational | | | | | √ |
| 13. **Negative institutional culture** | Organisational | | | | | √ |

Table 44: Initiation – Facilitating and inhibiting factors

A careful consideration of this stage' activities revealed a number of facilitating factors that aided use of the Moodle. Firstly, the faculty members involved were highly motivated to be part of an innovative project as well as due to some financial rewards to be provided. The two initial pilots were conducted by two of the project team members. This was due to their knowledge of similar systems and experience in IT. The other faculty members elected during the second phase were selected from an awareness creation seminar aimed at sensitizing and recruiting participants. Whether it was because of the privilege to be a part of the project, the financial reward promised, or some innate motive, the motivation was there to participate.

Secondly, lessons learnt from the pilot phase enabled some corrections to be made. These lessons were considered during the 2nd phase of the course delivery. Some additional components were for instance added to the initial courses offered in order to make them more effective. The initial pilot therefore proved useful as earlier anticipated by the planners.

Thirdly, the modification of the curriculum to incorporate internet and Moodle lessons was very useful at this stage. This was very important as a careful consideration of the students would reveal little to no knowledge about Moodle and some internet skills for some of the students. Absence of these knowledge and skills were believed to be capable of causing ineffective use of the platform. Hence their incorporation was very important to the success of the use of Moodle.

Another very important facilitating factor at this stage was the presence of internal support. Both e-learning and IT technical support were available thanks to the capacity building provided by the external facilitators. Both IT, multimedia and instructional technology staffs were recruited, trained and made available to support lecturers and students involved in the Moodle deployment and use. Students with access and use problems could therefore easily get assistance from the IT unit. Faculty members needing technical assistance could also contact the IT unit. Where the need was e-learning related, the trained multimedia and instructional technology staff was readily at hand to assist. This present help enabled the implementation to progress as anticipated despite some challenges.

As indicated in the preceding paragraph, the presence of external support was also very instrumental at this stage. The external facilitation provided through the PHEA ETI programme allowed an e-learning expert to be present both on campus and away periodically to assist in the implementation process. During this stage, activities could be monitored online by the facilitator to ensure everything was moving as anticipated. Again, challenges faced in the development of courseware received helpful assistance from the external facilitator which immensely aided project progress at this stage.

Nonetheless, some inhibiting challenges were observed at this stage. Among these was the inadequate consideration of pedagogical principles and models. As could be seen in the first two pilot cases, very little consideration of pedagogy and online delivery could be observed. Aside following the weekly structure of the Moodle where new topics were presented every week, the level of ‘online presence’ and other interactions was not very clear. It appeared a bit like a repository for documents where students went to download course materials. This may have been so due to the blended approach used though it does not excuse the lack of adequate pedagogical considerations required.

Another inhibiting factor was the lack of adequate computer resources. Students complained of their inability to access the computer labs adequately to gain the maximum benefit from the use of Moodle. Class sessions were scheduled according to time and often immediately after their session, another class was waiting to use the lab. After school, these labs were often closed making it difficult for students to access them. Coupled with challenges with electricity, this was posing serious challenges for the students and had the potential to mar the implementation.

In addition, the low technology competency among students was a problem at this stage. Although students are provided training on computer literacy upon their admission into the institution, this appears to be inadequate - especially when the students lack sufficient practical skills due to challenges in access to computers both on campus as well as out of campus. Many of these students often have little or no computer experience prior to being admitted into the university due to the larger social challenges in the Ghanaian communities. From basic computer operations to internet usage, many of these students demonstrated low competencies which reflected in their use of the Moodle.

This was not only a problem among students; faculty members were also observed to have low technology competencies. Access to computers and the internet can be described as a relatively recent thing among many faculty members. Even so, their use has often been limited to personal usage and not in the domain of teaching and learning. As a result, some of the skills required to effectively utilize computers and other information systems for teaching and learning have not been adequately developed in these faculties. This left a little more to be desired in their use of these information technologies in support of their teaching and learning activities.

Another important inhibiting factor was the inadequate motivation provided. As could be clearly seen, although some financial rewards were provided for developing the courseware, little or no motivation was provided for actual use. For many of these faculties, using the platform was an innovation for which they needed to get used to alongside their many busy schedules. Coupled with the low computer competencies, many did not have internet access at home. As such students' work could only be viewed on campus. No clear strategy was in place to encourage use, a factor which was telling on how the faculty members engaged with the platform.

As was indicated in a report, the 'negative institutional culture' was also inhibiting the activities of this stage. It was observed that some faculty members were more interested in the monetary motivation than the task of developing and using IT in their teaching activities to enhance students' learning. This was a culture believed to be "..a threat to the creativity, innovation and spirit of sacrifice at institution in the long term.." This cash-driven inducement to get things done was a hindrance to the smooth usage of the Moodle.

### 6.5.5 Acceptance stage

Through a series of advocacy workshops aimed at sensitizing and creating the needed awareness among faculty members, and an expansion in the number of courseware that could be created through the PHEA ETI programme, many lecturers were gradually embracing the use of Moodle to support their class delivery. This achievement can also be described as having been attained through a combined effort of advocacy and capacity building.

A major contributing factor to faculty members' acceptance of the Moodle was the inducement to develop courseware through the PHEA ETI programme. Each courseware developer was remunerated with a package of $2500. Through an initial advocacy programme, some faculty members and courses were identified and invited to workshops aimed at equipping them with Moodle use and courseware development skills. As an outcome of these trainings, the selected faculty members were expected to develop courseware to be deployed on the Moodle platform. Series of five (5) workshops were organised in this direction with the number of participants growing at a point in time (from 15 to 42). Although 20 courseware were targeted for the PHEA ETI programme, this number grew to 69 off which 42 were deemed to have attained acceptable levels for deployment and use.

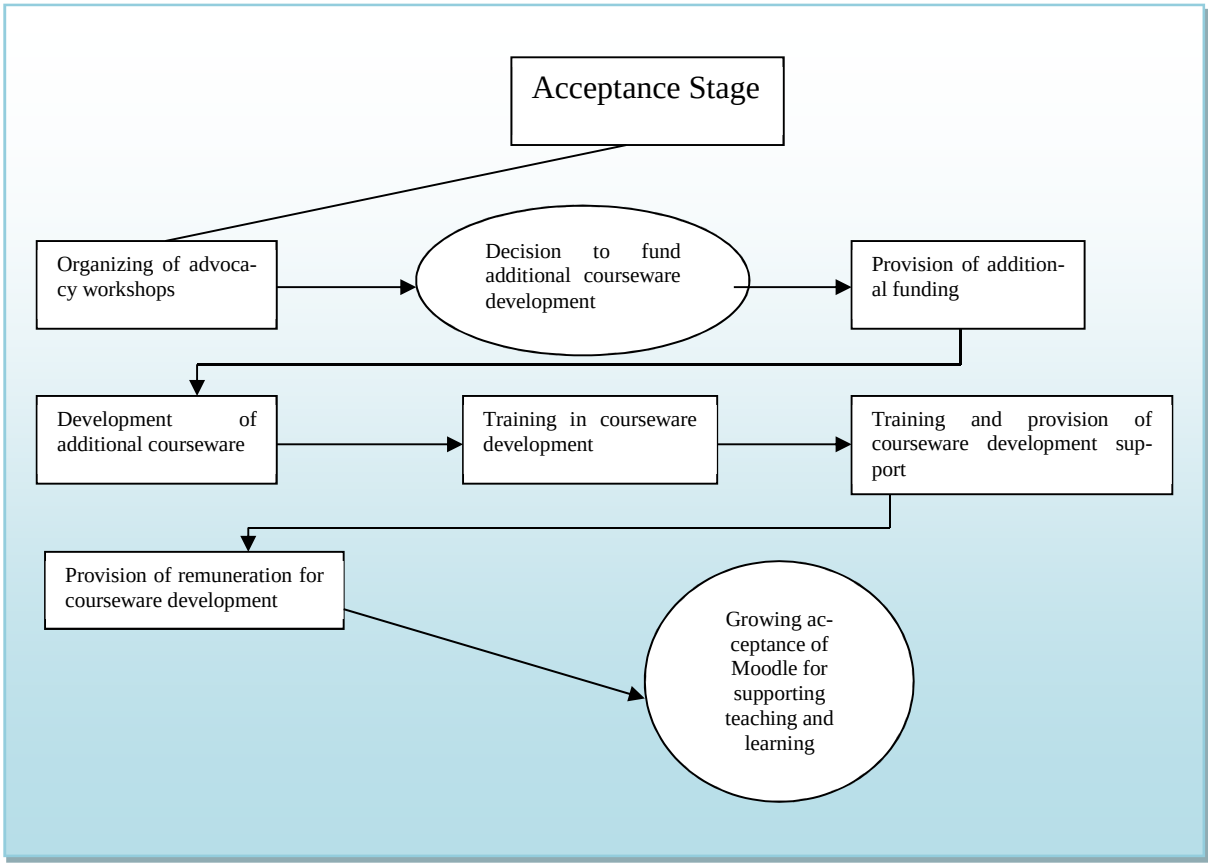



Figure 37: Acceptance stage

### *6.5.5.1 Facilitating and inhibiting factors during the acceptance stage*

| Factors in the acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Capacity building** | Task/Organisational | | | | | √ |
| 2. **Management support** | Organisational | | | | √ | |
| 3. **Incentives and motivational packages** | Environmental/Organisational | | | | √ | |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 4. **Poor connectivity and power cuts** | Technology/Environmental | | | | | √ |
| 5. **Academic' time demands** | Task/Individual | | | | | √ |
| 6. **Inadequate IT infrastructure** | Technology/Organisational | | | | | √ |
| 7. **Inadequate technical support** | Organisational | | | | √ | |

Table 45: Acceptance – Facilitating inhibiting factors

Although no clear strategy could be identified for gaining institution-wide acceptance, certain factors were observed to be facilitating this objective.

Firstly, the capacity building of some selected faculty members was gradually building the needed expertise and competencies required to roll-out a full-scale institutional deployment of the Moodle. These faculty members were trained to use the functions embedded in the Moodle to support their teaching and students' learning. Capacity was also provided in the area of courseware development. Faculty members and the trained multimedia and instructional technologists had developed skills that could be used to assist the larger community of faculty members in the development of their courseware. These capacities therefore were playing a great role in developing the needed confidence required to stimulate institution-wide development.

Secondly, the support provided by management from the initiation of the project sent a sense of commitment to the entire community about the institution' determination to realise the benefits of online learning. At some point, when the courseware development became a challenge, the VC was part of an external retreat undertaken outside of the institution's premises

to enable faculty members complete their development. Promises were also made by the VC to ensure that use of Moodle to support teaching and learning was taken into consideration for promotional purposes. These were gradually developing the needed acceptance among stakeholders.

Thirdly, as indicated in the previous paragraph, the incentives and motivational packages were also instrumental in creating the acceptance of Moodle use within the institution. From the programme onset where it was determined to incentivise courseware development participants with an amount of money, many faculty members became interested. This can be seen from the increase of participants from 15 to 42 to 69. The perceived monetary rewards caught the attention of many and so there was an increase in interest among faculty members to join the courseware development team. This became possible with the making available of more funds though the PHEA for this very purpose. The promise to use online presence as a criterion for promotion also contributed to this acceptance that was beginning to grow within the institution.

Nonetheless, there were still other inhibiting factors present, influencing the gradually growing acceptance of the use of the Moodle institution-wide. One of these factors was the poor connectivity of the internet and the power cuts. Frequent power cuts and poor connectivity of the internet marred the use of the Moodle. Progress in implementation was slowed down and in some cases workshops, class activities and on-campus of wifi to access the Moodle have been disrupted. This created a lot of inconveniences for both faculty and students. It was a source of major concern affecting the system'sacceptance by the users.

Another major inhibitor was the time demands on academics. Due to large class sizes and the academic workloads on faculty members involved in the project, there was insufficient time for faculty members to attend training programmes and concentrate on the courseware development. In some cases, some of these participants were involved in other programmes and committees which ate into their time and commitment to the project. This was a common observation among many faculty members in the institution and was influencing the needed time and attention for the Moodle use. As these practices were already a traditional pattern of their daily lives, this was gradually creating the impression that the Moodle usage was a kind of 'nuisance'. This was gradually affecting the acceptance of the Moodle use institution-wide.

Yet another inhibiting factor was the inadequate IT infrastructure. Several of the institution' IT infrastructure could be described as not significantly developed enough to support fully online delivery of courses e.g. internet connectivity. There was still the problem of inadequate access to computing facilities despite the improvements in network infrastructure and setup of computer laboratories. Students continued to complain about their inadequate access to these laboratories, often resorting to the use of internet Cafes which brought additional costs to them. Even those students with computers or laptops had internet connectivity challenges. All these issues were gradually affecting the acceptance of the innovation.

In addition to the above mentioned factors, there was also the issue of inadequate support. The technical services (e-learning/IT) provided to academics and students by these support staffs cannot be underestimated. Faculty members engaged in online courseware development require a lot of technical assistance to get the product 'just right' for delivery. These technical supports can provide one-on-one mentorship to the faculties which can greatly enhance the courseware development and actual online experience. However these were in limited supply. When a group was finally trained and brought on-board the programme almost at the latter end, their impact was felt by all involved. Their absence thus creates a sense of helplessness among participants when they encountered challenges. More support staffs could therefore be seen to be needed urgently. This sense of frustration was also gradually influencing some of the participants and may also be partly responsible for some of the challenges faced in the courseware development.

### 6.5.6 Routinization stage

Much institutional initiative is yet to be seen in this direction. A scrutiny of the PHEA ETI programme proposal and report highlights a concentration on advocacy and capacity building to equip the institution and its stakeholders with the tools and skills needed to utilize in a more effective way the potentials embedded in educational technologies and Moodle in particular. The encouragement to use the Moodle as part of the daily delivery of teaching and learning activities as well as integration with other institutional processes and practices that relate to teaching and learning was mostly from the PHEA ETI programme and its implementation team. This was carried out through capacity building and advocacy. Quite clearly, the management of the institution and in particular the VC could be seen to be actively involved. Although this was a good sign and an indication of management support and buy in, the actu-

al issue of institution-wide deployment appeared not to have been adequately considered. As expressed by one of the project leaders in a case study report of the PHEA ETI project, 'capacity to adopt educational technology has actually increased, and that was the overall goal'. This clearly highlights where the project focus lay. Efforts to ensure sustainability therefore were not adequately considered even though they were anticipated.

Two important outcomes however from the PHEA ETI programme - one expected and the other an unexpected outcome - was the development of an educational technology policy and an educational technology unit. The policy was intended to guide all online learning initiatives in the institution, while the unit was to continue with training of staff and expansion of online courses. A committee had been put in place by the VC to consider the draft policy as it as considered crucial to the development and sustainability of an online community. As one project leader put it, "if we put it to our current VC that we need something, then if a new VC comes and he is not interested, we could roll 'back'. Putting these structures in place would guard against this. It's a big plus". In other words, there was a possibility of the gains from the PHEA ETI programme being eroded if measures to institutionalize the use of Moodle were not put in place.

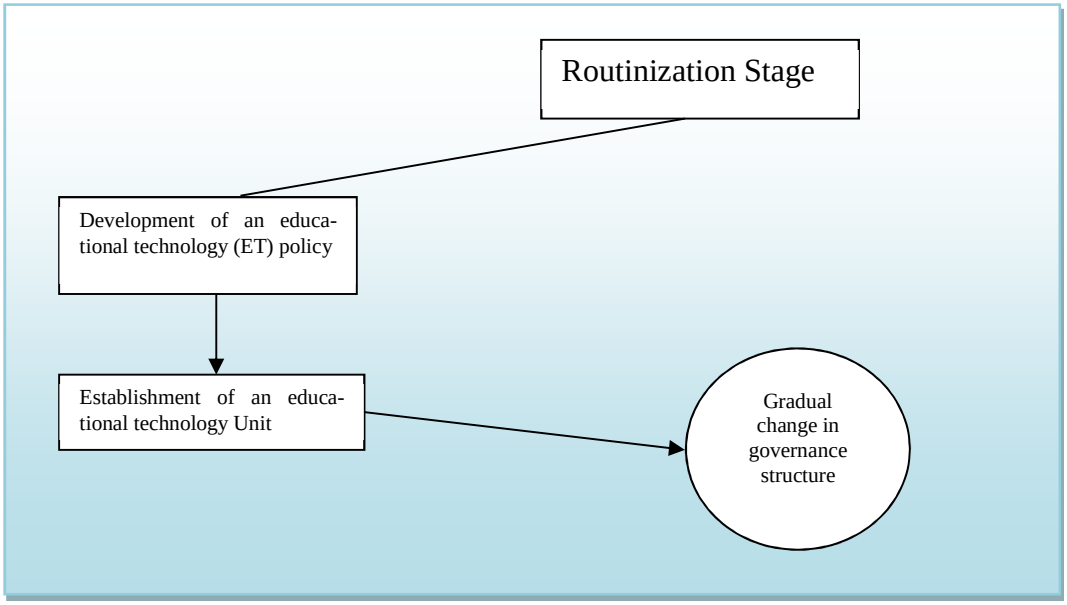



Figure 38: Routinization stage

### *6.5.6.1 Facilitating and inhibiting factors during the routinization stage*

| Factors in the routinization stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Available institutional capacity** | Task/Organisational | | | | √ | |
| 2. **Management commitment and support** | Organisational | | | | √ | |
| 3. **Draft educational technology (ET) strategy policy** | Organisational | | | | | √ |
| 4. **Establishment of an ET unit** | Organisational | | | | | √ |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 5. **Poor IT infrastructure** | Technology | | | | | √ |
| 6. **Inadequate motivation** | Organisational | | | | | √ |
| 7. **Poor connectivity and power cuts** | Technology/Environmental | | | | | √ |

Table 46: Routinization – Facilitating and inhibiting factors

As has been discussed in the preceding stages, a number of factors which facilitated the institution' implementation effort continued to be present to encourage routinization. Prominent among these are the institutional capacity availability and the support and commitment of management. Even though the project support from PHEA had ended, the skills acquired by the participants were still available for institutional use. Coupled with the commitment and support of management other initiatives were planned to sustain the gains made. As a consequence of these efforts a draft ET strategic policy was developed and waiting approval; while an ET unit was setup to continue training of staff and development of online courseware. This was a further indication of management's commitment, support and determination to integrate technology into teaching and learning.

However the inhibiting factors of poor infrastructure, inadequate motivation and poor connectivity and power cuts were still in existence. There were clearly very little efforts being made to resolve these issues which over time could derail any gains made.

### 6.5.7 Infusion stage

Although the period of this implementation spanned almost a year from the second semester of February 2011 to the end of the first semester of the 2011/2012 academic year, with measures put in place to monitor and evaluate how lecturers and students use Moodle for teaching and learning in hybrid courses, the overall impact of the use on teaching and learning was not measured. The use of Moodle for the distance programmes of the institution was also not part of the pilot. Clearly, the institution is yet to fully utilize and maximise the potential benefits from the use of the Moodle. As indicated in a full report on how lecturers and students used the Moodle, "the programme provided useful lessons that would guide larger scale deployment of Moodle in the post-implementation era". Any consideration of how the use of the LMS would support and enable the achievement of higher aspirations of the institution, such as for its distance programmes and expansion of access to the unreached, was likely to be undertaken at a later date. Any move towards a fully online presence was therefore presently unconsidered.

#### *6.5.7.1 Facilitating and inhibiting factors during the infusion stage*

| Factors in the infusion stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| ***Facilitating factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 1. **Management commitment and support** | Organisational | | | | √ | |
| 2. **Draft ET strategy policy** | Organisational | | | | √ | |
| 3. **Establishment of ET unit** | Organisational | | | | √ | |
| ***Inhibiting factors:*** | | 1 | 2 | 3 | 4 | 5 |
| 4. **Poor IT infrastructure** | Technology | | | | | √ |
| 5. **Inadequate motivation** | Organisational | | | | | √ |
| 6. **Poor connectivity and power cuts** | Technology/Environmental | | | | | √ |

Table 47: Infusion – Facilitating and inhibiting factors

As has already been identified in the routinization stage, although the pace of integrating the use of the Moodle into the day-to-day activities of the institution was slow, very little attention was given to use of the system for achieving higher level institutional agenda. The facili-

tating factors which provided the necessary environment for routinizing use were still present and could be utilized to speed infusion. Nonetheless, the challenges continued to exist. More was required to put action to words if the use of Moodle was to provide the much needed support institution-wide.

### 6.5.8 Summary of findings

In the current implementation, it is obvious the institutional purpose was to pilot the Moodle to build institutional capacity to use IT in teaching and learning while gaining the necessary experience and insight into institutional factors influencing their effective use. Detailed plans were developed for this purpose due to the availability of external funding and technical support. Training and awareness were provided with participants provided hands on opportunity to develop their courseware. Though a number of challenges were experienced throughout the implementation process, important achievements were made to stimulate future development of the Moodle institution-wide. As a result of the funding opportunity, the institution now had its own server where the application was installed, IT staff trained in the management of the application so as to provide the necessary technical support to users, as well as a supportive management through whom the opportunity was brought to the institution. The funding opportunity was very instrumental in pushing the institutional strategic plan of introducing IT into their teaching and learning environment. A further detailed discussion of the institution' implementation is presented below.

### 6.5.9 Discussion

A high level of planning could be observed for this institution' implementation of technology supported learning. This was facilitated by the window of opportunity for funding by the PHEA ETI project for the development of an institutional educational technology strategy. A committee was set up to work with external facilitators in developing the necessary proposals for accessing the fund needed to develop and implement a technology supported teaching and learning environment. The planning which encompassed a research to assess the state of institutional readiness, a deployment and piloting of a LMS and an assessment of the experiences of users was comprehensive due to the demands and expectation placed on the project by the external funders. However the level of institutional stakeholders' involvement and the evaluation of the purpose for introduction could be described as inadequate. Probably this was due to the lack of consideration for institution-wide roll out from the very initiation of the project.

This absence of an institutional plan for how II was going to be integrated into the traditional teaching and learning environment appears to be a common feature of many HEIs in Ghana. Holistic planning for how a technology support for teaching and learning would be rolled out can aid an institution such as the one under consideration harness external opportunities for such projects which can have long reaching consequences. However as in the current case, the focus was just on a small segment of faculty members most of whom were concentrated on one of the institution's 3 campuses. Institution-wide roll out thus promised to be a challenge considering how some of these wider considerations failed to be addressed.

From the initiation stage where contact with the funding organisation' representatives were made, the committee set up to facilitate the opportunity could not have been said to be constitutive of all relevant stakeholders, or encompass the interest of the entire institution which had three campuses. Their attention thus could be described as narrow, isolated and concerned with their present campus (main campus).

In the same vein, the decision to adopt the institutional LMS appears not to have received the necessary institutional attention or followed any clear institutional formal procedure for the selection and adoption of a particular learning technology for institution-wide usage. The selection and adoption of the Moodle appears to have been reached as a result of the recommendation of the committee appointed to oversee the PHEA project with the support of the VC and an external facilitating team from SAIDE and CET. Other than the large class challenges and other effectiveness of learning considerations, the technology' deep processes and governing logic vis-à-vis the institutional processes to be supported and enhanced appeared not to have been of much importance. For any meaningful benefits to be derived from the adoption of a particular solution, open source or otherwise, consideration of various options by important stakeholders such as faculty heads, faculty members and students, assessment of the tasks to be supported and any potential future development of additional technology supported teaching and learning should be considered. This however was not clearly present.

During the adaptation of the system, a lot of support was received from the external facilitators in the setup, configuration and going live of the initial pilot courses. Since the Moodle server was being hosted within the institution, in-house technical staff saw to the management and administration which enabled their competencies in Moodle management to be de-

veloped. Security was provided using the institution' network facilities access to which required institutional usernames and a password. Training was also provided in which courseware development was an essential component. However there was much delay in completing courseware due to other institutional engagements by those involved. Instructional technologists and multimedia specialists were also trained to provide support to participants involved in the project. The courseware utilized a course structure and a learning pathway rubric in addition to a checklist provided by SAIDE for their development to ensure quality of online learning support. All these efforts led to the development of 69 courses of which 42 were selected after the initial pilot of 2 courses. There was little consideration of the existing or anticipated institutional procedures which were required to be incorporated into the Moodle configuration. The IT staff along with the e-learning facilitators (both internal and external) appeared not to be very interested in the essential role played by existing institutional structures in getting a technological innovation as the LMS to be accepted by users.

The initial use stage which enabled institutional lessons to be acquired to facilitate future development of the Moodle usage was very critical in assessing the initial response of faculty members and students alike. Lessons from this stage which included the perceptions of users about the system' usefulness and challenges experienced could provide the institution with opportunities to enhance the platform's effectiveness when given the due diligence. Though generally agreed to be useful, challenges with internet access, access to computers in the laboratory and frequent power outages were felt to be serious inhibitors to the effective use of the platform. When these issues are appropriately addressed, future use challenges could be mitigated to ensure acceptance of the system by all stakeholders. Institutional leadership in terms of taking proactive actions in resolving the identified challenges should be evident to all. This would go a long way to assure users of the institution's support and commitment to integrating technology into teaching and learning. Currently however, there was no sign of such efforts being made or planned for future attention.

It was observed that acceptance of the system' use was growing especially among faculty members. This it was realized was mostly attributable to the financial remuneration that came with the sponsorship for the development of courseware. This was also as a result of the project's intent to make such courseware available open learning purposes. In addition, the training provided also enabled users to acquire the much needed competencies and capacity required to sustain such initiatives. Nonetheless there were other factors adversely affecting

these developments. Prominent among these was the academics' time which had something to do with the institutional culture where these academics were often saddled with other projects which provided little time for engaging with the Moodle. Coupled with internet challenges and limited access to computer labs for students' engagement, these could derail any gains the institution may have made.

Beyond the acceptance stage, the major efforts made by the institution to get the gains from the PHEA project to be embedded and expanded has been in the areas of finalizing the educational technology strategy plans for approval by the institution' board and the establishment of an educational technology unit for continuing training in online facilitation. This is laudable and at least highlights institutional willingness to institutionalize Moodle usage. This could be further enhanced if consideration could be given to the system' integration with other institutional information systems. This of course requires an improvement in the institution' current network reliability and a clear integration plan to highlight areas where the most gains could be made. It is also not very clear if the institution hopes to extend this LMS access to others who cannot make it to the institution' campuses in the future through fully online education. Such high level institutional ambitions could also ensure that much attention is given to the system' post implementation efforts to ensure institutionalization. A structuration perspective is provided in the next section.

### 6.5.10 Structurational perspective

In the previous cases, efforts have been made to identify and understand how the institutions develop their institutional LMS vis-à-vis how users utilize the platforms in the execution of the institutionally mandated tasks. This view represents a structurational perspective of information technology as presented by Orlikowski & Robey (1991). Here the institutional structures of signification, dominance and legitimation which represents the meaning people have and make of institutional practices, what resources are put in place to achieve institutional goals and what norms and values govern institutional behaviour and so warrant repetition are the essential elements under consideration here. These structures represent what organisational members know, understand and use in the performance of their tasks and interaction with other organisational members. In other words, the introduction and use of an LMS can be potentially influenced by existing institutional structures which have been shaped, accepted and used by the members of that organisation. The structures embed processes,

practices, values and beliefs that have come to be identified with that organisation. Some of these may warrant changes but the extent to which that happens involves what the implementers take into consideration and what users perceive of the system.

In the current system, the Moodle is configured using PhP and My SQL, the standard programming language with which the open source application was developed with. The configuration involved the installation of the application on the server and the setup of the course structures according to faculty, programmes and courses. This was facilitated by external personnel from South Africa through the initiative of the PHEA project. The observable institutional assumptions, processes and rules observed to have been incorporated into the set up were the institutional semester period of four months constituting 16 weeks and the organisation of the courses according topics for each week. Beyond this, very little consideration was given to some of these important issues. This was a clear indication of the lack of institutional understanding of the importance of detailed consideration of the Moodle' processes vis-à-vis the institutional processes and an adequate assessment of the potential of Moodle in enhancing the teaching and learning practices of the institution. This was very important considering how users often unconsciously make comparison between existing systems and innovations. Especially, where users do not perceive any need for the innovation and tend to perceive the innovation as placing extra demands on their existing tasks, the anticipated outcomes could be adversely affected.

Since the necessary level of the Moodle' processes vis-à-vis the institutional processes were not given the needed consideration, the configuration could be described as technology focused. The technology was configured based on its inherent functionality and how the originators describe it can be used to support and deliver online teaching and learning. The success of this approach depends on how well the processes being introduced fits into the repertoire of institutional meanings, resource allocation and values people attach to the tasks to be performed by the new processes. Where there is a close fit, or perception of little difference, the system would be welcomed. However a negative perception is an indication of a poor fit which can result in a resistance to use. In the current case, it is seen as a project to be completed and as such not given the necessary critical consideration required. It is perceived as a project with attached financial remuneration to be desired and this can be clearly seen in the initial use stage after ten (10) courses are deployed on the platform. The completion of the courseware became an albatross on participants' neck, as it appeared they were struggling to

complete them. Actual use in the blended mode also became saddled by numerous bottlenecks that made it difficult for participants to have the necessary online presence needed to encourage students' use. This clearly shows the lack of consideration of institutional members' perception of the Moodle' processes vis-à-vis their entrenched institutional processes they had become comfortable with. As was identified, the project's focus was on the building of capacity in courseware development and Moodle usage much more than on the actual use and how these could be affected by existing institutional structures.

There was no distinct compliance enforcement as it was perceived as a project which required deadlines to be met for reporting purposes. Monitoring and enforcement of use was therefore not mandatory. This could potentially have adverse effect on future implementation efforts if not immediately arrested. Participants were beginning to form their impressions about the system and develop their own understanding of how the system should be used with little attempts made to steer these formative behaviours in an institutionally desired path. This attitude could be likened to the existing institutional culture which required improvements. As such the introduction of the Moodle provided an excellent opportunity for these attitudes to be corrected. However it appears such agendas were beyond the current project's aspirations. Users therefore could potentially appropriate their use of the system in ways that reinforced the negative teaching and learning cultures that needed to be changed.

Although awareness and acceptance were increasing among stakeholders, efforts towards institution-wide implementation were slow and required more institutional efforts to be made. However the project was coming to an end with no plans in place for continuation by the institution. Future of the Moodle' institutionalization was therefore dependent on how well the participants had become dependent on the Moodle and perceived the benefits to be. For more innovative use of the Moodle however, more institutional training was required in the areas of pedagogical models for online delivery.

The perceived notion of the Moodle as a technological innovation in the institution' traditional environment and the project nature of the implementation can be argued to have influenced the limited involvement of relevant stakeholders and consideration for institutional processes that could have aided in the institutionalization of the Moodle. To entrench the gains from the PHEA ETI project these issues would need further consideration.

# CHAPTER SEVEN

## 7.0 CROSS-CASE ANALYSIS

### 7.1 Introduction

In this section we compare the cases under study to identify similarities and differences that can provide stronger arguments for how higher education institutions should implement LMS more effectively. In the following cross-case analysis, we compare each of the stages of implementation of the cases under consideration in order to recognize important similarities and differences. The following analysis is done according to the stages highlighted in the IS implementation framework. Following this, an analysis of the factors identified to have influenced each context' implementation is presented to enable identification of similarities and differences to be made.

### 7.2 Initiation stage

As has been clearly shown in this research, the initiation stage highlights important background activities and developments that enable a deeper understanding of the subsequent activities and outcomes of the institutions' efforts. Using a five stage Likert scale instrument, we examine the various institutions' efforts at this stage. Below is the scale.

| Evaluative terms | Meaning | Value |
|---|---|---|
| Absent | Institutional efforts directed towards performance is totally absent; no sign of intention or commitment | 1 |
| Inadequate | Institutional effort directed towards performance is partially present; some signs of intention and commitment | 2 |
| Barely adequate | Institutional efforts directed towards performance is moderately present; clear signs of intention but weak commitment | 3 |
| Adequate | Institutional effort directed towards performance is present; very clear signs of intention and moderate commitment | 4 |
| Very adequate | Institutional effort directed towards performance is highly present; unmistakeable signs of intention and high commitment | 5 |

Table 48: Initiation scale

| s/n | Institution (cases) | Score |
|---|---|---|
| 1 | Case 1 | 3 |
| 2 | Case 2 | 5 |
| 3 | Case 3 | 3 |
| 4 | Case 4 | 3 |

Table 49: Institutional initiation efforts

In the instance of Case 1, top management was behind the intention to introduce e-learning (online learning) into the institution. This was evident in many communiqués to institutional members during functions such as beginning and end of year reports, matriculations, congregations etc. The process of preparing faculty members and identifying an appropriate technological solution was also initiated by top management. It was obvious to all stakeholders what the intention of management was. However detailed planning was not conducted and appropriate resources committed. In this regard, institutional readiness assessment with respect to users, support and IT infrastructure was not conducted, clear specification of opportunity/need and required solutions were not determined, limited awareness creation and involvement of stakeholders highlights a weak commitment on the part of the institution.

Case 2 was actively spearheaded by the top management of the institution. Both vision and strategy for deployment was provided by management and driven by resource provision. A detailed testing of the proposed LMS software was conducted vis-à-vis the institutional functions (OU) it was expected to support. Issues of reliability, scalability, security and integratibility were considered along with users, support and IT infrastructure. Management was at the forefront of this initiation providing the much needed leadership.

In Case 3, the institutional efforts directed at the introduction of an LMS for teaching and learning purposes can be described as moderately present. This is highlighted by the prior use of the Moodle platform for a collaborative master's programme, the training of IT staff in Moodle administration, the inclusion of Moodle as the institutional LMS for e-learning delivery, the use of Moodle for computer-based examinations, and the sending of a delegation to study other institution's deployment of computer-based examinations. In addition, the provision of a sensitization and training programme in the use of Moodle for academic staff and its

use in the institution' distance programmes highlights a clear but weak commitment since these efforts appear to be uncoordinated and not clearly aligned to a single purpose of introducing an institutional LMS.

Case 4 had the opportunity of obtaining an external support that provided both technical and financial support. For this to be possible, the institution's management had to approve and provide necessary institutional support by way of assent and facilitation of the process using the institution's established units monitoring, evaluating and reporting on externally funded projects. This was however limited to the provision of the funding and technical support. Thus institutional effort was moderately present but commitment of management was weak.

## 7.3 Adoption-decision stage

This stage which typically involves a go or no-go decision has serious implications for an institution as it requires the further commitment of critical resources for the realization of the implementation objectives. Although a top management decision when it comes to institutional implementation, the conscious consideration of the users can be helpful at this stage.

| Evaluative terms | Meaning | Value |
|---|---|---|
| Bottom-up adoption | Decision to adopt taken by a few individual stakeholders and pushed for institutional adoption | 1 |
| Moderately bottom-up influenced adoption | Decision to adopt taken by a group of champions and pushed for institutional adoption | 2 |
| Top-down and bottom-up adoption | Decision to adopt mutually shared by management and all stakeholders | 3 |
| Highly top-down influenced adoption | Decision to adopt taken and championed by management with the involvement of few stakeholders | 4 |
| Top-down adoption | Decision to adopt taken by management and pushed downwards for acceptance | 5 |

Table 50: Adoption-decision scale

| s/n | Institution (cases) | Score |
|---|---|---|
| 1 | Case 1 | 4 |
| 2 | Case 2 | 5 |
| 3 | Case 3 | 2 |
| 4 | Case 4 | 2 |

Table 51: Institutional Adoption-decision efforts

The adoption of Moodle in Case 1 was taken by management after it had been recommended by an IT staff assigned to scout the IT/IS environment for an online learning solution. Representatives of the various faculties were present and involved in the decision although a detailed examination of the proposed LMS had not been undertaken by them. No demonstration had also been made to the general membership of the faculty group. As such there was no awareness of what the adopted solution was going to cater for or be unable to support. Its top-down influence was useful in the sense that it indicated management support for and commitment to the project. However in as much as it is a necessary condition for success, it is not the only condition required.

In Case 2, management was solely behind the decision. After having been convinced of Moodle's ability to facilitate the delivery of online education, it was adopted and setup continued in earnest. No faculty or students had as yet been recruited into the institution so their involvement was not required.

The institutional adoption decision to use Moodle as the institutional LMS was facilitated by a group of enthusiast made up of some top level management members and the head of IT. As identified at the initiation stage of Case 3, a number of events facilitated this decision to adopt the Moodle, especially its use to provide computer-based exams and its application at the postgraduate level. Its subsequent inclusion and acceptance for adoption in the institution's ICT policy represented clearly the institution's understanding and willingness to adopt it.

In Case 4, the institutional adoption of Moodle was facilitated by a group of lecturers and researchers who were involved in the project proposal writing and execution. These in collaboration with the funding institution conducted an initial assessment of the institution to determine its readiness to deploy a LMS as part of a three-phased project which received institutional approval.

## 7.4 Adaptation stage

During this stage, the LMS is either configured to follow institutionally prescribed processes or setup to get institutional members to use new processes embedded within the platform. The level of adaptation is influenced by the clarity of vision for the proposed e-learning or

online education, leadership, competent development team, training and the level of integration intended with other institutional IS.

| Evaluative terms | Meaning | Value |
|---|---|---|
| No adaptation | No adjustment is made to LMS functionality; no clarity in course site, courseware and instruction manual development; lack of clarity and enforcement of training; no idea of future integrations | 1 |
| Low adaptation | Little adjustments made to LMS functionality; some clarity in course site, courseware and instruction manual development; some clarity in training but no enforcement; little clarity in future integrations | 2 |
| Moderate adaptation | Reasonable adjustments to LMS functionality based on institutional requirements; clarity in course site, courseware and instruction manual development; clarity in training and some enforcement; reasonable clarity in future integrations | 3 |
| High adaptation | High adjustments to LMS functionality based on institutional requirements; high clarity in course site, courseware and instruction manual development; high clarity in training and high enforcement; high clarity in future integrations | 4 |
| Very high adaptation | Very high adjustments to LMS functionality based on institutional requirements; very high clarity in course site, courseware and instruction manual development strategy; very high clarity in training strategy and high enforcement; very high clarity in future integrations | 5 |

Table 52: Adaptation scale

| s/n | Institution (cases) | Score |
|---|---|---|
| 1 | Case 1 | 2 |
| 2 | Case 2 | 4 |
| 3 | Case 3 | 2 |
| 4 | Case 4 | 2 |

Table 53: Institutional Adaptation efforts

The adaptation of the Moodle along institutionally specified requirements in Case 1 was almost absent as no document could be located detailing specific rules and procedures for incorporation, nor was any oral information given to the Moodle administrator in this respect. The most visible adaptation was the homepage where the institution's logo had been embedded, a configuration for faculty to setup their own course sites, access via institutional email, and weekly outline of topics in a course. There was a lingering issue of management' expectation of faculty members setting up their own course sites, developing their courseware and

instruction manuals for online delivery not being resolved. In addition, although training was envisaged and planned, participation and enforcement were poorly done, causing any benefit that could have been derived to be missed. Though there were intentions to provide totally online education, it was unclear how the current learning platform was going to be integrated with other important processes to be supported by institutional IS.

Case 2 clearly had a thoroughly thought-out plan of modifying the Moodle LMS to suit institutional requirements. Through a substantive period of testing, the system was identified to be capable of providing the needed support for the institution's delivery of OU services. Carefully considered rules were subsequently programmed into the Moodle's functionalities to ensure clarity of institutional requirements and processes. For all users therefore, access and use was an indication of what can and cannot be done on the system. The institution took responsibility for setting up course sites, courseware and instruction manual to avoid any resistance and delays. Planned trainings were strategically implemented and enforced giving no room for excuses. Due to the OU vision, future integrations with other systems had already been determined and were being tested behind the scenes. The Moodle application therefore had been integrated with the institution's processes, rules and logic, and was constantly being assessed for more modifications.

With Case 3, the deployed Moodle had very little adjustments made to the functionalities provided. Very little by way of institutional requirements could be identified to have been incorporated into the Moodle. Though the course sites were to be setup by the Moodle manager, the courseware and instructional manuals were to be developed and populated on the platform by the lecturers. Training was identified to be an important requirement for the successful deployment of the Moodle institution-wide. Initial trainings organized were well attended by faculty members although actual use by many of these lecturers is yet to be seen. In addition, no clear plan has been identified in terms of how this platform would be integrated with other institutional information systems in the future although this may happen.

In the instance of Case 4, assistance was received from an external facilitator in the setting up of the Moodle. The system was set up without much consideration of the institutional requirements. The initial setup was to enable the piloting of two courses. This was to enable experience to be gained to inform subsequent roll-out of other courses. The faculty members involved were to develop the courseware and instructional manual. Assistance was provided

by the project team and external facilitator. Training was also provided to enable them use the Moodle effectively. The training segment was in particular identified to be crucial for effective use of the Moodle but participation in them required selection by the project team based on assessment. Participation by faculty at these training sessions also appeared not to be mandatory with little consequence for non-participation. It was also unclear whether or not there would be future integrations with other institutional information systems. Presently, the concentration was just on getting the Moodle to be used.

## 7.5 Initial Use stage

This stage captures first time use of the LMS for institutionally sanctioned tasks. A careful observation of this stage highlights how institutional requirements for use were adhered to and to what extent. While some institutions chose to pilot initial use by either getting some programmes (e.g. Case 2), courses (e.g. Case 1, Case 4), to be used for the first time, others preferred to roll all institutional programmes (e.g. Case 1) at the same time. Below we highlight some similarities and differences identified among the cases studied.

| Evaluative terms | Meaning | Value |
|---|---|---|
| Poor use | Users fail to use LMS as expected; Use of LMS features falls far below institutional expectations | 1 |
| Unremarkable use | Few users use the LMS as a repository for course materials; use is below institutional expectation | 2 |
| Moderate use | Sizeable number of users across all programmes use the LMS as expected; use of LMS features meets institutional expectation | 3 |
| Remarkable use | All users across all programmes use the LMS as expected; use of LMS exceeds institutional expectation | 4 |
| Outstanding use | Some users demonstrate exceptional use of the LMS beyond institutional expectation; use of LMS as expected by the institution is exceptional | 5 |

Table 54: Initial use scale

| s/n | Institution (cases) | Score |
|---|---|---|
| 1 | Case 1 | 2 |
| 2 | Case 2 | 4 |
| 3 | Case 3 | 3 |
| 4 | Case 4 | 3 |

Table 55: Institutional Initial use efforts

The initial use for Case 1 was unplanned. No strategy was used to roll out the LMS for use. All programmes at the undergraduate and postgraduate levels were required to start at the same time. The outcome was that no undergraduate programme was ever delivered on the platform. At the graduate level, the system was used as a document repository where course materials were stored for students to download. Use at the postgraduate level gradually declined while even though some undergrad courses were mounted onto the platform, they were never used. After almost two years, an e-learning specialist was hired to lead the institutional development and within two months, eight (8) undergraduate courses were being piloted. This number gradually increased to 25 in the next semester, an indication that users are gradually accepting the LMS as required by management.

Case 2 had a clear strategy for rolling out the use of the LMS. The initial intent was for it to be used by the distant students. All courses and programmes for the masters' programmes were therefore to be deployed on the Moodle. This was successfully done with all students and faculty members using the platform to conduct their institutionally authorized tasks. It was later decided that on-campus students should be supported with the system in a blended mode. This was also rolled out successfully with all instructors and students using the platform as expected.

In Case 3's situation, the initial use saw faculty members and at the graduate school utilize the platform to support students' learning. This was a requirement by the graduate school which made it impossible to lecture there without use of the Moodle. Subsequently, after the adoption of the ICT policy, all programmes in the institution were required to have an online presence on the Moodle. The heads of departments were required to enforce this directive by making sure all faculty members made their course outlines available for the Moodle administrator to place in the course sites. Currently all undergraduate programmes and postgraduate programmes have course sites created on the Moodle. However it was only at the postgraduate level that the platform was being utilized.

Case 4 from the very beginning decided to roll out the use of the Moodle through piloting. This was to enable lessons to be learnt to aid in appropriate design and resolution of challenges. The first two courses piloted were computer related and offered at the undergraduate and postgraduate levels respectively. This was in the second semester of the academic year. The faculty and students engaged in the pilot use subsequently identified a number of issues

that needed to be improved upon. These were subsequently addressed and factored into the next semester's setup of the same courses. More courses were added gradually with most of them offered at the main campus of the institution. Possibly, this can be attributed to the high presence of the project leaders on the main campus. Use by instructors was in line with the requirements of the institution as provided through the training sessions.

## 7.6 Acceptance stage

A careful monitoring and evaluation of users first time use can help an institution assess users' acceptance of the LMS for institutional actions. Users' compliance with institutional directives to use can show how users feel about the LMS introduction and requirement for use. This can enable the institution to put in place measures that can induce members to use the platform with little or no resistance. The higher the number of users using the system in the institutionally mandated way, the higher the acceptance. Using the following scale, we compare the similarities and differences identified among the cases.

| **Evaluative terms** | **Meaning** | **Value** |
|---|---|---|
| Poor acceptance | Users resist usage; no institutional inducement to use commitment | 1 |
| Low acceptance | Few users show signs of acceptance; infrequent use of LMS; unclear institutional inducement to use commitment | 2 |
| Satisfactory acceptance | Users show signs of acceptance; frequent use of LMS; some clarity in institutional inducement to use commitment | 3 |
| High acceptance | Users show high acceptance; more frequent use of LMS; high clarity in institutional inducement strategy to use | 4 |
| Very high acceptance | Users show very high acceptance behaviours; very high frequent use of LMS; very high clarity in institutional inducement strategy to use | 5 |

Table 56: Acceptance scale

| **s/n** | **Institution (cases)** | **Score** |
|---|---|---|
| 1 | Case 1 | 2 |
| 2 | Case 2 | 4 |
| 3 | Case 3 | 2 |
| 4 | Case 4 | 3 |

Table 57: Institutional Acceptance efforts

There was a clear indication of low acceptance levels of the LMS among the expected users in Case 1. From the initial roll out, only two faculty members were seen to show enthusiasm for use of the system at the graduate level. Later when some undergrad faculty members made their course materials available for placement online, evidence shows they never once visited the Moodle to see what was going on there. No inducement was introduced by the institution to motivate use and acceptance as management believed use of the platform for teaching and learning was part of a faculty member's responsibilities.

In Case 2, recruitment as an instructor or student was dependent on the agreement to use the Moodle for institutionally authorized tasks. Training was then provided and users tested to ensure proficiency and competency in use of the platform. Acceptance was therefore mandatory and over time, users have come to accept the system as an integral part of the institution and their core tasks. The frequency of use in this institution was high as management constantly monitored and enforced usage.

Although some faculty members in Case 3 showed enthusiasm, use of the Moodle by many was in compliance with management directive. Their use of the LMS was there infrequent and characterized mostly by placement of course resources for student access. No clear plans could be readily identified from the institution indicating willingness to induce members to commit to use. Those who were using the platform actively could be described as enthusiasts who out of perceived usefulness of the platform are motivated to use.

Case 4 had the advantage of external funding both technically and financially. Users in the pilot phase were therefore financially motivated to participate in the development of courseware and use of the Moodle for teaching and learning purposes. The inclusion of more faculty members in developing courseware for various courses also attracted some financial remuneration which also motivated the participants. Either for the financial benefits or other reasons, many other faculty members were ready to participate in the courseware development. Those involved also used the LMS frequently in the delivery of their courses. This was however during the period the institution was receiving the external support for the project. Beyond that, there was no indication of an institutional agenda to continue the inducement for sustainability purposes.

## 7.7 Routinization stage

This stage highlights institutional efforts aimed at getting the use of the LMS to be integrated into the institution's processes. Not only would those required to use the system use it for the intended purposes, but also, the frequency of use would be high due to their inability to perform institutional tasks without the system. For institutions which have been in existence for a while before the introduction of the LMS, governance systems relating to teaching and learning would need to be changed to take into consideration the use of the LMS. When use of the LMS is considered as a core component of the daily activities of the institution, the system would be deemed to have been routinized. Below we consider the various cases' performance at this stage.

| Evaluative terms | Meaning | Value |
|---|---|---|
| Hardly ever | Expected users hardly use LMS for teaching and learning purposes; no institutional encouragement to use; no change in governance structure | 1 |
| Occasionally | Expected users occasionally use LMS for teaching and learning purposes; insignificant institutional encouragement to use; little change in governance structure | 2 |
| Sometimes | Expected users sometimes use LMS for teaching and learning purposes; some institutional encouragement to use; some change in governance structure | 3 |
| Frequently | Expected users frequently use LMS for teaching and learning purposes; high institutional encouragement to use; high change in governance structure | 4 |
| Almost always | Expected users almost always use LMS for teaching and learning purposes; very high institutional encouragement to use; very high change in governance structure | 5 |

Table 58: Routinization scale

| s/n | Institution (cases) | Score |
|---|---|---|
| 1 | Case 1 | 2 |
| 2 | Case 2 | 5 |
| 3 | Case 3 | 3 |
| 4 | Case 4 | 2 |

Table 59: Institutional Routinization efforts

The expected users in Case 1 were not motivated to use the Moodle platform for teaching and learning purposes. As such use was occasional by very few of the users although all faculty members were expected to use the system. Despite the on-going nature of use, the institution

did very little aside issue directives for use which also were not enforced by management. A significant but of little effect change in the governance structure was the creation of an online teaching and learning centre that provided training and support for users. This unit however had little power to enforce usage.

Case 2 had all users using the Moodle to perform authorized tasks. Since the system was developed with institutional requirements, the governance structure of the institution revolved around the system's usage. From recruitment to actual teaching and learning, to the generation of reports for meetings, transcripts, etc. use of the platform was central. Users were encouraged to use the system as that was the only way to get things done within the institution. To accomplish this, management put in place a monitoring and enforcement system which ensured that those not found complying with institutional requirements were brought in line.

With Case 3, instructors at the graduate level were observed to be using the LMS for teaching and learning purposes. This was made compulsory by the dean of the School who coincidentally was a strong enthusiast. Encouragement to use the platform was therefore undertaken at this level with institution-wide initiatives yet to be launched. With the exception of a policy on the use of the Moodle for computer-based examination which had been approved and in enforcement, a policy on e-learning was yet to be approved. This would more formally highlight areas of governance which would be affected by the use of the LMS. No clear strategy however could be observed for the routinization of the Moodle into the institution's daily activities.

Due to the pilot nature of Case 4's implementation of the Moodle, users were yet to become comfortable with using the platform as part of their everyday teaching and learning support. At the institutional level, attention seemed to be focused on successfully meeting the funding organization's requirements for successful implementation than integrating the platform's use into the day to day activities of teaching and learning. Nothing about current institutional governance seemed to have changed to incorporate the use of the Moodle in teaching and learning.

## 7.8 Infusion stage

At the infusion stage, the institution is seen to be more efficient as it is now able to deliver institutional services in a timely and effective manner using same or less resources as compared to previously. More students can be served more quickly utilizing different delivery options. Higher level aspects of institutional work can now be realized due to the system's support of critical institutional functions. In addition, more users and features of the LMS capitalize this stage leading to higher levels of efficiency and effectiveness. The various cases similarities and differences are considered below.

| Evaluative terms | Meaning | Value |
|---|---|---|
| Very low efficiency | Institution still spends time processing and supporting students' academic needs manually; use of more features of the LMS in traditional education absent; use of LMS for non-traditional education absent | 1 |
| Low efficiency | Institution supports the processing and supporting of students' academic needs with IS but not in an integrated way; occasional use of more LMS features in traditional education; use of LMS for non-traditional education unclear | 2 |
| Moderate efficiency | Institution supports the processing and supporting of students' academic needs with IS in an integrated way; use of more LMS features every now and then in traditional education; use of LMS for non-traditional education clear | 3 |
| High efficiency | Institutional support for the processing and supporting of students' academic needs is integrated and a core part of institutional work; very frequent use of more LMS features in traditional education; use of LMS for non-traditional education very clear | 4 |
| Very high efficiency | Use of LMS is critical for providing and supporting students' academic needs in an integrated way in both traditional and non-traditional educational programmes. Difficult to separate the LMS from the institution. | 5 |

Table 60: Infusion scale

| s/n | Institution (cases) | Score |
|---|---|---|
| 1 | Case 1 | 2 |
| 2 | Case 2 | 5 |
| 3 | Case 3 | 2 |
| 4 | Case 4 | 2 |

Table 61: Institutional Infusion efforts

Although there were a number of IS like the students' registration system, an accounting system, an online journal and students' institutional e-mail, these were not being used to provide and support students' needs in an integrated way. Such integrations would usually use a single log-on access that enables linked processes to be accessed and completed with ease and little human intervention. In addition, even though not all faculty members were using the LMS as required by the institution, the few that did also did not utilize many of the features of the LMS. The functions utilized included courseware repository, quizzes and forums. Although the minimal features being used are useful, an increase in the application of different features by instructors in different aspects of their courses could stimulate and address the different needs of students in a more effective way. Another important consideration is the use of the LMS for delivering non-traditional programmes as in online education, distant education support, etc. Although management intended the LMS to be used in supporting programmes being offered in their other campuses both within and outside the country, no clear strategy could be identified for realizing this agenda. The higher institutional work could therefore not be facilitated by the LMS as anticipated by the management. Nonetheless, management's decision to introduce an educational resource planning system earlier is an indication of its determination to achieve an integration of all there information systems to enable higher institutional work to be achieved.

Through careful planning and strategizing, Case 2 was able to attain a level of embeddedness where the LMS was critical to its operations. Although initially intended for distant learners, the LMS was successfully being used to support on-campus students' learning and other needs in an integrated way. More features were also being used by instructors to deliver their courses due to the regular training and refresher courses provided by the institution every semester. Instructors were therefore kept reminded about the various features and how they could be applied to support teaching and learning activities. This was very instrumental in getting more features used. Currently, the institution is preparing to deliver fully online learning and on demand examination through their systematic integration of all institutional IS. High level institutional work is being achieved through this integration as core institutional work is being supported by the use of the LMS.

In Case 3, there was the evidence of other information systems being used to support students' registration and other needs like examination and transcript generation. However this was not in an integrated way so as to save time and resources. Although course sites for all

undergraduate and postgraduate programmes had been setup, use of the platform was by faculty members teaching at the graduate level. Aside some enthusiastic users who explored the platform's functionalities, use by many of the lecturers was mostly for courseware storage and access. The weekend and distance programmes were also supported with the platform. However there was little clarity about delivering fully online programmes on the Moodle platform.

In Case 4, there was also evidence of other IS being used to support students' registration and other needs like students' account, exams and transcripts database. However these were not being used in an integrated way. Preoccupation seemed to be with getting the Moodle to be used by all members of the institution to support teaching and learning with little consideration for integrating the platform with other institutional IS to enable higher institutional work to be accomplished. Current attention was focused on using the Moodle for supporting campus-based programmes at both masters and undergraduate level in addition to sandwich programmes based on campus. With most of the campus-based programmes being offered in the distance programme, courseware developed for the campus-based would also be made available for the distance programmes. However, fully online programmes had not been considered as yet.

## 7.9 An analysis of the various factors identified in the various cases according to the stages in the research framework used.

In the tables below, contextual factors identified in each stage of the cases have been highlighted to enable a comparison of the similarities and differences to be made. In addition the tables highlight the factor categories and strengths of the factors. The factor strengths show how influential the factors identified were deemed to be by some of the major players in the various institutions' implementation process. As can be observed, some of the factors have been categorized into two or three different categories to highlight how variedly the can be considered. For example in the table below (Case 1), the 'enthusiastic IT staffs' factor could have been categorized under organizational factor, an individual or a technological factor depending on the focus of analysis. In this research, the identification of the factor and their influence on the various institutions' implementation processes was the focus.

### 7.9.1 Initiation stage: Facilitating factor comparison of the 4 cases in the study

Table 62: Case 1

| Facilitating Factors in the initiation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Management support and commitment | Organisational | | | | | √ |
| 2. Enthusiastic IT staffs | Organisational/Individual/Technological | | | | √ | |
| 3. Training in Moodle administration for e-learning | Organizational | | | | √ | |

Table 63: Case 2

| Facilitating Factors in the initiation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Institutional Leadership | Organisational | | | | | √ |
| 2. Management support and commitment | Organisational | | | | | √ |
| 3. Experienced ITdevelopment team | Technological | | | | √ | |
| 4. External support and advise | Environmental | | | | √ | |

Table 64: Case 3

| Facilitating Factors in the initiation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. External collaboration | Environmental | | | | √ | |
| 2. Enthusiastic IT team | Organisational/Technological/Individual | | | | √ | |
| 3. External IT support | Technological/Environmental | | | | | √ |
| 4. External e-learning facilitator | Environmental/Task | | | √ | | |
| 5. Moodle Training | Task/Technological | | | | | √ |

Table 65: Case 4

| Facilitating Factors in the initiation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. External programme support | Environmental | | | | | √ |
| 2. Management support | Organisational | | | | | √ |
| 3. Experienced e-learning coordinators | Organisational/Task | | | | √ | |
| 4. Existing IT infrastructure | Technological | | | √ | | |
| 5. Detailed planning | Organisational | | | | √ | |

## 7.9.2 Initiation stage: Inhibiting factor comparison of the 4 cases in the study

Table 66: Case 1

| Inhibiting Factors in the initiation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Lack of adequate involvement of stakeholders | Organizational | | | | | √ |
| 2. Failure to adequately address faculty concerns | Organisational | | | | √ | |
| 3. Lack of clarity in institutional e-learning vision | Organizational | | | | √ | |
| 4. Failure to assess faculty readiness | Organizational | | | | √ | |
| 5. Poor coordination of people and activities | Organizational | | | | √ | |
| 6. Failure to assess institutional readiness | Organizational | | | | √ | |
| 7. Absence of change management strategy | Organizational | | | | √ | |
| 8. Inadequate supply of internal technical expertise in e-learning and Moodle | Technology & Task | | | | | √ |

Table 67: Case 2

| Inhibiting Factors in the initiation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Inadequate IT development staff | Organisational/Technological | | | | √ | |
| 2. Delays in LMS development time | Technological | | | | √ | |

Table 68: Case 3

| Inhibiting Factors in the initiation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Lack of experienced e-learning technical staff | Task/Organisational/Technological | | | | √ | |
| 2. Absence of clear institutional e-learning vision | Organisational | | | | | √ |
| 3. Lack of experienced e-learning faculty | Task/Individual | | | √ | | |

Table 69: Case 4

| Inhibiting Factors in the initiation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Cumbersome procurement laws | Environmental | | | | | √ |
| 2. Numerous institutional activities | Organisational | | | | | √ |

7.9.3 Adoption-decision stage: Facilitating factor comparison of the 4 cases in the study

Table 70: Case 1

| Facilitating Factors in the adoption-decision stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Management acceptance of proposed IT solution | Organizational | | | | √ | |
| 2. Training of IT staff in Moodle administration | Organizational/Technological | | | | √ | |

Table 71: Case 2

| Facilitating Factors in the adoption-decision stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Prior test and experimentation with the Moodle LMS | Technological | | | | √ | |
| 2. Large Moodle community support all over the world | Environmental/Technological | | | | √ | |
| 3. Open source and free | Technological | | | √ | | |
| 4. Popular among many prominent HEIs all over the world | Environmental | | | | √ | |

| Facilitating Factors in the adoption-decision stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| 5. Customizable to institutional business processes | Technological | | | | | √ |
| 6. Institutional Leadership | Organisational | | | | | √ |
| 7. Management support and commitment | Organisational | | | | | √ |
| 8. Experienced Moodle development team | Technological/Individual | | | | √ | |
| 9. External support and advise | Environmental | | | | √ | |

Table 72: Case 3

| Facilitating Factors in the adoption-decision stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Experienced Moodle managers | Organisational/Technological | | | | | √ |
| 2. Demand for technology support in T&L | Task/Individual | | | | √ | |
| 3. External community of practice | Environmental | | | | √ | |
| 4. Top management involvement and support | Organisational | | | | √ | |
| 5. Conduct of a need assessment research | Organisational/Task | | | √ | | |
| 6. Demand for technology supported examination | Task/Organisational | | | | √ | |
| 7. Development of an ICT policy | Organisational | | | | √ | |

Table 73: Case 4

| Facilitating Factors in the adoption-decision stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Management support | Organisational | | | | | √ |
| 2. Supportive institutional structures | Organisational | | | √ | | |
| 3. Existing institutional ET strategic agenda | Organisational | | | | √ | |
| 4. External support | Environmental | | | | | √ |

### 7.9.4 Adoption-decision stage: Inhibiting factor comparison of the 4 cases in the study

Table 74: Case 1

| Inhibiting Factors in the adoption-decision stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Inadequate demonstration of the systems functionalities | Technological | | | | √ | |
| 2. Failure to demonstrate the systems application to specific learning contexts | Technology/Task | | | | √ | |
| 3. Absence of LMS demonstration to actual users | Technological/Individual | | | | √ | |
| 4. Lack of adequate involvement of stakeholders | Organizational | | | | √ | |
| 5. Failure to adequately address faculty concerns | Organisational | | | | | √ |
| 6. Lack of clarity in institutional e-learning vision | Organizational | | | | | √ |
| 7. Failure to assess faculty readiness | Organizational | | | | √ | |
| 8. Poor coordination of people and activities | Organizational | | | | √ | |
| 9. Failure to assess institutional readiness | Organizational | | | | √ | |
| 10. Absence of change management strategy | Organizational | | | | √ | |
| 11. Inadequate supply of internal technical expertise in e-learning and Moodle | Technology/Task | | | | | √ |

Table 75: Case 2

| Inhibiting Factors in the adoption-decision stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Extended system development time | Technological | | | | √ | |
| 2. Courseware development time | Task | | | √ | | |

Table 76: Case 3

| Inhibiting Factors in the adoption-decision stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Financial constraint | Organisational | | | | | √ |

| Inhibiting Factors in the adoption-decision stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| 2. Lack of holistic institutional consideration of issue | Organisational | | | | √ | |
| 3. Inadequate assessment of institutional IT infrastructure | Organisational | | | √ | | |

Table 77: Case 4

| Inhibiting Factors in the adoption-decision stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Inadequate computer facilities | Technological | | | | | √ |
| 2. Inexperienced online tutors and students | Individual | | | | | √ |

### 7.9.5 Adaptation stage: Facilitating factor comparison of the 4 cases in the study

Table 78: Case 1

| Facilitating Factors in the adaptation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Readily available and customizable LMS solution | Technological | | | | √ | |
| 2. Large community of LMS product support globally | Technological/ Environmental | | | | √ | |
| 3. Trained institutional Moodle administrator | Organisational/Technological | | | | √ | |
| 4. Available IT technical support | Technological/Organisational | | | | √ | |
| 5. Availability of external host services | Technological/Environmental | | | | √ | |
| 6. Available courseware for PG programmes | Task | | | | | √ |
| 7. One-on-one training strategy | Organisational/Task | | | | | √ |

Table 79: Case 2

| Facilitating Factors in the adaptation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Management support and commitment | Organisational | | | | | √ |
| 2. Institutional Leadership | Organisational | | | | | √ |
| 3. Availability of technical staff | Organisational/Technological | | | | | √ |

| Facilitating Factors in the adaptation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| 4. External support (technical & advisory) | Environmental | | | | √ | |
| 5. Knowledge of core institutional processes to be supported | Organisational/Task | | | | | √ |
| 6. Institutionally developed courseware | Task | | | | | √ |
| 7. Institutional setup of course sites | Technological | | | | | √ |
| 8. Provision of training and testing for all users | Organisational/ Task | | | | | √ |

Table 80: Case 3

| Facilitating Factors in the adaptation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Experience in web application development | Technology/Individual | | | | √ | |
| 2. External support from webhost | Technology/Environmental | | | | | √ |
| 3. Training in Moodle management | Technology/Task | | | | | √ |
| 4. Support from collaborating institution | Environmental | | | | √ | |
| 5. Top management support | Organisational | | | | √ | |

Table 81: Case 4

| Facilitating Factors in the adaptation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. External support | Environmental | | | | | √ |
| 2. Capacity building workshops | Organisational/Task | | | | | √ |
| 3. Courseware development | Task | | | | | √ |
| 4. Pre-determined roll-out strategy | Organisational/Task | | | | √ | |

### 7.9.6 Adaptation stage: Inhibiting factor comparison of the 4 cases in the study

Table 82: Case 1

| Inhibiting Factors in the adaptation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. External power challenges | Environmental | | | | √ | |

| Inhibiting Factors in the adaptation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| 2. Lack of cooperation from faculty | Individual | | | | | √ |
| 3. Absence of managerial enforcement of directives | Organisational | | | | | √ |
| 4. Lack of adequate involvement of stakeholders | Organizational | | | | √ | |
| 5. Institutional T&L format clearly not considered | Task | | | | √ | |
| 6. Inadequate training for LMS technical staff | Technological/Organisational | | | | | √ |

Table 83: Case 2

| Inhibiting Factors in the adaptation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Inadequate technical staff | Organisational/Technological | | | | √ | |
| 2. Extended system development time | Technological | | | | √ | |
| 3. Accreditation challenge | Environmental | | | √ | | |

Table 84: Case 3

| Inhibiting Factors in the adaptation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Financial constraint | Organisational | | | | | √ |
| 2. Lack of instructional technologists and e-learning experts | Task | | | | √ | |
| 3. Inadequate IT/e-learning support staff | Organisational/Technology | | | | | √ |
| 4. Absence of strategy for training in e-learning use | Organisational/Task | | | | √ | |

Table 85: Case 4

| Inhibiting Factors in the adaptation stages | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Procurement barriers | Environmental | | | | √ | |
| 2. Delays in courseware development | Task | | | | | √ |

### 7.9.7 Initial use stage: Facilitating factor comparison of the 4 cases in the study

Table 86: Case 1

| Facilitating factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Available courseware for post-graduate courses | Task | | | | √ | |
| 2. Faculty one-on-one training strategy | Organisational | | | | √ | |
| 3. Faculty members engagement with students | Task/Individual | | | | √ | |
| 4. Access to computer labs and internet on campus | Technological/Organisational | | | | | √ |

Table 87: Case 2

| Facilitating factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Compulsory use requirement | Organisational/Task | | | | | √ |
| 2. Ready to use LMS | Technological/Task | | | | √ | |
| 3. Available technical and user support | Technological | | | | √ | |
| 4. Integration of LMS into all aspects teaching and learning | Technological/ Task | | | | | √ |
| 5. Provision of training and testing for on-campus students and faculty | Organisational | | | | √ | |
| 6. Institutional commitment to LMS use | Organisational | | | | | √ |

Table 88: Case 3

| Facilitating factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Support and training from collaborating institution | Environmental/Task | | | | √ | |
| 2. Management support | Organisational | | | | √ | |
| 3. Available technical and e-learning support | Technology/Task | | | | | √ |
| 4. Increasing faculty interest | Individual | | | | √ | |
| 5. Creation of online examination lab | Technology/Organisational | | | √ | | |

Table 89: Case 4

| Facilitating factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Motivated instructors | Individual | | | | √ | |
| 2. Lessons from pilot phase | Task | | | | √ | |
| 3. Modification of curriculum | Task | | | √ | | |
| 4. Internal support | Organisational | | | | √ | |
| 5. External support | Environmental | | | | | √ |

### 7.9.8 Initial use stage: Inhibiting factor comparison of the 4 cases in the study

Table 90: Case 1

| Inhibiting factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Students' use of system characterized by document download | Individual | | | √ | | |
| 2. Low usage by faculty members | Individual | | | | √ | |
| 3. None use by faculty at the undergraduate level | Individual | | | | | √ |
| 4. Management' none enforcement of use | Organisational | | | | | √ |
| 5. Lack of motivation among faculty | Individual/Organisational | | | | | √ |
| 6. Lack of adequate training for faculty members | Organisational | | | | √ | |
| 7. Poor preparation by faculty | Organisational/Task | | | | √ | |

Table 91: Case 2

| Inhibiting factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Turnover of technical staff | Organisational/Technological | | | | | √ |
| 2. Trust issues | Individual/Organisational | | | | | √ |
| 3. Challenges with some faculty members | Individual | | | √ | | |
| 4. Behavioural threats of some students | Individual | | | | √ | |
| 5. Technical challenges | Technological | | | | √ | |

Table 92: Case 3

| Inhibiting factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Destruction of online examination lab by fire | Organisational/Technology | | | √ | | |
| 2. Lack of institutional motivation to use Moodle | Organisational | | | | √ | |

Table 93: Case 4

| Inhibiting factors in the initial use stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Inadequate consideration of pedagogical principles and models | **Task** | | | | √ | |
| 2. Lack of adequate computer resources | Technology | | | | | √ |
| 3. Low technology competencies among students | Individual | | | | √ | |
| 4. Low technology competencies among academics | Individual | | | | √ | |
| 5. Inadequate motivation | Organisational | | | | | √ |
| 6. Negative institutional culture | Organisational | | | | | √ |

### 7.9.9 Acceptance stage: Facilitating factor comparison of the 4 cases in the study

Table 94: Case 1

| Facilitating factors in acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Procurement of tablets for faculty | Organisational/Task | √ | | | | |
| 2. Recruitment of an educational technologist | Organisational/Task | | | | | √ |
| 3. Establishment of an online centre | Organisational | | | | | √ |
| 4. Recruitment of instructional support staff | Organisational | | | | | √ |
| 5. Provision of specialized training | Organisational | | | | √ | |
| 6. Awareness creation for students | Organisational/Task | | | | √ | |
| 7. Piloting of selected courses | Task | | | | | √ |

Table 95: Case 2

| Facilitating factors in acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Top management support and commitment | Organisational | | | | | √ |
| 2. External advise and support | Environmental | | | √ | | |
| 3. Provision of training for users | Organisational | | | | √ | |
| 4. Compulsory institutional requirement for employment and admission | Organisational | | | | √ | |

Table 96: Case 3

| Facilitating factors in acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Perceived usefulness of the Moodle by faculty members | Task/Technology | | | | √ | |
| 2. Management support | Organisational | | | | √ | |
| 3. Increasing faculty interest | Individual | | | | √ | |
| 4. Motivated IT/e-learning leadership | Organisational | | | | | √ |

Table 97: Case 4

| Facilitating factors in acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Capacity building | Task/Organisational | | | | | √ |
| 2. Management support | Organisational | | | | √ | |
| 3. Incentives and motivational packages | Environmental | | | | √ | |

### 7.9.10 Acceptance stage: Inhibiting factor comparison of the 4 cases in the study

Table 98: Case 1

| Inhibiting factors in acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Lack of management enforcement of faculty use | Organisational | | | | | √ |
| 2. Lack of clarity in management e-learning vision | Organisational | | | | | √ |
| 3. Unaddressed faculty concerns | Individual/Organisational | | | | √ | |
| 4. Challenges with internet access on campus | Technological | | | | √ | |

Table 99: Case 2

| Inhibiting factors in acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Challenges with some faculty members | Individual | | | √ | | |
| 2. Behavioural threats of some students | Individual | | | | √ | |
| 3. Technical challenges | Technological | | | √ | | |

Table 100: Case 3

| Inhibiting factors in acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Inadequate IT/e-learning support staff | Organisational/Task/Technological | | | | | √ |
| 2. Delays in approving draft policies | Organisational | | | | √ | |

Table 101: Case 4

| Inhibiting factors in acceptance stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Poor connectivity and power cuts | Technological/Environmental | | | | | √ |
| 2. Academic' time demands | Task/Individual | | | | | √ |
| 3. Inadequate IT infrastructure | Technological/Organisational | | | | | √ |
| 4. Inadequate technical support | Organisational/Technological | | | | √ | |

### 7.9.11 Routinization stage: Facilitating factor comparison of the 4 cases in the study

Table 102: Case 1

| Facilitating factors in the routinization stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Development of an online resource website for the centre | Organisational/Task | | | | √ | |
| 2. Development of an instructional manual | Task | | | | √ | |
| 3. Development of an institutional e-learning policy | Organisational | | | √ | | |
| 4. Provision of online certification training | Organisational/Task | | | | √ | |
| 5. Support for faculty courseware development | Task | | | | √ | |
| 6. Clarity in institutional e-learning vision | Organisational | | | √ | | |
| 7. New ERP integrated with an LMS | Technological | | | √ | | |

Table 103: Case 2

| Facilitating factors in the routinization stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Mandatory periodic training of faculty | Organisational | | | | | √ |
| 2. Orientation and regular sensitization of students | Organisational | | | | √ | |
| 3. Mandatory assessment of course sites every semester | Task/Organisational | | | | | √ |
| 4. Compulsory medium for performing institutionally mandated tasks | Task/Organisational | | | | | √ |
| 5. Conscious reference to the system by all stakeholders | Organisational/ Individual | | | √ | | |

Table 104: Case 4

| Facilitating factors in the routinization stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Available institutional capacity | Task/Organisational | | | | √ | |
| 2. Management commitment and support | Organisational | | | | √ | |
| 3. Draft educational technology (ET) strategy policy | Organisational | | | | | √ |
| 4. Establishment of an ET unit | Organisational | | | | | √ |

## 7.9.12 Routinization stage: Inhibiting factor comparison of the 4 cases in the study

Table 105: Case 1

| Inhibiting factors in the routinization stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Lack of managerial enforcement of directives | Organisational | | | | | √ |
| 2. Unaddressed faculty concerns | Individual/Organisational | | | | √ | |
| 3. Conflicting decision to introduce new LMS | Organisational/Technological | | | | | √ |
| 4. Lack of involvement of IT staff in development of ERP | Technological/Organisational | | | | √ | |

Table 106: Case 2

| Inhibiting factors in the routinization stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Slow development time | Technological | | | √ | | |
| 2. Inadequate requisite technical expertise | Technological/Organisational | | | | √ | |
| 3. Technical challenges | Technological | | | | √ | |
| 4. Threat by hackers | Environmental | | | | √ | |

Table 107: Case 4

| Inhibiting factors in the routinization stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Poor IT infrastructure | Technological | | | | | √ |
| 2. Inadequate motivation | Organisational | | | | | √ |
| 3. Poor internet connectivity and power cuts | Technology/Environmental | | | | | √ |

### 7.9.13 Infusion stage: Facilitating factor comparison of the 4 cases in the study

Table 108: Case 2

| Facilitating factors in the infusion stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Support and commitment of management | Organisational | | | | | √ |
| 2. Monitoring and enforcement of use by management | Organisational | | | | | √ |
| 3. Mandatory regular training of faculty members | Organisational | | | | √ | |
| 4. Trust in the stability and security of the LMS | Individual/Technological | | | | √ | |

Table 109: Case 4

| Facilitating factors in the infusion stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Management commitment and support | Organisational | | | | √ | |
| 2. Draft ET strategy policy | Organisational | | | | √ | |
| 3. Establishment of ET unit | Organisational | | | | √ | |

### 7.9.14 Infusion stage: Inhibiting factor comparison of the 4 cases in the study

Table 110: Case 2

| Inhibiting factors in the infusion stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Trust issues | Individual/Organisational | | | | √ | |
| 2. Technology cost | Organisational | | | | √ | |

Table 111: Case 4

| Inhibiting factors in the infusion stage | Factor category | Factor strength | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1. Poor IT infrastructure | Technological | | | | | √ |
| 2. Inadequate motivation | Organisational | | | | | √ |
| 3. Poor connectivity and power cuts | Technological/Environmental | | | | | √ |

In the table below, the outputs of each of the cases are displayed. These are the outcomes of each of the stages. A lot of similarities can be identified in the outcomes. For example at the adoption-decision stages, stage 2, each institution had adopted an open source platform, Moodle as the institutional LMS. The same can be observed in the stage 3 of all the cases where the Moodle systems had been configured and were available for use at different levels of each institution. As can be observed again, only Case 2 had reached a state of infusion as its management had displayed a high level of institutional leadership.

Table 112: A comparison of the outputs of each stage for each of the 4 Cases

| Stages | Case 1: | Case 2: | Case 3: | Case 4: |
|---|---|---|---|---|
| Stage 1 | Report on LMS evaluation | Institutionally defined LMS requirements | Use of Moodle for a Master' programme collaboration | Detailed plans for introducing e-learning through PHEA support |
| Stage 2 | Adoption of Moodle and appointment of administrator | Adoption of an institutional LMS – Moodle | Adoption of Moodle as institutional LMS | Institutional decision to introduce e-learning support using Moodle |
| Stage 3 | Working institutional LMS | Functional institutional LMS | Availability of Moodle for institutional use | Moodle available for pilot test |
| Stage 4 | Non-use of Moodle by faculty; drop in use by students | Use of Moodle by all faculty members and students | Growing institutional interest and use of Moodle | Institutional experience of Moodle usage in blended learning |
| Stage 5 | Growing acceptance of e-learning among faculty | Mandatory use of institutional LMS | Growing acceptance within institution | Growing acceptance of Moodle for supporting teaching and learning |
| Stage 6 | Gradual routinization of e-learning practices | Moodle use perceived as normal | | Gradual change in governance structure |
| Stage 7 | | Integrated use of Moodle for teaching, learning and support services | | |

In the following sections, a comparison of the above factors by cases is presented.

## 7.10 A comparison of the factors identified in the four case studies

### Table 113: Initiation stages facilitators

| **Facilitating Factors in the initiation stages** | | | |
|---|---|---|---|
| **Case 1:** | **Case 2:** | **Case 3:** | **Case 4:** |
| 1. Management support and commitment | 1. Institutional Leadership | 1. External collaboration | 1. External programme support |
| 2. Enthusiastic IT staffs | 2. Management support and commitment | 1. Enthusiastic IT team | 2. Management support |
| 3. Training in Moodle administration for e-learning | 3. Experienced development team | 3. External IT support | 3. Experienced e-learning coordinators |
| | 4. External support and advise | 4. External e-learning facilitator | 4. Existing IT infrastructure |
| | | 5. Moodle Training | 5. Detailed planning |

From the table above, a number of similar factors can be observed in the initiation stages of the cases. Though similar in nature, their contextual influences are different. For instance, 'Management support and commitment' was observed strongly in cases '1', '2' and '4' but not so strongly in case '3' due to the initial focus on a master's programme collaboration which required the use of an LMS for delivery. This requirement therefore did not cover institution-wide implementation even though management was involved in the negotiations and made available the human resources to be trained. Thus looking at the external collaboration in Case 3, one can argue the involvement of management although not in such a way as to influence institution-wide implementation. More especially, there is no suggestion at this stage of a possible institutional roll out in the long run unlike the other three cases where the intention is to introduce the e-learning institution-wide. Even with the three, Case 1 and Case 4 had this intention from the very early beginning while Case 2 was decided upon after the system was setup for Open University purposes. The support and commitment of management therefore varied for each context. Whereas in Case 1 management support and commitment was evident to all staff of the institution, with an IT staff selected for training in Moodle, very little resources could be seen to be invested at this stage. In the case of Case 2 however, management is actively involved every step of the way financially, providing human resources, providing technical advice and even assisting in courseware development for the various courses. Case 3 can be observed to have management support and backing

through the set-up of a committee, provision of institutional structures to facilitate project success and the personal involvement of the VC.

Other factors identified to be present in two or more of the cases include: training in Moodle management, enthusiastic IT staff, and external support in various forms. These factors have been very influential as can be seen in the ratings given by participants.

Other relevant factors at this stage that appear not to have been present in all the cases include: institutional leadership as demonstrated by Case 2, experienced development team, experienced e-learning coordinators, extensive assessment of institutional IT infrastructure readiness and the depth of planning undertaken by Case 4. This depth of planning was only observed in Case 4 due to the demands of the external support they were receiving.

Table 114: Initiation stage inhibitors

| **Inhibiting Factors in the initiation stages** | | | |
|---|---|---|---|
| **Case 1:** | **Case 2:** | **Case 3:** | **Case 4:** |
| 1. Lack of adequate involvement of stakeholders | 1. Inadequate IT development staff | 1. Lack of experienced e-learning technical staff | 1. Cumbersome procurement laws |
| 2. Failure to adequately address faculty concerns | 2. Delays in LMS development time | 2. Absence of clear institutional e-learning vision | 2. Numerous institutional activities |
| 3. Lack of clarity in institutional e-learning vision | | 3. Lack of experienced e-learning faculty | 3. Lack of experienced e-learning faculty |
| 4. Failure to assess faculty readiness | | | 4. Lacked technical expertise but had plans to build capacity |
| 5. Poor coordination of people and activities | | | |
| 6. Failure to assess institutional readiness | | | |
| 7. Absence of change management strategy | | | |
| 8. Inadequate supply of internal technical expertise in e-learning and Moodle | | | |

Similarities and differences can also be observed in factors inhibiting this stage of the institutional implementation efforts. As can be seen from the table technical personnel in e-learning and Moodle. Cases ‘1’, ‘2’ and ‘3’ had inadequate to a lack of these technical expertises. Case 4 on the other hand realised this limitation and put in place a strategy to build the capacity of the institution in this area through the PHEA partnership. In Case 2 for instance, there was the case of an advertisement for Moodle developers and network technicians. Whilst ten applications were received for the Network technician advertisement, only one was received for the Moodle administrator advertisement. This highlights the need for more technical specialists in these areas if institutions are to make the necessary headways. As can be observed in Case 2, due to the limited experience in these areas, development was often slow. Numerous trials and errors were encountered before the system displayed the expected functionalities required by the institution.

Other factors that inhibited some of the institutions due to contextual differences included: the lack of adequate stakeholders, failure to adequately address the concerns of faculty, poor coordination of people and activities, failure to assess institutional readiness and absence of a change management strategy as in the case of Case 1. In Case 4, for instance, cumbersome procurement laws and numerous institutional activities were some of the factors that limited the progress and achievements made during the initiation stage. As indicated by the table below, the outputs of the various institutions vary. This is an indication of how contextual factors can influence and shape the outcomes of institutional agendas. More especially, when a holistic planning is not undertaken, potential outcomes can be as diverse and unanticipated as possible

Table 115: Adoption-decision stage facilitators

| **Facilitating Factors in the adoption-decision stages** | | | |
|---|---|---|---|
| **Case 1:** | **Case 2:** | **Case 3:** | **Case 4:** |
| 1. Management acceptance of proposed IT solution | 1. Prior test and experimentation with the Moodle LMS | 1. Experienced Moodle managers | 1. Management support |
| 2. Training of IT staff in Moodle administration | 2. Large Moodle community support all over the world | 2. Demand for technology support in T&L | 2. Supportive institutional structures |
| | 3. Open source and free | 3. External community of practice | 3. Existing institutional ET strategic agenda |
| | 4. Popular among many prominent HEIs all over the world | 4. Top management involvement and support | 4. External support |
| | 5. Customizable to institutional business processes | 5. Conduct of a need assessment research | |
| | 6. Institutional Leadership | 6. Demand for technology supported examination | |
| | 7. Management support and commitment | 7. Development of an ICT policy | |
| | 8. Experienced Moodle development team | | |
| | 9. External support and advise | | |

As can be observed among the following factors, management commitment and support cut across all the institutions. In Case 1, their acceptance of the proposed LMS solution - Moodle - is evident. This is further reinforced when an IT staff is sent abroad to train in Moodle administration. In Case 2, management support and commitment is evident in the continued recruitment of IT staff for further Moodle development and configuration. In Case 3, management approves its incorporation into the ICT policy as the institutional LMS for supporting and delivering teaching and learning while in Case 4, management approval and support is lent to Moodle selection as the institutional learning platform.

It can further be observed that the presence of trained IT personnel in Moodle administration is an important factor as observed in three of the cases, ‘1’, ‘2’ and ‘3’. This is very important as without these personnel working internally to enable uptake through the provision of sup-

port, institution-wide adoption can be an uphill task. In the case of '4', expertise was provided by external Moodle and e-learning facilitators as captured by the factor 'external support'. This external support is also observed in Case 2 where external experts in Moodle and e-learning provide technical IT assistance with the Moodle as well as advice on e-learning implementation issues.

Other factors of relevance to some of the contexts but not all include: the nature of the Moodle (open source and free, accepted by many HEIs, customizable to institutional process) as exhibited by Case 2, the demand pull exhibited in Case 3 – demand for technology support in teaching and learning, demand for examination support, development of an ICT policy, and the support of institutional structures, and the presence of a strategic educational technology agenda by Case 4. Case 2 exhibited commendable institutional leadership as indicated above through extensive prior testing and experimentation with the Moodle. This has also been very instrumental in getting the institution to adopt Moodle among the many other open source and proprietary LMS.

As can be seen, all the institutions opted for an open source solution from the very beginning. One of the reasons could be attributed to the high cost of proprietary LMS solutions. However it can also be observed that even open source solutions do not come cheap even though they are free. Customizing these solutions to meet institutional requirements can require a lot of resources, especially technically competent Moodle programmers. As can be observed in Case 2, their staff had to learn this management on the job which resulted in extensive time being taken to complete important tasks. In Case 3, there was no option especially as the institution' resources were constrained with other projects. It is however important to note that the factors identified were influenced by the unique contexts of the various cases.

Table 116: Adoption-decision stage inhibitors

| **Inhibiting Factors in the adoption-decision stages** | | | |
|---|---|---|---|
| **Case 1:** | **Case 2:** | **Case 3:** | **Case 4:** |
| 1. Inadequate demonstration of the systems functionalities | 1. Extended system development time | 1. Financial constraint | 1. Inadequate computer facilities |
| 2. Failure to demonstrate the systems application to specific learning contexts | 2. Courseware development time | 2. Lack of holistic institutional consideration of issue | 2. Inexperienced online tutors and students |
| 3. Absence of LMS demonstration to actual users | | 3. Inadequate assessment of institutional IT infrastructure | |
| 4. Lack of adequate involvement of stakeholders | | | |
| 5. Failure to adequately address faculty concerns | | | |
| 6. Lack of clarity in institutional e-learning vision | | | |
| 7. Failure to assess faculty readiness | | | |
| 8. Poor coordination of people and activities | | | |
| 9. Failure to assess institutional readiness | | | |
| 10. Absence of change management strategy | | | |
| 11. Inadequate supply of internal technical expertise in e-learning and Moodle | | | |

As can be observed in the above table, conduct of an institutional readiness assessment prior to rolling out an LMS appears to be an important consideration for many of the institutions. Case 1 and Case 3 were affected by this failure to conduct an institution-wide assessment. Case 2 introduced the platform before receiving accreditation and so had no need for this assessment while Case 4 conducted an extensive research to understand their infrastructural readiness. This was however saddled with numerous challenges. The assessment however

enabled Case 4 to identify issues with their computer availability and accessibility, as well as with faculty and students inexperience with e-learning issues. A major constraint with Case 3 had to do with financial resources, a factor which could be argued to have influenced the other cases.

As can be observed from the table, Case 1 had several contextual factors influencing it at this stage. For instance, the functionalities of the Moodle were not adequately demonstrated to the decision makers prior to the decision being made. In addition, the Moodle' application in different learning contexts was also not demonstrated, users (students and faculty) did not also get the opportunity of a demonstration of the system they would be using, stakeholders were not adequately involved, faculty concerns were not addressed, unclear institutional e-learning vision, no assessment of faculty readiness, poor coordination of people and activities, absence of a strategy to manage the change process, as well as inadequate supply of internal technical expertise in e-learning and Moodle. These factors adversely affected the institutional decision to adopt the LMS as could be observed from faculty members' non-attendance at training sessions and their subsequent refusal to use the platform to engage students online. Case 2 could be seen to be saddled with the system development time challenges as well as delays in courseware development time. Case 4 also had issues with inexperienced faculty members and students.

Table 117: Adaptation stages

| **Facilitating Factors in the adaptation stages** | | | |
|---|---|---|---|
| **Case 1:** | **Case 2:** | **Case 3:** | **Case 4:** |
| 1. Readily available and customizable LMS solution | 1. Management support and commitment | 1. Experience in web application development | 1. External support |
| 2. Large community of LMS product support globally | 2. Institutional Leadership | 2. External support from webhost | 2. Capacity building workshops |
| 3. Trained institutional Moodle administrator | 3. Availability of technical staff | 3. Training in Moodle management | 3. Courseware development |
| 4. Available IT technical support | 4. External support (technical & advisory) | 4. Support from collaborating institution | 4. Pre-determined rollout strategy |
| 5. Availability of external host services | 5. Knowledge of core institutional processes to be supported | 5. Top management support | |
| 6. Available courseware for PG programmes | 6. Institutionally developed courseware | | |
| 7. One-on-one training strategy | 7. Institutional setup of course sites | | |
| | 8. Provision of training and testing for all users | | |

As identified in the other stages, contextual conditions play an important role in the factors that tend to be influential on the implementation process. In the adaptation stage, management support and commitment can be identified to be at different levels among the various cases. While it is very strong in Case 2 with management monitoring and guiding the incorporation of institutional processes and practices into the Moodle configuration, it is moderate in Case 3 where management is actively seen encouraging faculty members to actively participate in the Moodle training and usage. Very little involvement of management is observed in Case 1 and Case 3 although one can argue the presence of management support and commitment from previous stages.

Another factor that enabled these institutions to make some headway in their implementation effort in this stage is training in the Moodle administration and use. Case 1 trained an IT staff for a week in Moodle administration, Case 2 had IT personnel constantly under training in Moodle configuration, administration and integration with other information systems, Case 3 provided 3-month training for three IT personnel, while Case 4 had external facilitators provide the necessary training to project participants. This is a very important factor as many of these institutions admit to the inadequate availability of IT professions skilled and experienced in Moodle development and management.

In relation to the training Moodle, another factor observed to play an important role in facilitating the implementation process is the availability of external support in the form of technical and advisory support in Moodle and e-learning implementation. In Case 1 for instance, the availability of an external hosting services enabled them to overcome the challenges with power supply. Case 2 has continued to use external support from partners and friends of the institution right from the inception. Case 3 and 4 have also received external support from facilitators that have proved very useful. Case 3 also benefitted from the support provided by their external hosting services. This was very instrumental in getting the Moodle to go online as there were insufficient resources available for the initiative.

Training for users has also proven to be an essential influential factor. These trainings cover group as well as one-on-one strategies. Training in Case 1 concentrated on faculty members with no attention given to students. Case 2 provided training opportunities for both faculty members and students on a regular basis which has proven very helpful. Case 3 provided training in Moodle use and advocacy among faculty members with no training for students. Case 4 provided participating students and faculty members with training on the Moodle and its use. The role of training therefore cannot be overemphasised. What is important however is the nature of the training and the frequency of the training. This, it has been realized can be a very powerful tool for institutionalizing desired practices among stakeholders such as faculty members.

Technical IT support staff availability was another important factor in this stage for the institutions. Although these were inadequate for all the institutions, their role in providing the much needed Moodle development services and user support cannot be overlooked. All the cases showed their critical need for trained and experienced technical IT staffs who could

develop and manage the Moodle application as well as provide the necessary user support required by users.

The availability of courseware was another important factor influencing this stage for many of the cases – ‘1’, ‘2’ and ‘4’. In the case of three these were made available by faculty members who were eager to use the platform. Case 1 had courseware available for their masters’ programmes through their collaboration with an external university from United Kingdom. A couple of course materials were made available by some faculty members at the undergraduate level but were never engaged with after the administrator had uploaded them. As can also be observed, Case 2 and Case 3 had specific strategies to develop their own courseware which proved to be very essential to their achievements in Moodle deployment and usage.

However there were other factors which proved useful for some of the contexts. For instance Moodle’ free, open source and customizable nature along with the huge internal community to provide support was an important factor for Case 1’ developers. Strong institutional leadership, knowledge of the core institutional processes to be supported and the decision of the institution to setup, create and populate the course sites was a deciding point for its successful implementation. As can be observed in Case 3 and 4, experience in web application development, support from collaborating institution, and the existence of a roll-out strategy were contextually useful for their achievements at this stage.

Table 118: Adaptation stage inhibitors

| **Inhibiting Factors in the adaptation stages** | | | |
|---|---|---|---|
| **Case 1:** | **Case 2:** | **Case 3:** | **Case 4:** |
| 1. External power challenges | 1. Inadequate technical staff | 1. Financial constraint | 1. Procurement barriers |
| 2. Lack of cooperation from faculty | 2. Extended system development time | 2. Lack of instructional technologists and e-learning experts | 2. Delays in courseware development |
| 3. Absence of managerial enforcement of directives | 3. Accreditation challenge | 3. Inadequate IT/e-learning support staff | |
| 4. Lack of adequate involvement of stakeholders | | 4. Absence of strategy for training in e-learning use | |
| 5. Institutional T&L format clearly not considered | | | |
| 6. Inadequate training for LMS technical staff | | | |

Clearly technical support in Moodle development and usage in addition to online teaching and learning were in short supply in almost all the institutions – Case 1, case 2, and Case 3. Case 4 had similar issues but had made plans to resolve it through piloting of the implementation and building of institutional capacity through external facilitators. As can also be observed, many of the factors occur within unique contexts but can potentially be found in other contexts depending on how the factors are identified and addressed. The external power challenge experienced by Case 1 is a typical example as all the other cases were in existence around the same period. However in Case 2 for instance, students and faculty members were expected to access the Moodle from the comfort of their homes and not on campus so on campus use was limited. Again the Moodle developers worked both from home and on campus during the day time since they were hard pressed for time and needed to get certain functionalities working. Power therefore was a remote consideration for them. In Case 3 full enforcement of usage was only at the graduate level and even with that, it was only an online presence that was mandatory. Actual usage was not rigidly enforced. In Case 4 for instance, since it was only a pilot which was increased from 2 courses to 10 courses eventually, although electricity power may have been an issue, it did not come out very strongly.

Other unique contextual factors can be identified for each case. For instance in Case 1 the lack of corporation from faculty made progress in deployment and use very difficult. Faculty members failed to attend training sessions, did not make course materials available, etc. All this while, management was failing to enforce directives although these were issued. There were also the issues of inadequate involvement of stakeholders (including students), lack of clear consideration of institutional teaching and learning processes, with possibly inadequate training in Moodle administration contributing to the challenges faced at this stage of the institutional deployment. Case 2 had issues with development time which appeared to be taking too long, and accreditation of the programmes. Case 3 continued to have issues with financial resources, instructional technologists and e-learning expertise, in addition to an absence of a clear strategy for training in e-learning usage for stakeholders. Case 4' major challenges were with the procurement of the needed equipment and delays in courseware completion even though financial resources were provided. Contexts can therefore be clearly seen to play an important role in the success of e-learning implementation using a LMS.

Table 119: Initial use stage facilitators

| **Facilitating Factors in the initial use stages** | | | |
|---|---|---|---|
| **Case 1:** | **Case 2:** | **Case 3:** | **Case 4:** |
| 1. Available courseware for postgraduate courses | 1. Compulsory use requirement | 1. Support and training from collaborating institution | 1. Motivated instructors |
| 2. Faculty one-on-one training strategy | 2. Ready to use LMS | 2. Management support | 2. Lessons from pilot phase |
| 3. Faculty members engagement with students | 3. Available technical and user support | 3. Available technical and e-learning support | 3. Modification of curriculum |
| 4. Access to computer labs and internet on campus | 4. Integration of LMS into all aspects teaching and learning | 4. Increasing faculty interest | 4. Internal support |
| | 5. Provision of training and testing for on-campus students and faculty | 5. Creation of online examination lab | 5. External support |
| | 6. Institutional commitment to LMS use | **6.** Courseware available for PG courses | **6.** Courseware available for courses in the project |
| | 7. Courseware available for running programmes | 7. Training of faculty members in Moodle use for e-learning | 7. Training provided to participating faculty members |

One of the most important factors in this stage is the availability of courseware as indicated by table above. All four institutions had courseware available at certain levels of the programme delivery. For instance Case 1 had courseware available and mounted for postgraduate programmes due to their collaboration with an external international institution. In Case 2, all available programmes and courses running had courseware developed at all the levels – certificate, diploma, undergraduate and postgraduate. Case 3 on the other hand had courseware made available by the collaborating institution on a masters' programme on global leadership. Other masters programmes offered locally had to develop their own courseware which could be described more appropriately as course materials. In Case 4, courseware was developed for all the courses considered o the project. These were later to be made available for open learning purposes.

As can be observed in the table, on-going training was still crucial at this stage. In places where group training proved difficult as in Case 1, one-on-one training strategies were used to train interested faculty members. Case 2 had a well-planned training strategy for faculty members and students. Students were trained upon admission and as and when new features were introduced while faculty members were trained at the beginning of every semester. Training programmes on Moodle use were organised by the IT manager who happened to be very instrumental in the institutional implementation. Faculty members were therefore shown how to use the various features of the Moodle to administer their courses and students' learning activities. In Case 4, training was provided to different participants – faculty members, instructional technologists and multimedia specialists who were to provide support to users and technical IT staff responsible for managing the Moodle. This was all aimed at getting the Moodle to be accessible, useable, and reliable in order to enhance teaching and learning on campus.

Another important factor identified among many of the cases is the availability of technical and user support. In Case 1, this was present but subtle as there appeared to be a strong resistance to the introduction of the innovation. The interested faculty members invited the Moodle administrator for one-on-one training sessions while many others especially at the graduate level, preferred to give documents to the administrator for loading onto the platform. Students were also assisted with access challenges from time to time. In Case 2, all users were assisted with technical IT and e-learning specific support as and when needed. This was very instrumental in sustaining usage. Case 3 provided IT and e-learning support to faculty

members involved in the use of Moodle for delivering their teaching and learning activities. Additional support personnel were recruited to assist at a point due to inadequate supply of these staffs. Case 4 provided internal support through their internal IT support unit responsible for their network and other IT infrastructure. These were responsible for assisting users solve their access challenges to the institution' network and other Moodle resources. The PHEA implementation committee were also available to assist Moodle users with specific e-learning challenges. All these enabled the users to use the Moodle with as little challenges as could be allowed within the institutional context.

Another factor observed in this stage was the support and training provided by external facilitators. Case 3 and 4 were observed to directly benefit from these supports as they had the opportunity to have the facilitators visit their campuses to extend the necessary support. Even when these facilitators returned to their countries, the support was still extend via online mediums. In Case 4' instance, one external facilitator was able to access the Moodle platform all the way in South Africa. This was a major landmark for them as they had been struggling to be able to do this.

Other facilitating and yet contextually situated factors include faculty members engagement with students and access to computer labs and internet on campus for Case 1, compulsory use requirement, ready to use LMS, integration of the LMS into all aspects of teaching and learning, and the commitment of the institution to the use of the Moodle for Case 2. In the case of Case 3 and 4, the following factors could also be observed: increasing faculty interest and the creation of an online examination lab for Case 3, and the motivated instructors, lessons from the pilot phase, as well as the modified curriculum all aided Case 4' achievements.

Table 120: Initial use stage inhibitors

| **Inhibiting Factors in the initial use stages** | | | |
|---|---|---|---|
| **Case 1:** | Case 2: | Case 3: | Case 4: |
| 1. Students' use of system characterized by document download | 1. Turnover of technical staff | 1. Destruction of online examination lab by fire | 1. Inadequate consideration of pedagogical principles and models |
| 2. Low usage by faculty members | 2. Trust issues | 2. Lack of institutional motivation to use Moodle | 2. Lack of adequate computer resources |
| 3. None use by faculty at the undergraduate level | 3. Challenges with some faculty members | | 3. Low technology competencies among students |
| 4. Management' none enforcement of use | 4. Behavioural threats of some students | | 4. Low technology competencies among academics |
| 5. Lack of motivation among faculty | 5. Technical challenges | | 5. Inadequate motivation |
| 6. Lack of adequate training for faculty members | | | 6. Negative institutional culture |
| 7. Poor preparation by faculty | | | |

Prominent among the inhibiting factors observed among the cases was the behaviour of the students. Postgraduate students in Case 1 could be observed to be simply downloading course materials from the Moodle platform while undergraduate students were total missing online. This was a bit of a challenge as the system was expected to be used for other activities other than just a document repository. This could however also be attributed to the behaviour of faculty members. Case 2 had no such issues as all users were using the platform as expected. However, the activities of some students on the institution' network sometimes threatened functionality and accessibility of the system. These behaviours involved online activities that often threatened the shutdown of the institution's online access which could potentially disrupt academic work. In Case 4, it was observed that many of the students had low competency levels when it came to the use of computers. Coupled with their unfamiliarity with Moodle usage, this was a huge problem for the project implementers.

Lack of motivation could also be observed among the institutions. Case 1 had issues with faculty motivation. For some reason, faculty members were actually resisting the directives of

the institution to use the Moodle although they could not openly say so. In Case 3 also, there was no clear indication of institutional attempt to motivate users although there was one incidence where the VC during a training session stated that attendance would be used in their promotion criteria. In the instance of Case 4, although there was a financial package which acted as an incentive to participants, the institution itself took no initiative to continue this after the project' termination or even attempted to include other forms of motivations. Case 4 clearly had no motivation plan as they argued the use of the Moodle was a condition for either being employed as a faculty or admitted as a student. Acceptance of either was what entitled one to be a part of the institution. Students and faculty members were as such required to be self-motivated if they wanted to be with the institution. This worked out better than expected.

Other unique contextual factors include the numerous issues with faculty in the instance of Case 1. For example, the actual usage of the Moodle by faculty was low, use by faculty members at the undergraduate level was virtually non-existent, management failed to enforce use directives, lack of adequate training, and poor preparation by faculty members. Judging from these challenges with faculty, the institutional expectation of use was certainly going to be an uphill task. In Case 2, there was a high turnover of the technical staff, problems of trust of staff, challenges with some faculty members who somehow wanted to still use face-to-face approaches, and technical challenges with the institutional online system due to frequent disruptions from the host. Case 3' initial use experience was disrupted by the gutting down of their online exam lab by fire. Although this did not affect their online Moodle as it was hosted externally, it affected some faculty members as many were beginning to get used to conducting their examinations online. Case 4 also had a number of contextual factors influencing this stage of their implementation. For instance there was inadequate consideration of pedagogical principles of models necessary to engage students' attention in the learning process. Other factors included a lack of adequate computer resources, low technology competencies of faculty members, and the negative institutional culture threatening appropriate use of the Moodle

Table 121: Acceptance stage facilitators

| Facilitating Factors in the Acceptance stages | | | |
|---|---|---|---|
| **Case 1:** | **Case 2:** | **Case 3:** | **Case 4:** |
| 1. Procurement of tablets for faculty | 1. Top management support and commitment | 1. Perceived usefulness of the Moodle by faculty members | 1. Capacity building |
| 2. Recruitment of an educational technologist | 2. External advise and support | 2. Management support | 2. Management support |
| 3. Establishment of an online centre | 3. Provision of training for users | 3. Increasing faculty interest | 3. Incentives and motivational packages |
| 4. Recruitment of instructional support staff | 4. Compulsory institutional requirement for employment and admission | 4. Motivated IT/e-learning leadership | |
| 5. Provision of specialized training | | | |
| 6. Awareness creation for students | | | |
| 7. Piloting of selected courses | | | |
| 8. Management support and commitment | | | |

During this stage of the implementation process, the institutions were expected to engage in activities that would impact positively on the users' acceptance of the LMS platform. It is important to note that some actions by an institution towards the achievement of acceptance could have been undertaken at the earlier stages. Hence the emphasis made in this stage highlights the on-going activities being undertaken by an institution to further entrench acceptance by its users.

Clearly visible in all the four cases is the continued support and commitment of their management although at varying levels. Case 1 for instance witnessed a number of strategic moves including the recruitment of an educational technologist experienced in e-learning delivery, the establishment of an online centre for training and the recruitment of instructional technology assistants. Clearly efforts were being made to put in place structures to move the institutional agenda forward. In Case 2, management was still seen to be committed to the use of Moodle in all aspects of institutional teaching and learning through the close monitoring of

usage by all stakeholders. Faculty members were expected to assess their course sites at the end of every semester, undergo compulsory training at the beginning of every semester and engage wit students online in the course of the semester. All these were rigidly being enforced by management. Management commitment and support in Case 3 could be seen in their attendance at training sessions, the issuing of directives for all courses to have an online presence, the adoption of Moodle as the institutional platform and the establishment of an online examination lab. In Case 4 too, management continued to encourage acceptance through participation in some of the training sessions and the building of capacity in courseware development and Moodle usage. These activities all show how albeit inadequate some may appear, the various managements were making effort to encourage acceptance among users.

A look at the table above highlights two instances where some form of incentives are provided to motivate users and encourage commitment to use. For instance, Case 1 procured tablets for its faculty members to encourage their active involvement with the institution' e-learning agenda. In Case 4, a financial incentive was provided to participating faculty members to encourage their active participation. No such incentives or other motivational factors were observed in Cases 2 and 3.

Another factor observed to play a useful role in the institutions at this stage too is the provision of training opportunities. In Case 1 for example, the introduction of the online centre saw specialized courses such as how to create multimedia learning materials, set online quizzes, develop courseware etc. provided to faculty members. This was done in addition to one-on-one support provided to interested faculty members. In Case 2, training of faculty members twice a semester was the established standard. Through these trainings, new features and potential uses were introduced to them to bring them up to speed with latest developments on the Moodle. In Case 4, special attention was given to the development of the necessary institutional capacities in Moodle management, courseware development, instructional design and multimedia support. All these are recognized as having played strategic roles in enabling the institution to achieve their current levels of development.

Other contextual factors observed to have facilitated important roles include the creation of awareness among students and the piloting of courses for institutional learning purposes in

Case 1, the external advise and support, in addition to the compulsory institutional requirement

for employment and admission as a student in the instance of Case 2. In Case 3, even though insufficient resources was being made available some important factors observed to be facilitating acceptance among institutional members include the perceived usefulness of the Moodle among faculty, the increasing faculty interest, and the motivated IT/e-learning leadership provided by the IT manager.

Table 122: Acceptance stage inhibitors

| **Inhibiting Factors in the Acceptance stages** | | | |
|---|---|---|---|
| **Case 1:** | **Case 2:** | **Case 3:** | **Case 4:** |
| 1. Lack of management enforcement of faculty use | 1. Challenges with some faculty members | 1. Inadequate IT/e-learning support staff | 1. Poor connectivity and power cuts |
| 2. Lack of clarity in management e-learning vision | 2. Behavioural threats of some students | 2. Delays in approving draft policies | 2. Academic' time demands |
| 3. Unaddressed faculty concerns | 3. Technical challenges | | 3. Inadequate IT infrastructure |
| 4. Challenges with internet access on campus | | | 4. Inadequate technical support |

A number of similar inhibiting factors were also identified among some of the cases. For instance in Case 1, the management' lack of enforcement of directives given to faculty regarding use of the Moodle for teaching and learning was a big issue. This probably could be attributable to the unaddressed concerns of faculty members, another factor observed to negatively affect management's efforts to encouraging acceptance within the institution. This factor was also present in Case 2 where some faculty members were in the habit of attempting to still use face-to-face approaches where they go to lectures and dictate notes to students despite knowing the institutional directives. But for the monitoring and enforcement of required use by management, the institution would have made little progress. In Case 3, the academic' lack of time for e-learning activities was obvious. This was due to other institutional engagements which tended to take a large chunk of their time. As can be seen in this discussion, issues regarding academics' use of Moodle varied from institution to institution and yet play a crucial role to the successful implementation of such technological innovations

Another observed similarity among the institutions studied in this research was the issue of technical challenges not caused by any fault of the institution. In Case 1 for instance, internet access on campus was a major challenge for both students and faculty members. Times without number, complaints were received about access challenges and this was threatening acceptance by users. In Case 2, the problem with access to the serve due to challenges at the host site was also threatening confidence in the system's reliability. Considering how dependent the institution was on the online system for most of their operations, this was indeed a threat. Challenges to internet access on campus and problems with the electricity power supply was also noted to be a major inhibiting factor to efforts to create acceptance of Moodle use in Case 4.

In addition, IT infrastructure and e-learning support were also identified to be inadequate in some of the institutions. For instance Case 3 and 4 identified these to be major challenges affecting acceptance of the Moodle introduction for e-learning purposes.

Notwithstanding, other inhibiting factors that differed because of their contexts were identified among the cases. These include: lack of clarity in institution' e-leaning vision in the instance of Case 1, behavioural threats of some students in Case 2, and delays in the approval of drafts policies that could potentially strengthen acceptance in Case 3. All these factors allude to the presence of many varied factors capable of influencing the outcomes of institutional efforts to introduce LMS for e-learning purposes.

Table 123: Routinization stage facilitators

| **Facilitating Factors in the Routinization stages** | | |
|---|---|---|
| **Case 1:** | **Case 2:** | **Case 4:** |
| 1. Development of an online resource website for the centre | 1. Mandatory periodic training of faculty | 1. Available institutional capacity |
| 2. Development of an instructional manual | 2. Orientation and regular sensitization of students | 2. Management commitment and support |
| 3. Development of an institutional e-learning policy | 3. Mandatory assessment of course sites every semester | 3. Draft educational technology (ET) strategy policy |
| 4. Provision of online certification training | 4. Compulsory medium for performing institutionally mandated tasks | 4. Establishment of an ET unit |
| 5. Support for faculty courseware development | 5. Conscious reference to the system by all stakeholders | |

| Facilitating Factors in the Routinization stages | | |
|---|---|---|
| **Case 1:** | **Case 2:** | **Case 4:** |
| 6. Clarity in institutional e-learning vision | 6. Management support and commitment | |
| 7. New ERP integrated with an LMS | | |
| 8. Management support and commitment | | |

The routinization stage depicts the period of the institution where the introduced innovation is seen as a part of the daily activities performed by organisational members. The innovation at this stage is perceived as normal as one cannot see him-self or her-self perform mandated organisational tasks without using the system. In the cases under study, this state of use among institutional members cannot be said to have been attained for all the cases except one institution – Case 2. As can be observed from the table above, a number of initiatives have been taken by Case 1 that can potentially result in routinization. However, this is not the case as majority of faculty members are yet to use the platform for engaging in teaching and learning activities. The facilitating factors in Case 1 includes the development of an online resource website for the centre, an instructional manual for guiding faculty members in the development of their course manual, the institution of an online teaching and learning training certification, support of faculty in courseware development, clarity in institutional e-learning vision and the introduction of an Educational Resource Planning system that integrates a new LMS. These initiatives are aimed at not only encouraging usage but more essentially instituting and entrenching the new institutional practices expected of stakeholders. Of huge importance is the shift by management from supporting an open source platform to procuring a proprietary platform for institutional use. Such a move emphasises management' commitment to ensuring the institutional vision of providing online education becomes a reality. A careful scrutiny of Case 2' factors will reveal the presence contextual factors that have been present since the establishment of the institution. These include mandatory periodic training of faculty members, orientation and regular sensitization of students, mandatory assessment of course sites every semester by faculty members, compulsory medium for performing institutionally mandated tasks, and the conscious referencing of the system by all stakeholders. To them, the system is the institution and vice versa. This is very important as it shows the extent to which the system has been routinized by members of the institution. In the last instance, Case 4, this stage cannot be said to have been attained even though those factors can be ob-

served in the institution. There is a gradual increase in interest as highlighted by the increase in courseware development. However a routinized use of the system is yet to be observed.

Table 124: Routinization stage inhibitors

| **Inhibiting Factors in the Routinization stages** | | |
|---|---|---|
| **Case 1:** | **Case 2:** | **Case 4:** |
| 1. Lack of managerial enforcement of directives | 1. Slow development time | 1. Poor IT infrastructure |
| 2. Unaddressed faculty concerns | 2. Inadequate requisite technical expertise | 2. Inadequate motivation |
| 3. Conflicting decision to introduce new LMS | 3. Technical challenges | 3. Poor connectivity and power cuts |
| 4. Lack of involvement of IT staff in development of ERP | 4. Threat by hackers | |

A close look at this stage' factors shows that many of the inhibiting issues identified in the previous stages are still unresolved. One wonders how some of these institutions' intend to achieve their objectives if no clear attempts are being made to resolve identified challenges. The big question however is whether the management of these institutions acknowledge the presence of these challenges and if initiatives or plans have been made to resolve them. For instance in Case 1, the lack of enforcement of directives, unaddressed faculty concerns have been in existence for some time. No clear plan can be identified highlighting management' intentions to resolve them. In addition, the decision of management to introduce a new LMS which is proprietary is posing huge impedance for some faculty members who are still trying to master the Moodle. Unfortunately, initial introduction to this new system highlighted the uncompleted configurations which posed difficulties for users during their learning process. With all these challenges and with management insisting the new LMS should be used, one can be sceptical about the outcomes. In addition to all these, the IT staffs were not adequately involved with the developers of the new ERP system which integrates the LMS. This limited their ability to assist users in resolving their challenges with the new LMS platform. The failure of management to have involved these technical staff adequately in the processes of acquiring the new system requires further investigation but suffice it to say, it is currently affecting routinization of the e-learning practice within the institution.

As can be noted on the table, Case 2 had its own unique inhibitors which varied from those of other contexts. These factors included slow development time, inadequate technical expertise, technical challenges and threat by hackers. With the available IT staff still learning on the job and gaining the much needed experience, on-going development of the Moodle and its integration with other institutional systems was slower than would have been expected. Nonetheless, due to the inadequacy of these technical staffs with a high turnover rate for the institution, the slow pace had to be accommodated. Other technical challenges from the host were still being experienced necessitating a change in host organisations. Coupled with threats from both internal and external hackers during this stage, the institution appeared to be hard-pressed on all corners.

With Case 4, the challenges experienced in some of the previous stages (initial use and acceptance) were still present at this stage. Nothing much had been done by the institution to improve the IT infrastructure, motivate faculty members and improve the poor internet connectivity. The frequent power cuts from the national grid were still prevalent and were bound to remain so unless the institution found an immediate solution.

Table 125: Infusion stage facilitators

| **Facilitating factors in the infusion stages** | |
|---|---|
| **Case 2** | **Case 4** |
| 1. Support and commitment of management | 1. Management commitment and support |
| 2. Monitoring and enforcement of use by management | 2. Draft ET strategy policy |
| 3. Mandatory regular training of faculty members | 3. Establishment of ET unit |
| 4. Trust in the stability and security of the institution' IS | |

Only Case 2 was observed to have reached this stage of the implementation process. Through the systematic development of other information systems developed from open source platforms, the institution was now capable of providing Open University educational services. It was now able to use the Moodle to support on-campus, distance and Open University students. This had become possible as a result of the following observed factors as indicated in the table: continued management support and commitment, management' monitoring and enforcement of use, mandatory regular training of faculty members and the trust of users in

the stability and security of the institution' information systems. In the instance of Case 4, these factors were observed in the routinization phase where their effects were yet to be ascertained. The factors presented here, therefore, indicate the current prevailing contextual conditions that could facilitate the achievement the Moodle's institutionalization.

Table 126: Infusion stage inhibitors

| **Inhibiting factors in the infusion stage** | |
|---|---|
| **Case 2:** | **Case 4:** |
| 1. Trust issues | 1. Poor IT infrastructure |
| 2. Technology cost | 2. Inadequate motivation |
| | 3. Poor connectivity and power cuts |

In the table above, two factors can be observed to inhibit the efforts of Case 2 towards infusion. Trust issues have to do with the difficulty of trusting the technical staffs' commitment to the institution's ideals. Since in Ghana, Case 2 appeared to be the first institution to have attained success in the use of an LMS to support educational delivery, there was the concern that competitors would set in and capitalize on the opportunity. In particular, due to the limited availability of the technical staff capable of handling Moodle development, there was the worry that the current staff would be poached by competitors leading to institutional strategies being revealed to competitors. This was a big worry to the institution that was still young compared with other institutions. In addition, the cost of hosting the institution' digital resources was beginning to tell on the institution. In particular, the hosting of the institution' online digital library which carried thousands of gigabytes cost more than the institution could afford. It was believed future development of additional digital resources was bound to follow the same trend and this was a source of worry for the institution's management. In Case 2' situation, the factors identified to be prevalent correspond to those identified in previous stages. They had still not been resolved and so could potentially adversely affect infusion of the LMS.

In the next section, a model implementation framework is proposed for the implementation of LMS in higher educational institutions for e-learning purposes. This framework is based on the current research' framework which highlighted the supporting role such a framework can provide to existing and new higher educational institutions in developing countries that intend to introduce and institutionalize LMSs in support of e-learning activities.

## 7.11 Proposed Institutional E-learning Implementation Framework using a Learning Management System (LMS)

The proposed institutional e-learning implementation framework posits a complex interaction of actions and contextual factors working together to bring about anticipated institutional outcomes. Whereas the framework projects a linear sequence of events and activities, this sequence highlights a logical (rational, planned) progression of an organisation's efforts to introduce an innovation such as the LMS for e-learning purposes. This is not to say this is the norm in reality as has been captured by the two-way arrow in the diagram below and as the cases in the research highlighted. Rather, the framework seeks to highlight important stages in an institutional information system' implementation process, along with the contextual factors that shape outcomes. It suggests the need for detailed planning that combines top-down and bottom-up strategies that can ensure the realisation of institutional objectives. The diagram below consists of three broad phases of innovation often found in the organisational innovation and IS innovation literatures; and seven sub-categories including an initiation, adoption-decision, adaptation, initial use, acceptance, routinization and infusion stages. The rest of this section describes the stages in detail and how it can be used to guide an institutional e-learning implementation using an LMS.

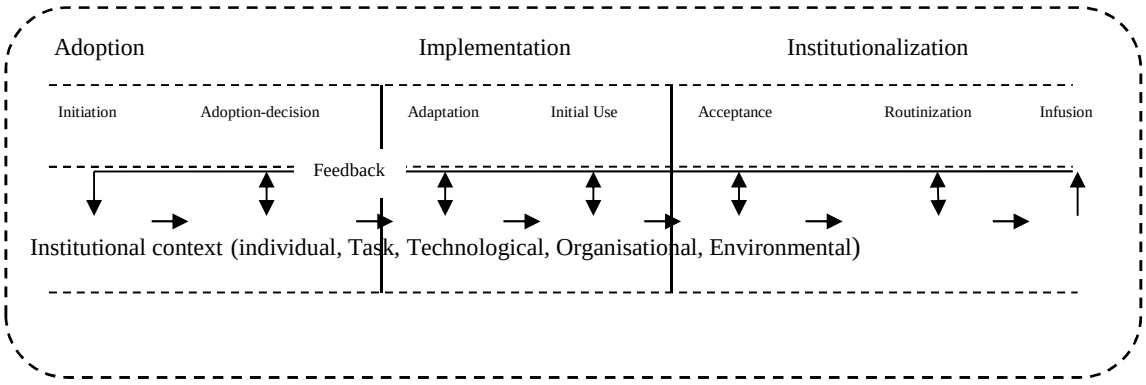



Figure 39: Institutional e-learning implementation process

In the diagram above, the external boundary indicated by the dashed lines shows the context within which the institutional implementation occurs. It represents the individual, task, technological, organisational and environmental factors institutions need to be aware of before, during and after deploying an LMS. In the middle of the diagram is the actual implementation process divided into major phases and sub-categories representing specific stages in the process. The stages are linked by arrows that highlight the outputs from that stage. Within each

stage (except initiation and infusion) is a two-way arrow showing a feedback process into the outputs from previous stages. The arrow highlights the possible consideration of activities that should have been considered in previous stages but were either not considered or the output(s) from a particular stage was inadequate to facilitate the activities of the next stage. It also signals how some of these activities can occur in parallel with other activities believed to belong to a particular stage. The solid black lines to which the arrows connect signifies the feedback process inherent in each stage that enables corrective measures or enhancements to be made to strengthen the outcome(s) of each stage. It is important to note the arrow at the infusion stage, the last stage in the implementation process. The arrow highlights the possible start of a new implementation goal, an enhancement to an existing goal or a reconsideration of activities that could have been appropriately addressed in the previous stage. Ultimately, the successful implementation of a technological solution such as the LMS does not imply an end to other unconsidered uses to which it could be put to. It signifies the beginning of a new institutional goal especially where that goal was previously unconsidered.

In planning to introduce e-learning into an institution of higher learning, adequate preparations must be made in the initiation stage to clearly highlight the problem or need to be addressed and the readiness of the institution. Consideration must be made about whether the institution is a new or has been in existence for a while as this can impact on the implementation process. When an institution has been in existence for a while with stakeholders used to traditional ways of performing core tasks, introducing innovations of this sort can result in a resistance e.g. Case 1. On the other hand there is evidence to show that an institution that begins with the system already in place before recruiting users will be less likely to face much resistance. It is also important to consider the different LMS solutions available at this stage vis-à-vis the institutional processes to be supported. This is particularly relevant as different solutions exist, open source and proprietary, with different implications and requirements for an institution. For instance, a proprietary solution would have a standby support team from the sellers although the extent of configuration and integration would be limited by the application' capabilities. An open source on the other hand will provide extensive opportunities for institutional configuration and integration but will require experienced and skilled internal technical staffs to develop. The cost of the two alternatives must be carefully considered before a decision is made. An institution-wide intention of this nature must assess the readiness of the institutional IT infrastructure, faculty members and students in the use of such technologies in the teaching and learning process. This also is very important as the in-

adequate or undeveloped IT infrastructure can negatively affect perception and use by users. Where students and faculty members are identified to be unprepared, steps must be taken to raise their awareness and competency levels as this can also affect use.

Training therefore is an essential component at this stage depending on the state of the institution's core stakeholders (knowledge and skills in LMS use). What is most important at this stage is the identification of the reasons for the introduction – need/problem, or opportunity, and the proposed technological solution and how it fits into the institution' frame of work. Where an institutional educational technology strategy already exists, it will aid the institution with its detailed planning required at this stage. Where possible, stakeholders e.g. students, faculty members, etc., must be involved in the selection or comparison of the LMS solution. Their involvement will go a long way to ensure their ownership and loyal participation when it comes to use. The output(s) of this stage when considered carefully will lead to identified institutional needs/problems or opportunities along with identified LMS solution for adoption.

The adoption-decision is also another important stage where stakeholder involvement can facilitate successful deployment and use. This also can benefit from considering whether the institution is new or an already existing one. When the institution is new, e.g. Case 2, consideration may cover environmental factors such as state of technological development of the country' citizens, readiness of the country's IT infrastructure for e-learning delivery, etc. However when the institution has been in existence for some time, the institution may need to involve stakeholders in the institutional decision, an action which may appear to be usurping the authority of management but can have positive implications on some of the latter stages e.g. initial use and acceptance.

The decision at this stage which often involves an acceptance or rejection of the proposed LMS, should be based on how well the solution matches the needs/problems or opportunities identified by the institution. Most of the necessary LMS comparisons should have been carried out at the initiation stage to enable an informed decision to be made. In particular, the institutional task processes to be supported by the LMS must be carefully considered to enable a right fit to be made with the selected solution. When a solution is selected without consideration of the processes to be supported, and maybe by a small group unrepresentative of stakeholders, the necessary support may not be garnered, and this can also influence latter

stages of the implementation process. The outcome of this stage, an institutional selection of a particular LMS solution, will feed into the next stage's activities.

The adaptation stage is where the selected LMS solution is developed. This development can be a decision to develop the LMS from scratch, purchase from off-the-shelf, or customize an open source LMS. In this stage, the LMS will be configured to either suite the institution' processes (which would have been identified in advance) or the institution' existing processes changed to fit with that of the LMS. If the LMS is being developed from scratch, it will integrate the desired institutional processes, but if it's a proprietary solution, the seller would have to configure the required processes into the LMS. When an internal development team is to oversee to the adaptation of an open source solution, this team must be very conversant with the institutional processes to be configured and must have the state of art technical competencies to be able to undertake the configuration. An experienced e-learning expert will be useful in this stage as the knowledge in setting up the LMS' course site will be required.

When proprietary software is being procured, this may be provided by the selling organisation. However when an internal team is responsible for the development, an instructional designer, educational technologist, or e-learning expert will prove very handy at this stage. Such a personnel will actually prove useful from the initiation stage to guide the institutional decisions and actions towards the introduction of the e-learning. But in the adaptation stage, this is crucial. Of critical importance here is the inclusion of pedagogical considerations in the set up and development of courseware. Without these the use of the LMS may appear to be a document repository which overtime, even the most enthusiastic user may stop visiting.

The development of courseware for the programmes and courses to be supported is equally important at this stage. The institution must be clear on whether it would source the courseware externally, have faculty develop them, or contract an internal team within the institution to oversee their development. This has a number of implications for the institution' success as their absence or inadequacy will cause challenges in the institutional agenda. A multimedia support for the development of the courseware can also be considered at this stage as the different media will aid learning development. Also, the stage requires intensive training for the faculty members as well as students.

Preparing these core users adequately will go a long way to enhance use. The training should also be focused on equipping users with the appropriate knowledge and skills required to utilize an e-learning platform effectively. More importantly, a decision should have been made in advance how the initial LMS use was to be undertaken. This could have been decided upon in the initiation stage after an assessment of institutional readiness. Nonetheless it is crucial at this stage. Other essential considerations here bother on the technical considerations on hosting, security and management of the LMS. Will this be hosted externally or a competent institutional team exists to handle this. The output of this stage should be an institutionally ready LMS for use.

In the initial use stage, active monitoring of use should be engaged in by the institution to assess whether use of the LMS is in the anticipated way or users are appropriating the use in unanticipated ways. This is because it would enable the institution assess whether institutionally mandated practices and behaviours are being reinforced or new practices are emerging (some of which may be harmful). The result of this stage, an institutional experience in first time use for teaching and learning should also be monitored for signs of acceptance or rejection by stakeholders as it will enable appropriate strategies to be put in place to address the expected outcomes.

During the acceptance stage efforts need to be made by the institution to reinforce the right (expected) behaviour of users. Careful monitoring of previous stages would highlight what may be the concerns of users which can be elicited through questions, interviews or focus group discussions. Other strategies like the establishment of an e-learning community of practitioners to encourage the dissemination and sharing of helpful information. This group which should include major stakeholders should be used to identify and resolve concerns while encouraging users' usage continuance. Other strategies that have been observed to work in other contexts are the provision of motivation some of which may be financial, sponsorship packages, etc. this however may not always be required as some cases have shown e.g. Case 2. The output of this stage should be clear signs of institutional inducement of members to commit them to the use of the LMS.

Since the goal for introducing such a technological solution may be dependent on how the users utilize the system, the routinization stage seeks to facilitate institutionalization by getting the LMS to be used in every area of the institutional users mandatory tasks so as become

unavoidable. The institution must be seen to be encouraging this level of integration through the enactment and enforcement of policies e.g. e-learning policy, establishment of e-learning support centres, revising of existing institutional structures to incorporate e-learning, representation of e-learning matters in governance structures etc.

The LMS can also be integrated with other institutional information systems such as students' information management system, timetabling and course allocation system, registration system, human resource system, etc. to encourage users to frequently visit the platform. The recruitment of new faculty and periodic refresher courses for faculty can also include mandatory courses on LMS use for supporting teaching and learning. Through this effort of the institution, measures can be put in place to enable institutional stakeholders not to bypass the use of the system in the performance of their daily tasks. The institution must consciously identify and institute these measures to routinize the LMS' use. The output of this stage should be visible institution of measures aimed at encouraging the use of the LMS as a normal activity through conscious and careful integration with institutional processes and practices.

The last stage of the institutional implementation process, the infusion stage should see the institution utilizing the LMS for higher level aspects of institutional work in a more comprehensive and integrated manner. One such higher level institutional work is the provision of opportunities for life-long learning. Again the institutional LMS could be made available for open learning to enable people who cannot make it to their campuses to still gain the privilege of having their education with them. All areas of institutional operations that can be enhanced through an integrated and comprehensive use with the LMS should be exhausted at this level. although it may potentially lead to the identification of new areas for consideration that may require the institution to start from the initiation stage, such a situation will not be deemed out of place but a true consequence of an institution; effort at institutionalizing an innovation such as the LMS.

At each of the stages described above, when the actual institutional outcome(s) vary from the expected outcome(s), through the feedback processes, the identified shortfalls can be catered for by the institution within the stage the shortfall was identified. Thus there may not necessarily be the need to start from scratch as the framework may suggest.

As will be noted, the description of the stages in the proposed framework will be influenced by contextual factors as described above. This will vary from institution to institution but as has already been highlighted above, some of these factors will be play very strategic roles that can lead the institution to realize its goals for introducing the LMS. Among these include management support and commitment, institutional leadership, training in the LMS development and management, good understanding of the institutional processes to be supported by the developers, adequate technical staff (IT and e-learning), courseware availability and the enforcement of use by management. More of these factors as well as those to be cautious about have been listed above.

## 7.12 Chapter Summary

Higher education institutions implementing e-learning using the LMS to support students learning in Ghana tend not to undertake holistic planning prior to introducing the system. This is particularly true of institutions that have been in existence for a while. Strategies for deployment and use are often undetermined and hence make a proper assessment of the system's use challenging. Although institutionalizing any new system like an LMS may take time, clear institutional strategies must be put in place to realize this goal. Simply leaving the LMS use for e-learning purposes to evolve can at best lead to waste of institutional resources.

## 7.13 Conclusion

The institutional implementation of an LMS for e-learning purposes need to undertake holistic planning that involves all institutional stakeholders, and take into consideration all institutional processes that will be potentially affected by the new system. Strategizing how the system would be rolled-out and sustained thereafter should be the end result of this holistic planning. When this is facilitated, both technical implementation and objectives for introducing such systems can be realized.

# CHAPTER EIGHT

## 8.0 DISCUSSION – A STRUCTURATION PERSPECTIVE

### 8.1 Introduction

As has been noted in the IS literature, information technology is both an antecedent and a consequence of organizational action. It has a dual nature where it has objective properties consisting of a set of rules and resources that are involved in mediating human action, and thus contributes to the creation, recreation and transformation of their contexts. It also has subjective properties where it is perceived as a social product of subjective human action within specific structural and cultural contexts. This duality of an IS has great implications for HEIs seeking to deploy LMS in accordance with the institutional vision. With the current availability of open source and proprietary LMS on the market, institutions are more likely to overlook the significance of critically evaluating the rules and procedures embedded in an LMS against the specific requirements of the institution based on needs, opportunities or even both. This is the core issue in LMS implementation around which all other considerations revolve. The big question every institution should ask is…..”Why do we want to implement this?” The following discussion looks at how a hastily or carefully carved response to this question holds the key to many institutions’ challenges in the implementation of LMS for e-learning purposes. The discussion is carried out through the lenses of the structuration model of IT (Orlikowski & Robey, 1991).

### 8.2 A structuration perspective of institutional LMS implementation

Implementation is broadly considered here to include activities prior to the physical deployment of the LMS and activities after the deployment and use. Three broad phases can be identified in this conceptualization: Adoption (institutional initiation and decision), Implementation (physical deployment) and Post-implementation (institutionalization). In the following sections a discussion of these three phases is presented.

#### 8.2.1 Adoption (Institutional)

The adoption phase examines how the institutions initiated and took a decision to introduce the LMS. The initiation and decision to introduce and use is looked at in terms of who was behind and how the idea was subsequently adopted (or not by the entire institution). Institutional adoption of a technological innovation should be clearly thought through before intro-

duction. This requires a clear identification of a need or problem to be met or resolved by the introduction of the technology. In identifying the need or the problem, the role played by the institution through its mandated unit or committee is critical to ensuring that the solutions identified meet the expectation of all stakeholders concerned. Greater success can also be achieved where the technology introduction is enshrined in the institution' vision, mission and strategy.

#### *8.2.1.1 Institutional Initiation*

In the cases studied in this research two were directly initiated by members of the top management, the third was initiated through a collaborative effort as part of a MOU with another institution and the fourth through a window of opportunity for funding for technological introduction into teaching and learning with the support of management. With Case1, management always took the opportunity to inform members of the institution of the intention to introduce e-learning. Long before the introduction of the LMS therefore, institutional members were sensitized to this intention of management. Management later at an academic board meeting more formally informed members and requested the deans and heads of department to discuss with their members courses could be put online. When management received reports from the faculty members that they were unprepared for going online, management invited a facilitator from a top university in the US to demonstrate how some technical courses in Engineering could be delivered online. Later, management invited members of the IT unit to investigate into the different types of LMS and recommend one for adoption. When Moodle was recommended, management selected one IT personnel to go for a one week training in the UK. One can clearly see the total commitment and support by top management to the introduction of e-learning. Clearly there was no in-dept consideration of the institution' teaching and learning practices by this board or the IT department for which the LMS' introduction was expected to take into consideration.

In Case 2, through the prior experience of the President in the development and use of LMS, a group of students were guided in the testing and configuration of the Open Source Moodle platform, the development of courseware, and the establishment of a tertiary institution. The LMS was therefore in place before the institution received the necessary accreditation to begin operations. Not only was the President the brains behind the use of the LMS to setup the institution, he was also actively involved in the setup and management of the system as a

computer scientist himself. He particularly took a leading role in the development of the various courseware for the course web sites, ensuring these were in readiness for use by visiting members of the accreditation board, faculty members and students. There as detailed consideration about the teaching and learning processes required of faculty and students along with support services to be provided by administrators in the configuration of the Moodle platform.

In the case of Case 3 the initiation occurred through a requirement for a collaboration to introduce a master's programme in Global Leadership. The MOU required three persons to be trained in the administration of Moodle and the development and setup of courseware and course sites respectively. The IT unit was subsequently brought in, trained and assisted to setup and manage the Moodle platform. Up to this point, management' interest could be said to be minimal since it took the determination and enthusiasm of the IT manager and support from some deans and other events to attract total management support. The setup of the Moodle platform could also be described as not taking into consideration the teaching and learning practices of the institution. Concentration was on the functionalities provided by the platform and the requirements of the collaborating institution.

In Case4, the initiation occurred when the institution got selected to benefit from an international funding aimed at developing the educational technology strategy and integration of technology into teaching and learning in higher education institutions in Africa. A committee was subsequently setup to plan for and develop a proposal for the award of the funding. The institution's structural provisions for managing external funding and projects were subsequently made available to support the implementation. Although the teaching and learning practices of the institution were considered and deemed to be inadequate, the focus of the initiative was on utilizing the functionalities of the Moodle platform in the institutional courses and building the capacities of faculty members to develop courseware and utilize the platform.

#### *8.2.1.2 Institutional Planning*

The institutional commitment to the introduction of e-learning requires a holistic planning that takes into consideration the existing resources (infrastructure, human, funding, etc) available for the successful introduction of the innovation. Although the need to plan appears to be

common knowledge, there is evidence to show that this is seldom the case. In the instance of Case1, there is very little evidence of this kind of institutional planning. No implementation committee was setup to plan and strategize for the roll-out of the LMS even though awareness was being created at every given opportunity about the institution' intention to introduce its courses online. A roll-out strategy was also visibly missing from the institution' unwritten plans and activities. Even after an instructional technologist was recruited and an online unit set up, the roll-out strategy was still unclear.

In the case of Case 2, although there was no evidence of a documented plan, one could identify a systematic approach to the implementation: installation and configuration of the Moodle platform, development of courseware, mounting of courseware onto the Moodle, application for accreditation, recruitment of faculty members, admission of students, development and integration of other institutional IS.

There is also very little evidence of a holistic planning for the implementation in Case 3. Although there was planning for the training in the administration and course development of Moodle, the deployment of the platform, the awareness creation, training in the use of Moodle for computer-based exams etc. was not part of a holistic plan directed at introducing e-learning. The apparent time being taken by the LMS to be integrated into the institution's teaching and learning practices was therefore understandable.

Extensive planning however was undertaken in the instance of Case 4. This may have been facilitated by the establishment of a committee to oversee the implementation of the project. The planning covered pre-assessment of the institution and a post-implementation evaluation all in the form of a research conducted. Members of the implementation team had several meetings during the planning stage, and although there were challenges in sometimes getting all team members to meet, they were finally able to put together the proposal in which was detailed the full implementation plan.

#### *8.2.1.3 Awareness and Sensitization*

Awareness and sensitization enables stakeholders to know about the institutional intention for introducing the technology and allows members to buy into the process. The awareness can be created in various ways e.g. through workshops where internal, external or both facilitators

are invited to present on the particular technology, demonstration sessions are organized to show members how the system works, etc. through this, all stakeholders would become sensitized to what the institution intends to do. Some times this can be done long before the LMS is introduced, allowing stakeholders to clarify their concerns and misconceptions long before the system arrives. In Case 1, although members of the top management took it upon themselves to inform members at every given opportunity of the institution's intention to introduce e-learning, arguing it was the way to go, that was where the sensitization stopped. The institution therefore did not have a strategy for creating the needed awareness and sensitization that could have addressed all the concerns that later created bottlenecks for the implementation.

Case 2 on the other hand was established with the Moodle LMS as the institutional learning platform long before any recruitment was done. Both faculty members and students were subsequently required to undergo training and take compulsory examination to show they understand and can use the platform to achieve expected academic goals. Through this effort, members were sensitized to the system and its centrality to everything done in the institution. Every stakeholder in the institution understands and knows that without the Moodle system, the institution does not exist; the system is the institution, and the institution, the system.
In Case 3 awareness and sensitization (advocacy) was undertaken and is still ongoing. This was done by the head of IT who saw the need to get stakeholders to buy into the process. Workshops and training sessions were organized for stakeholders in addition to other formal and informal meetings with both individuals and departments. Some departments were currently requesting for specialized training with some deans actually championing the LMS platform in their schools. However no institutional plan could be found for creating awareness and sensitization.

Case 4 had an initial awareness workshop where some participants were identified and selected to be part of the project implementation as courseware developers and Moodle users. Though several workshops were organized for the selected participants, this was aimed at capacity building, leaving larger section of the institution's stakeholders uninvolved. No systematic plan could be identified for creating the much needed institution-wide awareness and sensitization that could garner the needed support.

#### *8.2.1.4 Infrastructural Readiness*

The availability and readiness of the requisite IT infrastructure is critical to the success of the implementation. Administrators, faculty members and students require reliable and accessible networks both on campus and off campus to engage with the Moodle LMS. As part of the planning, an assessment should be made of the institutions' infrastructural resources to inform subsequent implementation activities. Access to computer labs, internet and LAN or WAN (where applicable), wireless access points is important for any meaningful engagement with the Moodle platform. Clear decisions should be made on whether the Moodle would be hosted on the institution's premises or externally on a hosted server. This is important as a dedicated server would need to be procured for that purpose. The availability of backup power is also important along with adequate backup for the LMS' data. Where this is not catered for, there could be data loss in the event of power outages. All the institutions had issues with their infrastructure which could not be said to be adequate and ready. There did not also appear to be any immediate plan to improve the reliability and readiness of the IT infrastructure.

Case1 in their initial decision to host the LMS on campus set up a PC server with UPS for backup power. Although the internet bandwidth was 10MB, reliability of access was still problematic. This could have been caused by age-long LAN that may have required a change. When due to a serious national power crisis a new decision had to be made to host the LMS on a sub-domain of the school' website which was hosted somewhere in the US, there was still some challenges since it was a shared server. In addition, the total number of PCs available (on two campuses) was two-hundred and eighteen (218) and a student population which stood at a little over 2000, this number of PCs (including that for faculty members with offices) was inadequate. Students and faculty members who had access to laptops could access the wireless hotspots on campus, helping to reduce pressure on the inadequate computers.

Case 2 started with the hosting of the Moodle on a dedicated server hosted in the US since its students were expected to access the resources from all over the country, anytime, any day. On campus there were three labs with about 60 computers connected to a LAN. There was also a wireless access point for students and faculty members with laptops to access. With a student population of over 1600, and a majority of these owning laptops, there was no pressing constraint to provide more PCs on the campus premises.

Case3 had three labs with about 158 computers dedicated to students' computer literacy courses, a local area network connecting all the buildings on campus, internet connectivity and a special lab setup with a hundred (100) computers dedicated to computer-based examinations until its destruction by fire. With a population of over 6000 students, these PCs were woefully inadequate. To enable students access the Moodle platform from anywhere in the world, the system was hosted on a shared server somewhere in the US. The school' website however was being hosted on an external shared server. Since the Masters in Global Leadership was basically an online programme with international and local facilitators, students accessed the Moodle platform from the comfort of their homes (external access), thus initially there was not much pressure on the already inadequate PCs that were serving first year students with need for computer introduction. Nonetheless the infrastructure was still inadequate and needed enhancements.

An assessment of Case4' infrastructure showed that it had connectivity across the main campuses scattered across the country with an internet connectivity via VSAT, 847 computers with 356 available for students use, other hardware and software were required for setting up the Moodle platform on campus. These included a server, an antivirus, and an Adobe CS4 suite. Though the internet uplink and downlinks were 1.7 Mbps and 3.5 Mbps respectively, the reliability of this was in question due to its slowness and often inaccessibility.

In terms of infrastructure many of these institutions could be said to be not ready both for deployment and use. This was important as the some of the faculty members and students were very much aware of these constraints and even though ere in support of the initiatives, actually felt the timing was not right.

#### *8.2.1.5 Stakeholder Involvement*

Several stakeholders can be identified in educational institutions from those with direct stakes to those whose interest may not be directly influenced by the introduction of the LMS. Faculty members and students can be described as having direct stakes in the LMS as their core roles are affected by it. Others not so directly affected include the Examination unit, students' records, accounts and finance, and the IT unit. There are equally other organizational units like the quality assurance, academic boards, institutional governance, management unit (all internal) as well as governmental and partner institutions (external stakeholders) where appli-

cable. Understanding the role of each of these stakeholders, how they directly influence the LMS implementation and use, and how and where they should be involved is critical to the success of the implementation. Too often however this is inadequately addressed. The buying into the process and the taking of ownership of the process is important to the eventual institutionalization of the LMS. These stakeholders must therefore be identified and their involvement strategically harnessed to ensure success.

In the cases studied the institutional stakeholder involvement strategy was not carefully planned out particularly in institutions that had been in existence for a while before the introduction of the LMS. These institutions (Case1, Case3, & Case4) were comfortable with the face-to-face classroom approach and coupled with the unreliable technological infrastructure in the country and institutions, were more prone to resist the LMS than institutions that started with the LMS from their inception (Case2). In Case1 for example, when top management introduced the idea, deans and HODs were asked to consult with their faculty members to determine which courses would be initially rolled out. When they raised concerns, management further invited an external facilitator to demonstrate the possibility of deploying even Engineering courses online. Though some faculty members were still not convinced, these issues were not adequately resolved. Management later involved the IT unit by requesting them to look into the various LMS available and make a recommendation since they were in charge of the technological infrastructure of the institution. This could have been more appropriately carried out if other stakeholders like faculty member were involved along with other relevant institutional units to be affected. This however was not the case.

Case 2 for one started with the system prior to accreditation and roll-out of the various programmes, recruitment of students and faculty members. The LMS was therefore in place with sufficient resources to begin with. Faculty members subsequently were allowed to update and provide other recommendations for the improvement of the LMS. Other institutional stakeholders also access the system for their administrative tasks, e.g. finance, student records, examinations, etc. During the application for accreditation, the National Accreditation Board requested for several presentations to be made to enable them assess how the system worked. This was very instrumental in getting the accreditation. Other collaborating partners like the OUM was highly interested in the functionality of the system in allowing Case 2 to offer their programmes in Ghana and other parts of Africa as a gateway. Clearly, these systems span internal and external stakeholder interests.

With Case 3 the need was identified early by the IT manager to get the necessary buy-ins from the relevant stakeholders including top management, faculty members, and some administrators. Thus seminars, workshops, formal and informal interactions with these stakeholders were deployed to get the necessary involvement and buy-ins. At some of the training sessions, the VC was personally present to show support. Some Deans were also invited during some of these training sessions to make presentations of their use and experiences. Although not institutionally planned, the work of the IT manager in pushing institutional adoption by involving stakeholders has been very instrumental in getting the institution to where they are presently.

Case4 on the other hand identified its stakeholders early in the planning focusing more on the core users, faculty members and students. Through this initial assessment and identification, a research was planned to more formally assess faculty and institutional readiness, as well as how to enhance students' use of the LMS. Since it was a pilot project, attention was focused on a few faculty members and students, most of whom were located on the main campus. This therefore failed to aid full involvement of stakeholders, a factor that would influence the future efforts at institutionalization.

#### *8.2.1.6 Information Technology Staff Readiness*

The IT department of higher educational institutions have traditionally been concerned with the procurement, setup, management and maintenance of the IT resources (hardware and software). Recent developments in ICT however have led to many of these institutions introducing applications for managing student information, library resources, human resources of the institution, as well as applications that manage other institutional process like admission, examination etc. The technical competencies required by the IT staff of these institutions to manage these technologies that allow information to be communicated across national boundaries now includes the ability to programme in different languages like PHP, ASP. PYTHON, understanding different databases like Oracle, MSSQL, MySQL etc. with which most of the online applications are developed. Where these competencies are lacking, the institution might resort to external assistance which often comes with financial implications. In more recent times, a lot of HEIs are resorting to open source applications like the Moodle LMS which requires some modification to often be made to meet institutional requirements. The institutional IT department however is often composed of hardware and networking

technicians with often little or no expertise provided for software. This problem appears to be prevalent in many institutions including the cases under study.

When Case1 decided to introduce the Moodle LMS, many of the IT staffs were networking, server and hardware technicians. This caused the management to select one IT personnel to be trained in Moodle administration. The duration of the training was about a week. The IT personnel, with the aid of available online community support and documentation, setup the system and trained some two other IT staff to assist. Later, this IT staff left the institution for further studies, leaving the two trained staffs to manage the Moodle LMS along with an external web designer responsible for the institution's website. When the institution decided to introduce an academic ERP, the IT staff were not actively involved to build the relevant capacity, resulting in an IT department that has little control over the institution' information systems.

Case2 started with the testing and configuration of the Moodle platform by students as a project assignment before the decision to introduce a higher educational institution using the Moodle platform. The initial technical staffs were therefore computer science students with programming capabilities in PHP and database applications. This knowledge and skill facilitated the team's ability to modify and integrate the Moodle platform to fit the institutional processes. Though these personnel were competent in these programming skills, their mastery of the Moodle application still takes time. They have subsequently been able to integrate this platform with other applications, creating some form of academic ERP. When an advertisement was placed in Ghanaian newspapers and internet sites for Moodle experts and Network specialists, only one person responded for Moodle and 10 applications were received for network specialists. This highlights the challenges facing institutions seeking to deploy such systems in Ghana.

In Case3, there were already three IT staff, with three other technicians responsible for minor networking trouble shooting and hardware repairs. The three core IT staffs were trained in Computer science and had different levels of practical experience. The IT manager in addition had a master's degree in IT with extensive experience in website development and online applications using PHP. There was also external facilitation from collaborators and partners with experience in online teaching and learning as well as computer-based examinations that

provided invaluable support for the institution' LMS setup, configuration and use. Although the institution made do with the available resources, more was still left to be done.

The Case4 had an IT staff located in the NOC and responsible for the institution's IT infrastructure. Four of these staffs were specially selected to be trained in the installation, configuration and management of the Moodle LMS. These staffs were responsible for the setting of the Server, the Moodle application and for providing access controls for students and faculty members, as well as general technical support to all users. In some of the trainings, external facilitators were present to provide the much needed assistance in capacity building.

Adequate provisioning for the IT staff in all of these institutions was lacking through failure to assess and plan for the Moodle in some cases, and share lack of these experienced IT staff in other cases.

#### *8.2.1.7 E-learning Expertise Readiness*

The deployment of an LMS for online teaching and learning purposes requires the involvement of several expertise including technological and pedagogical specialists. Thus even though the platform is an IT system that requires IT expertise to install and configure, instructional technologists and designers with online teaching and learning knowledge and experience are required to ensure that the right application of these systems in teaching and learning are realized. These e-learning specialists assist the IT staff and faculty members with the required know-how in setting up courses for effective delivery. Where these specialists are unavailable, external assistance should be sought from partner institutions or e-learning organizations with the necessary experience in these matters.

Case1 for instance had no ready e-learning staff that could assist in the planning and implementation of the technology. Training had to be organized for one of the IT personnel to acquire some knowledge of the Moodle's implementation. The training lasted one week, a possible sign of its inadequacy, especially as it was limited to the Moodle application' setup and administration. As adequate assessment and planning were not carried out from the beginning, arrangement for external support was not considered. Also, though the president and the vice had experience in the system use, their tight management schedules could not afford them the opportunity to assist in this area.

In Case2' situation, there was an e-learning expert with vast experience in the use of similar platforms providing the much needed guidance for the setup of the Moodle platform and the associated courses. Through its collaborations with experienced institutions, external advice was sought from the institution's partners which further enhanced the structuring of the LMS and the development of the course sites.

Case 3 began with a three months training of 3 personnel from the It department as required by the MOU in the areas of Moodle administration, course development, and studentship where the personnel experienced what students' go through in the use of the LMS. With the IT manager' previous experience with the Moodle, his teaching background and support from external facilitators, he and his team members were able to provide e-learning support to the institution two deans with experience and interest in the use of the Moodle platform also provided strong expertise to other faculty members.

In Case 4 there was internal and external e-learning expertise available. The institution had trained instructional technologists and multimedia specialists who acquired their training from abroad. These were brought in to assist in the implementation. The external facilitators were brought on board through the funding opportunity provided by the external collaborators to guide and assist the institution through all the implementation stages. The availability of these e-learning staff was very instrumental in pushing the implementation through, although it can be said also that they were inadequate considering the population of the institution.

#### *8.2.1.8 External Support Availability*

External support becomes necessary when institutional capacity is lacking, and in some cases when there is the need for mentorship. The experiences and competencies of the external support which may be institutional or individual expert in nature is necessary especially when the institution in question lacks the expertise and competencies required to successfully deploy such systems as the LMS. These external supports can arise as a result of collaborative agreements between institutions, the opting for proprietary LMS with available support, or through partnerships with other institutions that have the experience in the deployment and successful use of such systems. How the institution harnesses such support can determine their potential to providing the much needed strategic support to attaining institutional objec-

tives. Unfortunately, these often appear to be unmatched with specific institutional plans, making the benefits from them to be unrealized. The timing of such external support is also important. Determining what stage and what impact the support would create is important to achieving the institutionally set goals and objectives. External support could be brought in to create the much needed awareness, deployment as well as institutionalizing the LMS. Such issues therefore require critical consideration by a dedicated implementation team if it is to be impactful.

Case1 had external support coming in to show faculty members that technical courses can be successfully delivered online. This did not however dissuade faculty members from feeling that they were not ready to go online. When the new system, which was proprietary was introduced, support was externally provided making the in-house IT team somewhat 'redundant'. They could not assist users when there was a problem and always had to refer users to the external support. This created a situation where the system was perceived as unready.

In Case 2, the external support came in the technical configuration stage and advisory needs of the institution where external Moodle experts provided some necessary services to enable the system perform as required, and advice provided on other areas of the implementation like Course Content Development. Where security and other threats were concerned, the institution also relied on the service providers' alertness and competencies to augment their capacities. Partners in programme delivery also provided the necessary support where necessary to ensure that institutional standards were met.

Case 3 received assistance from external facilitators with experience in the setup and use of open source applications like Moodle. The institution required specific training from a specified institution in the US through an online medium and also provided assistance in the setup of the system. External support and facilitation was also sought from their international partners in Nigeria to setup and manage a computer-based examination centre. This institution was well experienced in this area and so took them through a one week training and tour of online examination and tour of their infrastructure. Later, these partners came to provide onsite assistance in their setup of a computer-based examination centre. Support was also provided by their web hosts during the installation of the Moodle application since the capacity and resources of the IT unit were inadequate.

Case4 received external funding and facilitation from experienced institutions in South Africa. The facilitation covered all aspects of their implementation processes: from the initial research conducted to get a baseline understanding of the state of the institution' infrastructure, educational technology and lecturers' readiness to actual deployment of the Moodle LMS including courseware development, mounting of courses, use to evaluation of faculty and students' use of the platform. This facilitation from external individuals and institutions was a necessary component of the funding agreement received from the donor institution.

External support plays a vital role in the successful introduction and integration of LMS in institutions. As has been highlighted, this support can occur at any stage of the institution's implementation process and is direr when the institution has little or no experience in LMS deployment.

#### *8.2.1.9 Consideration of Core Task (teaching and learning)*

As indicated above, though educational institutions perform many tasks similar to business organisations, their core task involves the teaching and learning processes. Several reasons can underlie an institution's decision to introduce an LMS. This may be to support students' learning, improve facilitation (teaching), provide access to education, or in compliance to a national directive. Whatever the objective of the introduction, an important component is the pedagogical models, the unique processes, norms and values of the institution. Teaching or supporting students' learning via LMS requires careful consideration and design. There is evidence to show that many students who take online courses are unable to complete. Also, when used in a blended or hybrid learning, the absence or irregular presence of the facilitator can impede effectiveness of the medium. The failure to provide guidance and cues on how students can progress with their studies, find ready support, etc. on the platform can also affect effectiveness. Thus there is the need for an institution introducing an LMS to carefully consider how instruction would be facilitated and students learning guided to achieve effectiveness. Else the entire process would centre on the software and its functionalities which can conflict with known processes and practices of the institution, eventually resulting in resistance and refusal to use.

Prior to and after the setup of the Moodle platform in Case1, there was no evidence of the pedagogical and quality consideration of the courses to be mounted onto the Moodle plat-

form. The Moodle itself was setup to go through three stages of usage: mounting of course materials on the platform, engagement in collaboration, and use in assessment. Faculty members were then trained in the Moodle' functionality and asked to mount their course materials onto the platform. Little was realized from this approach as many faculty members failed to comply with the directive. In December 2012 when an instructional technologist was appointed and an online centre set up, more intensive training including online instructional design and facilitation was provided. Different models of instructional design and approaches were introduced, allowing faculty members to decide on the most appropriate for their courses.

The Case 2 was purposely setup to provide online degrees in collaboration with a well-established Open University. The format and design of their courses were designed along the recommendation of the collaborating Open University. The units in the various courses are therefore designed along pedagogically sound principles allowing students to learn on their own, at their pace and then attend class meetings every two to three weeks. When access to the Moodle resources was made available to on-campus students in a blended mode, the same structure and design ensured students had access to course resources prior to their lectures and also after during their personal study time. The needs of students have been well catered for and thus initially, there was the temptation that such students would fail to attend lectures after gaining access to the course materials.

Case 3 had the privilege of the existence of an institutional instructional design format introduced to bring uniformity across all programmes and courses. The format was designed along the ADDIE model which widely accepted model of instructional design both for face to face and online instruction. This format was used to prepare course outlines which were subsequently mounted onto the Moodle platform. With the assistance of the external facilitators from the collaborating university in the UK, the courses designed for the masters in Global Leadership (which was an online programme) took students learning needs and support into consideration. Students therefore attended face-to-face sessions once a month as some facilitators felt the need for such interactions.

In the Case 4 the planning and implementation team with the assistance from the external facilitators designed an instructional framework made up of best practices and a quality assurance checklist to guide faculty members both in the design of the courseware and the setup

of the courses on the Moodle platform. The quality assurance ensured that important considerations for enabling students undertake quality self-study had been provided for. In the first two courses that were piloted, the course syllabuses were modified to incorporate the use of the Moodle application. This enabled a review of the courses to be made to determine their relevance and adequacy.

### 8.2.2 Implementation (physical deployment)

There are two core concerns involved in this phase: the Moodle LMS' successful installation and configuration, and the successful re-engineering of the institution's processes (with teaching and learning at the centre). The Moodle LMS often comes with its own functionality some of which may need to be adapted to the institution's requirement. However where the the functions (or some) of the Moodle are seen to enhance or provide solutions to existing institutional challenges by making the processes easier or more efficient, the institution's processes may need to be adapted to that of the LMS platform. All these need to be critically evaluated to clearly integrate the LMS into the repertoire of the institution' processes. Where this is not done, an institution introducing an LMS may encounter challenges in getting the platform to be accepted and integrated. In the following sections we discuss further some pertinent issues in deployment phase.

#### *8.2.2.1 Installation and Configuration*

Installing software requires the existence of the hardware component and technical staff with the requisite knowledge and experience to configure the software and the server on which it is to reside. The configuration often will take care of security, backup, access control and functionality of the software, in this case the Moodle LMS. This is much easier if the institution has the resources and experienced staff but where the resources are lacking and an external host has to be relied upon, it comes with associated cost and trust issues. This is not to say that the trust issue does not arise in cases where the software is installed and configured within the institution. Both cases have their merits and demerits for instance, where expertise is lacking, the external host can be relied upon to provide such technical assistance as providing security, setting up backup, etc. although at a cost that might be expensive to the institution. That aside, hosting such applications come with configurations that may need to be carried out on a shared server, a situation that may not be suitable to other users of the server, necessitating a dedicated server to be purchased. With the Moodle application, a lot of international

web hosts have specialized services for institutions and so have wide experience in their set-up, configuration and management which institutions can opt for. Somehow though, institutions in Ghana do not subscribe to such services but rather allow their IT personnel to spend a lot of time in setting up the LMS for use.

In Case1 for instance, the setup and configuration of the Moodle application which was freely downloaded was done by a trained staff on a local PC server that was dedicated to the LMS. When challenges were experienced due to unpredictable power outages and the inability of the UPS to sustain the server for long, the decision was taken to host the Moodle on a sub domain on the institution' website which was on a shared server hosted somewhere in the US. This was done and has remained so till date with the interface designed with the institution's colours, logo and name. When a new LMS was introduced to replace the Moodle LMS, its installation and configuration was done by an external proprietary host in India with very little involvement by many of the institutional stakeholders like the IT department, the online centre, and some administrative personnel. The new system' functionality therefore required some modifications using inputs from the users, and since this has not been resolved, there are difficulties involved with its use.

The Moodle installation and configuration by Case 2 was done on a dedicated server by a team that had conducted several tests on the platform during projects in school. As such the setup on the external server took place without much challenge as the web host' technical team was also at hand to assist with the configurations.

Case 3' Moodle platform was setup by the IT manager on a sub-domain of the institution's website with the help of the web host' technical team. This was necessary due to the shared nature of server. Opening certain access on the server could affect other applications hosted on the server as such there was the need to seek approval and support from the web host, which was readily provided due to the existing good relationship shared between them.

Case 4 procured a server for the hosting of the Moodle on their campus premises. This was to provide their NOC personnel the opportunity to develop the much needed capacity in order to assist future expansion of the LMS implementation. Four staff of the NOC were selected and trained to manage the installation and configuration of the Moodle after the server was pre-

pared. Access to the platform was provided using the institution' official network account for access security and control.

The capacity of the Moodle applications hosted on shared servers had not been tested by the full implementation of all courses in some of these institutions, e.g. Case1 and Case 3. The use of a dedicated server on the campus premises by Case 4 was also being piloted so not all courses were mounted and in use. With a little over 2000 and 6000 students in Case1 and Case3, a substantial use of the system would have to be tested to really determine the adequacy of the resources and capacity of the resources to contain simultaneous access.

With the exception of Case2 that began with the platform and thus was able to integrate all its processes into the Moodle's use through plug-ins, Case1, Case 3, and Case 4 showed no evidence of a consideration of the institution's processes considered and either adapted to the Moodle' functionalities or that of the Moodle adapted to the institution. It therefore could be argued that the Moodle' functionalities were imposed on the institution' processes thus creating a resistance.

#### *8.2.2.2 Courseware development and Course site setup*

The development of the courseware to be used in a course is an important requirement in the deployment of an LMS otherwise there would be no reason to go on the platform. The courseware development involves the inputs of subject experts, multimedia and graphics specialists and instructional designers to ensure the course materials are put together in a pedagogically accepted way useful for online consumption. To develop this however an institutional decision is required as to whether it should be developed in-house by each faculty member or a specially composed group, or it should be outsourced to external developers or purchased from a commercial developer. Where this decision is not considered, it could lead to possible delays in the mounting of courses onto the platform, or even failure to mount any course onto the platform. In some institutions, faculty members perceive their lecture notes as their personal property. This problem is the result of institutional failure in insisting on the use of core texts for courses offered within them. This may also be attributable to inadequate resources availability.

Closely related to the courseware development is the issue of course site setup. Depending on the nature of the deployment, courseware developers could be required to setup their own courses after training is provided on how it should be done on the platform. The course website can also be mounted by a designated unit within the institution and access given to course facilitators to include or modify as needed. This ensures that all courses within the institution are mounted and a uniform minimal standard established. Faculty members can then be allowed to include and exclude certain resources or determine the order of delivery. This however should be fully determined prior to the deployment. The need for this can be seen in the potential challenges that could occur when faculty members are required to setup their courses and enrol their students with very minimal assistance and motivation e.g. Case1.
In Case1, faculty members were required to develop their course materials and upload them onto the Moodle platform. They were initially required to develop their course instructional manual after which the course site would be populated with the relevant course contents. Many of them felt this was laborious and moreover no remuneration was being provided for what they felt was an extra job. In addition, they were required to register their students in their course, an activity they believed should have been performed by a special unit. The impact of this could actually be seen in the resistance and delays in mounting the courses onto the Moodle platform by faculty members.

Case 2 on the other hand developed all the courseware for the various courses and mounted them onto the Moodle before recruiting any faculty member. This was done by the President and his development team with the advice of external partners. The institution bore the responsibility to do this which later paid off as there was no resistance on the part of the employed faculty members but a simple compliance and use of the Moodle after training was provided. Faculty members however are required to assess and recommend modifications to the courseware at the end of every semester and are part of the assessment of the performance of the faculty members. This has served to strengthen the initial development by the institution and also involved faculty members in the subsequent enhancement of the application.

In Case 3, the initial courseware for the masters in Global Leadership programme received support from the collaborating university as the course materials were already available. The trained IT personnel were then assisted to mount the various courses onto the Moodle with the help of a facilitator. Later, with the graduate school' introduction of more masters programmes, the faculty members were required to develop their own courseware for mounting

on the platform. With the policy on the use of Moodle as the institutional LMS accepted, all faculty members including undergraduate and diploma programmes were required to develop their course outlines and upload them onto the platform. Other course materials will be gradually mounted onto the platform with the introduction and enforcement of e-learning use by the institution.

With the assistance from the funding window and internal and external facilitators, the courseware for the piloted programmes were developed by the faculty members involved in the instance of Case 4. These faculty members were given training and guidelines in the development of courseware and at a point sent on a special retreat to prevent distraction and enable completion of the courseware. Faculties involved were motivated with some amount of monies leading to 42 courseware developed (but some were yet to be completed). Both online learning best practices, rubrics and quality guidelines including internal and external evaluation of the courseware was used to ensure quality of the development. The courseware however did not cover all courses offered by the institution. This was perhaps due to resource constraints, both financial and time wise. Motivation was key to the current achievement and may be required for future development. Peer review of these courseware was however not undertaken, an activity that could serves as a pre-quality check, before external review.

The availability of courseware for LMS is critical to its successful implementation. However its development involves both financial and time constraints which can impede its availability for effective LMS deployment. Institutions therefore need to take decisions on how this important aspect of LMS deployment will be addressed prior to implementation.

#### *8.2.2.3 Support staff involvement*

In higher educational institutions, different staffs provide support services to the core teaching and learning processes. These support services include admission, registration, examination, student records, students' accounts, library services, quality assurance, departmental administrative support, office of the dean, IT support, etc. Some of these staffs tend to be directly or indirectly affected by the LMS and as such need to be involved in the deployment process. For instance, the quality assurance unit of an institution has the responsibility of assuring that programmes offered in an institution are of a quality standard, whether face-to-face or online. Members of this unit must therefore be actively involved in the process of

deploying the LMS to ensure that quality standards are met. In the same way, the department or community that oversees new programmes or even examinations must be involved in the process to ensure that the institution' online development goes through the mandatory institutional processes required for traditional programmes. This requires careful analysis of institutional processes, units and personnel to identify those who need to be involved. Where this is done, the implementation assumes an institutional nature and not just a group of selected persons spearheading a new development. These affected staffs need to involved in a timely fashion if their support and impact are to be harnessed for the overall success of the implementation. Many institutions however often neglect to consider this factor.

In Case1 for instance support staffs were not seen to be involved in a way that would have aided the deployment and integration of the Moodle. Faculty members had already been asked to consider which courses would be ready to go online before IT was asked to look into available LMS platforms and recommend one for adoption. When an IT personnel was sent for training outside the country, his job schedule was to setup the Moodle, train faculty members in its use and manage the system. Clearly, affected institutional processes were not considered. Later after an online certification programme had been organised for faculty members, one was planned for administrators but unfortunately never came on. So although administrators were aware of the institution' e-learning implementation, they did not know how their work was affected by or related to the LMS.

In Case 2, all administrators were introduced to the system upon recruitment since the LMS was central to their work. Through the Moodle's integration with other institutional systems, those dealing with students' admission had the responsibility of populating the system with admitted students' details. All information related to the administration of teaching and learning could be conducted on the platform which was turning out to be some Academic enterprise resource system. The institution could do nothing without the system if it was not there or working.

In Case 3' situation, there was very little evidence of the involvement of support staff. In one instance, when the director in charge of examinations realized multiple choice questions could be arranged in such a way that questions appearing would vary from paper to paper, or screen to screen, it became adopted as an institutional standard for conducting multiple choice exams. This is one clear instance of how the Moodle' processes could influence the

institutional exam process in an innovative way. However the same could not be said for other institutional processes as no holistic planning had been done prior to the start of the implementation.

Case 4 had the support of institutional structures put in place to manage external funds and projects to ensure prudent compliance with funders' expectations. The implementation team put together for the project focused on the requirements of the project which was essentially to get the Moodle running and populated with courseware developed by the subject experts within the institution. The involvement of other stakeholders in order to facilitate institutionalization was not really taken into consideration. Thus even though the project lasted three (3) years, more effort was required to involve support staffs who' work is linked with some functions in the Moodle LMS.

It is obvious detailed institutional planning involving all stakeholders, whose works are directly or indirectly related to functions performed by the LMS, is seldom undertaken when institutions plan to introduce LMS. Other IS within the institution whose outputs could serve as inputs for the LMS are often not taken into consideration. This has the potential of delaying the integration of the LMS into the institution' practices since most processes that could be integrated continue to operate in isolation. Some of these processes which are manual in nature tend to delay other processes which are performed on the LMS and thus would be better-off being integrated. For instance the requirement in some of the cases for faculty members to enrol their students could have been addressed by the admissions unit directly in conjunction with accounts to certify registered students who have fully paid their fees and enrolled for a particular year or semester in a particular course. A faculty member thus simply sees the total number of students enrolled for his course without having to spend time enrolling them. The involvement of support staffs therefore can greatly enhance the outcomes of LMS implementations in HEIs.

#### *8.2.2.4 Initial Use*

When a new system is rolled-out for use, it is important to monitor how the system is being used in order to determine whether the use conforms to the expectation of the implementers or there is the need for further interventions to get the much needed results. Although the technical installation and configuration of an LMS may be successful, use of the application

is an important indicator of how the objectives of the implementers have been translated into reality. The successful configuration of the LMS however is not a guarantee that the system would be used in a goal oriented way. The factors contributing to this outcome are many and require careful evaluation of use and the intended objectives. The initial use also depends on the roll-out strategy adopted by the institution. Where it is a pilot case, then corrective measures would be taken to achieve the desired objectives and address the concerns of users. Where it is a total roll-out, the use by faculty members and students must be monitored to ensure responsive support to all their concerns from technical to actual teaching and learning. Depending on whether it's a fully-online application or blended/hybrid application, the presence of faculty online has been identified to be important to sustaining students' interest and use of the LMS. Faculty members must therefore ensure they address students' needs by being present at specified times to respond to students' postings, assignments, discussions, emails, etc. timely. Students' use of the system also must be monitored and where applicable sanctions meted out to those not using the platform as required. Fortunately a user log on most of these LMS ensures that the activities of all users are recorded to enable assessments to be made. In the following sections, we take a look at how faculty members and students used the Moodle LMS when they were first rolled-out.

#### 8.2.2.4.1 Faculty Use

The faculty members of an institution are direct stakeholders of an LMS as the instructional use of such applications requires their committed involvement. Without faculty members committed use of the Moodle application, students will not be motivated to go online which will eventually lead to the LMS not being used. Use of the institutional LMS by faculty members can also be affected by institutional directives e.g. in Case2 where lecturers were required to use the Moodle for all their interaction with students. A minimum guide as to the nature of use may be required help faculty members get started though not necessarily in all cases as there may be some who know how to use it or have the enthusiasm to learn how to effectively use it. Where no such faculty guide exists, there is the likelihood for some faculty members to simply upload their courseware but fail to be present online. Also, there is the need to monitor exactly what faculty members do online to ensure that their use of the LMS is in accordance with institutional expectations. Fortunately, such reports can be generated from the Moodle platform thus making a weekly assessment possible for monitoring purposes.

In Case1, when the Moodle was rolled-out for use, faculty members were required to mount their courses onto it for students' access. At the graduate level, the course materials were already available so it was easy to place them on the Moodle. However the configuration of a single log on access for each student did not enable any meaningful interaction between students and faculty members at the graduate level. In fact for this very reason of not being able to interact on a one-on-one basis with students, some faculty members felt the purpose of the platform was defeated and so did not go onto it. At the undergraduate level, although a few faculty members especially from the Informatics department made their course notes available, they never visited the course site to see what was happening. One faculty member who was very enthusiastic about the Moodle actually used it to not only distribute his course materials, but also interacted with some students and conducted an online assessment with his class. But by November 2012, no single faculty was seen using the platform, not even the very enthusiastic ones. This may have been due to the departure of the Moodle administrator from the institution, earlier on in the year but a look at faculty involvement in 2011 showed very few if any activity on the Moodle platform. This also may have been attributable to the non-enforcement of institutional directives on the Moodle use. No penalty was given to any faculty member who refused to use the system. At some point the Moodle administrator had to personally 'chase' faculty members for their lecture notes to be uploaded, but this equally did not yield much results. There was clearly the need for institutional enforcement of the Moodle use directives at all levels, however, there no immediate solution in sight. When the instructional technologist was recruited and the online centre established in December 2012, there was a transformation in the use of the Moodle platform by some faculty members. Eight (8) courses were mounted onto the Moodle by January with the faculty members actively mounting their course materials, interacting with students and assessing students online. These faculty members subsequently became ambassadors helping the centre to sensitize other members to get on board. By September 2013, twenty-five (25) courses had been mounted onto the platform and being used in a blended mode. The faculty members actively using the platform have been certified to teach online and have created an online presence where students know they can be reached and interacted outside of the classroom as often indicated in the lecturers' introduction to the course.

In Case 2, faculty members were first trained upon recruitment in the use of the Moodle system to facilitate instruction, interaction, and assessment. Faculty members were then required

to take an examination to certify their total understanding of their role in the use of the system and the system's functionality. Since the course sites had already been mounted by the institution and students registered for the courses, lecturers simply went to work structuring their courses according to the units per week and adding the required activities. Assignments and topics for discussions were posted on the course sites as well as quizzes after each unit. Deadlines were specified with frequent reminders on the notice boards of students. During meetings with students in the face-to-face encounter, faculty members interacted with students without the need to dictate notes as students already had access to these prior to attending the sessions. At the end of the semester, faculty members assessed the adequacy of the resources on the course sites and recommended improvements where necessary. The use of the Moodle by faculty members was a core part of their daily routine as they performed their duties. This could be attributed to the absence of any other option should one chose to instruct in the institution. The use of the Moodle was mandatory and measures were in place to check its use to ensure that the institution' purposes are realized.

With Case 3, in the instance where the Moodle was rolled-out for the first time for use in the collaborative master' programme in Global leadership, faculty members interacted with students through e-mails, chats, and discussions. Assignments were also issued and submitted via the Moodle, with students viewing their results on the platform. When other masters' programmes were introduced, the active use of the Moodle was by enthusiastic faculty members. The not too enthusiastic simply put their course materials online and visited the site once a while to see what was happening. The enthusiastic ones however engaged actively with the Moodle platform as many of the students were workers who could not attend regular classes. This was a useful platform to keep interaction on-going even after face-to-face sessions. All faculty members later complied with directives to upload their course outlines as such currently, all courses at the diploma, undergraduate and graduate levels have their course outlines mounted on the Moodle. However, at the undergraduate and diploma levels, faculty members are as yet to start any meaningful use of the Moodle. The institution is yet to enforce a mandatory use of the Moodle even though its been officially accepted as the official institutional LMS platform.

Case 4 implementation took the form of a project with budget constraints which limited the amount of faculty members who could participate. The initial pilot involved two faculty members with experience in IT. Incidentally, these faculty members were core members of

the implementation team and so were dedicated. Their courses were presented over a semester with students engaged in different aspects of the Moodle' use. The two courses offered spanned undergraduate and graduate courses which ensured the testing of the Moodle for two categories of students. The faculties supplemented their face-to-face with the resources on the Moodle. They provided lecture materials, quizzes, had interactions with students and engaged in discussions. Their experiences were used to guide ten (10) more faculty members selected to participate in the project for capacity building and learning purposes. Though the number of faculty members involved in the development of courseware for deployment on the Moodle increased from two (2) to sixty-nine (69) with forty-two (42) courses appreciably developed and the rest still under development, the Moodle was gradually being diffused throughout the institution. It is unclear whether this increase is due to the availability of funding from which courseware developers were motivated with some monetary packages, or due to growing enthusiasm about the Moodle' potential in enriching students' learning experience. The use however was within the project's timeframe, thus much is to be learnt after the project ends. The true test of the system's impact will then be observed as during the project, faculty members were under obligation to deliver a certain standard which was monitored and evaluated. Whether this has become an integral part of the institution' day to day activities is yet to be seen.

Faculty members' appropriate use of the Moodle LMS is important to students' purposeful engagement with the resources mounted onto it. This use must be monitored and evaluated to determine whether its in accord with institutional expectations. Where it is not, appropriate measures must be taken to remedy and encourage usage. The user log facility on the platform can be very useful in this respect, but it also requires the commitment of the institution in enforcing its expectations through sanctions.

#### 8.2.2.4.2 Students Use

Students have traditionally been expected to listen to and obey their instructors in class. This belief implies that students' use of the Moodle platform is highly dependent on facilitator's instruction and directives. Students are more likely to use the Moodle if they perceive it to be an important tool in their course as indicated by the facilitator. If it is even more perceived to be intrinsically linked to their assessment, then use is likely to increase further. Where penalties are attached for non-use as in the case of quizzes with time spans, students' commitment

to use can increase. Institutions can therefore facilitate students' use of the LMS by creating the much needed awareness of its use among students and the implications for non-use. When this is enforced in class by the faculty members, the institutional objectives for introducing such systems can be realized. Institutions that took time to sensitize their students had higher student usage of the Moodle than those that did not.

In the instance of Case1, from the onset in 2010, no sensitization was formally created among students, especially at the undergraduate side. Faculty members were expected to inform their students about the Moodle and how to access resources on them. At the graduate level however, since the resources were already available, faculty members simply asked them to go to the IT unit for user names and passwords which actually was generic for all. Graduate students thus accessed the platform for their course materials since contact with faculty members was only on weekends and with most of them being workers reporting from all over the country, their lecture materials was very important to them. Overtime however, this access of lecture materials reduced till it grinded to a halt. This possibly could be attributed to faculty members' non-use of the Moodle. In 2012 December when the instructional technologist was recruited and an Online Centre setup, coupled with an orientation, a campaign was sent to each class to sensitize students about the LMS and its use. With eight faculty members actively engaged in the system's use, students' use of the platform improved. Students accessed course materials including videos, interacted more with their faculty members and undertook quizzes online. Although there were challenges with their use due to some students recent familiarization with the system or general lackadaisical attitude towards the Moodle, with the commitment of some faculty members to the system' use, student's use is gradually increasing and becoming regular at the undergraduate level. At the graduate level however, use has still not commenced for some unknown reason.

With Case2, students are given a special orientation when admitted after which they are required to sit for an exam. They are sensitized from the very beginning of their dependence on the Moodle platform for their academic success even before they come into contact with the faculty members. They are taught to access their course materials prior to attending lectures, accessing their assignments, notices, core texts, engaging in chats, collaboration and discussions since these are integral part of most courses. Students in the distance education as well as those in face-to-face all use the Moodle platform on a daily basis as required by the institution. This could be attributed to the institution' monitoring of students' use through the access

logs. Also, a plug-in now enables parents of the students to access the system from home and thus are able to monitor their ward' performance and activities in the institution. The Moodle platform can be described as fully integrated into the institution.

In Case 3' situation, students currently using it actively are in the graduate school. Initially, students in the masters' in Global Leadership, which was offered as an online programme with monthly on-campus meeting accessed the system for all their course materials including assignments and project works, interacted with their facilitators and colleagues, engaged in discussions, quizzes, etc. Later, with the introduction of more post-graduate programmes at the graduate school, the Dean of the school insisted that faculty members in the school had to use the Moodle as a condition for teaching. Thus students there have access to their course materials, interact with faculty members and fellow students. This has been very helpful since many of them are workers and given the time spent in face-to-face interaction, more interaction outside of the classroom is important to them.

Currently in Case 4, as a result of the project nature of the implementation, only students in the courses mounted on the Moodle were actively engaged in its use in a blended format. As part of their course requirements, students are required to access their course notes arranged weekly, access assignments, undertake quizzes and engage in discussions. Although there are challenges with internet reliability and access, as well as computer access generally on the campuses, students manage to resort to internet cafes both within and around the campus environs. The ease of access to course materials without having to copy notes in class and the ability to contact the lecturers, interact among themselves and test their understanding via quizzes have been some of the highlights of the Moodle use for the students. Thus though some of the classes are large in nature, students' needs have been augmented through the implementation of the Moodle and with more monitoring and evaluation of students' experiences, the institution can support students learning more effectively.

Students' use of the LMS' functionalities can be enhanced with a research-based institutional approach to supporting students' learning. Using direct institutional interventions and faculty members commitment while providing a reliable infrastructure for ease of access and the provision of user support, such systems can change the nature of support provided to students and enable diverse students participate in higher education more effectively.

### 8.2.3 Post-implementation (institutionalization)

At the post-implementation phase conscious efforts are made to get the users to integrate the system's use into their day-to-day activities. This phase is characterized by activities after the successful (or unsuccessful) technical deployment and roll-out of the LMS that seek to realize the anticipated gains from the technology's introduction. Activities in this phase can distinctly be identified after the initial successful installation, configuration and availability for use. It is in this phase, after initial use that a good assessment of acceptance by users can be made with the institution taking steps to strengthen acceptance among the user. Also, efforts are made to increase the use of the system by incorporating it into the daily routines of both core and peripheral stakeholders. Finally, efforts are made to increase the degree of use of the system through an increase in the use of the various functions and an integration of the system with other institutional information systems into some sort of educational ERP.

In the cases under study, most of the activities discussed under deployment and use took place immediately after the Moodle's installation and configuration. In Case1 for example, after the installation and configuration in 2010, the training of faculty members, mounting of courses onto the platform, recruitment of an instructional technologist and the establishment of an Online Centre all occurred after the technical configurations. These were activities aimed at getting faculty members to use the system and subsequently realize the institution' goal of going online with its programmes. It is difficult to conclude that they were consciously carried out to institutionalize the Moodle platform as an integral part of the institution's systems. This comes in sharply especially when even before the platform could be accepted a new system was introduced which had challenges of its own. The new system just like the Moodle failed to adequately involve stakeholders and indication of failure to learn from past experience. Evaluations were not carried out to adequately understand what was really happening so as to inject appropriate interventions. Currently, the only strategy for institutionalization is the use of the Online Centre to enforce the institution' objectives. But this also is facing challenges since no effort is being made by the institutional authorities to enforce their directives. The use of the LMS therefore (Moodle or other) is yet to be institutionalized.

In Case 2' situation it can be said that the Moodle LMS has been institutionalized. It is the centre of all activities in the institution. It is a requirement for students, faculty members and administrators in the institution. Nothing gets done without the system either in learning, teaching or general administration. The system is linked to the institution' online library, stu-

dents' fee payment system, institutional human resource system, students records and exam records system, with a single log-on access for each and every stakeholder in the institution. This notwithstanding, more efforts are being made by the development team to create a seamless access to all institutional resources and services aimed at establishing an Open University where students need not come to the institution but can stay wherever they are all over the world and have their education. So far it's the only institution in the case study that has been able to achieve this level of institutionalization.

With the undergraduate and diploma programmes yet to make any meaningful use of the institutional Moodle platform, and the graduate school making an appreciable use of the Moodle for teaching and learning purposes, the institution is still some way from institutionalizing the Moodle platform. Although an institutional ICT policy has captured the application as the LMS for the institution, and it has been adopted as the question bank system for the institution' computer-based examinations with well over 6000 students having used it for mid-semester and end of semester exams at both the undergraduate and graduate levels, its use in supporting students' learning is yet to be institutionalized, especially at the undergraduate level. A policy on use may be required to enforce institutional use of the Moodle LMS. However this is yet to be considered and implemented.

Institutionalization of the Moodle in Case4 may take some time as the current implementation was a funded project that lasted 3 years. The concentration therefore was centred on meeting project requirements so as to satisfy the funding organization's expectation. Should the implementation team be disbanded after the project, or funds be unavailable to motivate courseware developers, or an online centre established to sustain the gains from the project, it could adversely affect the institutionalization of the Moodle LMS

## 8.3 Summary

Higher education institutions implementing e-learning systems like the LMS to support students learning in Ghana tend not to undertake holistic planning prior to the introduction of the system. Strategies for deployment and use are often undetermined making a proper assessment of the system's use difficult. Although institutionalizing any new system like an LMS may take time, clear institutional strategies must be put in place to realize this goal. Leaving this evolve can at best lead to waste of institutional resources. The lack or absence of these

detailed planning and considerations tends to cause traditional teaching and learning processes to still dominate the institution' teaching and learning processes despite the introduction of an LMS.

Clearly both developers and users fail to adequately consider important institutional practices that the LMS is intended to support, utilizing the platform's functionalities as given. This presents some sort of innovation to those required to use them. When these are not adequately sensitized and prepared for the innovation, the intended objectives tend to be delayed or sometimes forfeited. Both developers and users must therefore work together if the intended benefits of these systems are to be integrated into the traditional environments of these institutions.

## 8.4 Conclusion

The institutional implementation of e-learning systems like the LMS need to undertake holistic planning involving all institutional stakeholders, and take into consideration all institutional processes that are affected by the new system. Strategizing how the system would be rolled-out and sustained thereafter should be the end result of this holistic planning. When this is facilitated, both technical implementation and objectives for introducing such systems can be realized.

# CHAPTER NINE

## 9.0 CONCLUSIONS

### 9.1 Introduction

When a phenomenon is "re-searched", the underlying reason could be that little is still known about the area, some clarity is still required, or that despite what we know about the phenomenon, challenges are still experienced and so justifies an empirical investigation to understand why expected outcomes are not sometimes realized in some cases. The current research sought to understand how higher educational institutions in Ghana implement LMS for e-learning purposes to support students' learning. The study took an institutional perspective so as to be able to better understand and explain the outcomes as a consequence of institutional structures and human agency.

In order to be able to capture as broadly as possible the experiences of those involved in the implementation, a conceptual framework, an adaptation of Kwon & Zmud's (1987) and Cooper & Zmud's (1990) IS implementation framework, was used as a sensitizing framework to conduct a research based in the hermeneutical traditions of Heidegger (1967), Gadamer (1975) and Ricoeur (1981).

The findings which were first analysed and presented using Gadamer (1975) and Ricoeur's (1981) theories of interpretation, was followed by an analysis based on the IS implementation framework, and finally analysed using the structurational model of information technology (Orlikowski and Robey, 1991). These theories provided useful lenses through which information technology outcomes could be understood and explained as the consequences of institutional actions.

In the following sections, we provide conclusions on the research which sought to answer the questions: "how do higher education institutions implement….." and "what factors…….". These conclusions are drawn from an overall summary and interpretation of the findings and understandings gleaned from the research.

## 9.2 Initiation/Adoption-decision phase

This phase which matches Rogers' initiation phase (agenda-setting & matching) of an organisational innovation has been identified to be an important phase that can impact heavily on an institution's IT implementation outcomes. Often taken for granted, institutions need to recognise that the activities of this phase influence the other areas of the implementation process - initial use, acceptance, routinization and infusion – and as such require careful consideration and planning. In particular, the following issues have been identified in the research to play important roles in realizing intended outcomes.

### 9.2.1 Clear vision for the LMS

Institutional leaders must be able to clearly articulate to institutional members what the vision for the information technology is. This vision, whether the system is intended for a totally online learning, blended learning, or whatever form, must be clearly and elaborately described and shared with institutional members. Clarity in the intended plans of the institution would leave no doubt in the mind of stakeholders what exactly the intentions of the institution are and what role is in there for them.

### 9.2.2 Needs/Opportunities specification requirements

Whereas some institutions may have needs they would require the LMS to provide solutions to, others may see opportunities. But whatever the underlying reason, it is important to clearly specify and document what the identified needs or opportunities require from the LMS solution. If the LMS is to provide a totally online solution, exactly what practices and processes are required to be supported? If on the other hand it is to be applied in a blended mode, how is it to be applied and what practices and processes would the LMS be required to support? When this is known, the LMS' functionalities can be clearly matched with the institution's requirements, and an assessment made to determine whether the proposed specifications in relation to the LMS use are in familiar territories (existing practices) or unknown territories (innovative practices). This is also expected to provide a blue print for scanning the environment for potential solutions based on other important considerations.

### 9.2.3 Identification of an Institutional solution

Whether a single or multiple solutions are identified, what is most important here is what the institution seeks to be able to do with the LMS. With both open source and proprietary LMS

available on the market, an institution should be guided by its short and long term plans for the LMS use. While open source LMS can be modified and integrated with several other information systems of the institution's choice, proprietary systems are more closed and restrictive with trade secrets often being guarded by the companies. Flexibility therefore is a major issue although a ready support exists. Open sources applications on the other hand have a lot of flexibility but often require further enhancements to meet institutional needs. The decision therefore should also be influenced by the availability of a competent and experienced development team who can deliver institutional targets timely.

### 9.2.4 Awareness creation

Making stakeholders aware of institutional intentions for the introduction of an LMS is very important, especially for institutions that have been in existence for a while. This awareness is aimed at providing information, sensitization and participation in institutional activities in order to stimulate a sense of ownership in stakeholders. This awareness can be achieved through seminars, presentation, workshops, hands-on testing, simulations, etc often with stakeholders allowed to contribute through asking of questions and making suggestions. During the awareness creation, the selected solution or solutions could be given to a group of stakeholders to test over a period, after which their opinions would be sampled and factored into the final institutional decision.

### 9.2.5 Institutional readiness assessment

Although some institutions may not regard this as essential, a good knowledge of how ready the institution is to deploy an LMS for supporting students' learning is necessary. Three important areas of institutional readiness assessment include users (faculty, students, support staff), IT infrastructure, and user and technical support availability. Institutional users need to be assessed to determine their level of computer literacy, knowledge and concerns about intended technology use, nature of training required as well as their perception about whether or not the institution will be able to support the vision. Concerns identified during this assessment should be resolved or evidence shown that they are being catered for. Institutions should then address the issues as quickly as possible as they can influence other stages of the implementation. The institutional IT infrastructure needs to be evaluated in terms of its adequacy. Access to PCs, laptops and internet for instructors and students should be assessed for both campus-based and distance programmes. Where internet access is a challenge both on

campus and in the community, it can potentially create bottlenecks for users. Hosting of the LMS equally requires critical consideration in this category as to whether it should be hosted externally or internally. The technical support required to assist in the development of the LMS as well as e-learning usage should also be assessed holistically. When the institution has satisfied itself of the adequacy of their readiness, which will vary from context to context, they can then move on with the rest of the planning.

### 9.2.6 Setting-up of an implementation committee

Poor coordination of organizational actors and actions can often lead to expectations not being realized. This sometimes is the result of a failure to setup a steering committee or the proper constitution of such committees. These committees which must be setup and empowered by the institution to conduct LMS implementation on its behalf must be seen to wield sufficient power to enforce implementation through the allocation of institutional resources. The terms of reference for such committees should be clearly spelt out to enable their results to be evaluated periodically. The constitution of such a committee is also very important. Instructors, students, support staff, IT staff, quality assurance staff, instructional and learning specialists as well as decision makers need to be considered for membership of such committees. This broad inclusion will ensure the consideration of the concerns of both core and peripheral users which will in turn ensure some level of ownership. The committee should be responsible for the holistic planning and implementation of the LMS for supporting institutional objectives.

### 9.2.7 Development of LMS strategy

Prior to the physical introduction of the LMS, an institution will need to develop an LMS strategy. The strategy will highlight clearly how the institutional vision will be translated into reality. Important considerations of such a strategy should indicate who has responsibility for the creation of course sites, courseware and instruction manuals. It should also highlight the training required by users and how the institution intends to resolve this. In addition, how the LMS would be rolled out for use should be explicitly stated. In this regard, whether the roll out would be in phases, pilots, parallel with existing processes or at once should be clearly indicated. The strategy should then be discussed with stakeholders and time frames specified. To ensure ownership of the process and the LMS by users, their concerns at this stage should be considered and included in the final institutional decisions.

### 9.2.8 Stakeholder involvement

The above discussion highlights the relevance of stakeholder involvement if implementation is to be successful. This is particularly true for institutions that have been in existence for a while. Since the LMS may introduce some changes to their normal practice, the implications of the LMS for their tasks needs to clarified for them. This would enable their concerns to be raised and properly addressed by the institution. This may not necessarily be critical for institutions getting ready to be established. However existing literature confirms the potential for users to resist changes to the normal work practices especially when they are suspicious of management intentions. Thus even though some management may not deem this necessary, sufficient evidence exists to show the savings an institution can make by involving stakeholders in the implementation of innovations.

When an LMS is finally selected by an institution, the decision should clearly incorporate the concerns of stakeholders. This will garner the necessary support for successful implementation and prevent loss of valuable institutional resources. As has been indicated above, by this time the institution would have clearly determined whether it is going for an open source or proprietary software, whether it has the technical capacity to develop and enhance its choice internally and the resources required to commit to success of the implementation. This level of detailed planning appeared to be clearly missing in some of the cases studied and could account for the inability of some implementation efforts to meet expectations.

## 9.3 Physical Deployment of the LMS

This phase compares with the aspect of the implementation phase of Rogers' (2003) organizational innovation process that deals with the physical deployment of the LMS. When left to technical IT people alone, this stage will simply see the deployment of the LMS as a technological artefact with little concern for institutional and pedagogical considerations. This may be attributed to the fact that such areas are not their areas of expertise and so it beholds on the institution to consciously ensure that institutional and pedagogical considerations are consciously taken into consideration by including such personnel in the development team. Some of the areas of consideration have been included below.

### 9.3.1 Clarity of institutional requirements from LMS

Although this would have been considered in the initiation stage, it is important for a clear document specifying requirements to be provided to the development team. Thus during the

configuration and adaptation of the LMS, these institutional requirements could be closely monitored and tested to ensure that they have been incorporated. Institutional requirements for programmes, courses, attendance, assessment, graduation, etc could be programmed into the LMS while specific pedagogical considerations could be incorporated into course resources to ensure effective teaching and learning. This is also very important as an LMS, whether open source or proprietary, would incorporate structures and cultures different from a particular institutional context, and thus requires a modification of those functionalities to suit institutional requirements.

It is also important at this stage to consider integration with other institutional IS during this phase. This of course should be based on the institutional vision. If the vision is to provide a totally online support for teaching and learning, institutional processes to be supported and systems required would need to be carefully considered and selected. This is particularly important for open source LMS which often standalone from other IS. Some proprietary systems have enterprise platforms that they fit into easily due to agreements between the organizations concerned. These however tend to be expensive and so many institutions resort to open source solutions. These integrations can facilitate use, acceptance and routinization depending on how they are implemented and so should be given some consideration in this phase.

### 9.3.2 Course site, Courseware and instructional manual development

It is important to note that without these important components of an LMS being present, no instructor or student can engage with the system. Some institutions however fail to see the severity of failure to take a clear decision on their development taking into consideration structural and cultural contexts of their implementation. Responsibility for the development of these components can be borne by either the institution or the instructors with different implications. When an institution takes responsibility for the development of these components either through an establishment of a special team or outsourcing to an external organization, it can both save time and ensure some level of compliance. When this responsibility is left to the developers and instructors to take, it can lead to some confusion and possible delays resulting in non-compliance with management directives. An implementation committee must therefore quickly resolve this issue to forestall any eventual bottlenecks.

### 9.3.4 Provision of training

Institutions need to recognize that training is not only required to provide users with the knowledge, skills and competence in the use of the LMS, but also to encourage acceptance and facilitate routinization. The level of importance attached to training sends strong signals to stakeholders of the importance attached to training programmes. This can be further strengthened by the attachment of consequences to non-participation in training programmes. Training should be seen as a reinforcement of institutional requirements as it informs and reminds stakeholders of procedures and practices deemed to be important by the institution, regular provision of training therefore can ensure commitment to use, as it reinforces institutional expectations. Holding training programmes occasionally therefore may not provide the immense strategic benefits that could be derived from their consideration. Institutions therefore must carefully consider their training delivery, monitor and ensure that the intended objectives are being realized.

### 9.3.5 Roll-out strategy

When adequate planning is not conducted, strategy for rolling out the LMS for first time use is often not considered. Experiences with institutions that attempted to roll-out the system for al programmes and all courses at the masters and undergraduate level has shown the importance of adequate planning and consideration of a roll-out strategy. Again it must be emphasized this is particularly relevant for institutions that have been in existence for a while, have many students and may not have sufficiently tested the system's capacity and institutional readiness to deploy an LMS. Sometimes, it is useful to roll-out the LMS use gradually through pilot testing or even in phases to allow important lessons to be learnt both about users and about the systems capabilities. When considered in advance, it can lead to smooth roll-out of use and important lessons for future institutional development.

### 9.3.6 Resource commitment and institutional enforcement

The development and use of an LMS for teaching and learning purposes requires the institutional commitment of resources including time, people and IT. Instructors in particular require time for preparation and setup of their course site, time to attend to their students effectively on the platform, and time for training on use and developments in the LMS's functionalities. People, experts in user support, pedagogy and technical development of the LMS must be provided to ensure achievement of institutional expectations. These resources must be

clearly budgeted for and provided by the institution as it sends strong signal about the institution' commitment to the whole process. Equally important is the institutional enforcement of compliance to training schedules and use of the platform. When resources are spent, stakeholders must be held accountable through a clear awareness of institutional expectations. A moderate consideration of this can result in great achievement for the institution.

## 9.4 Post deployment phase

Some institutions will often leave their implementation at the deployment and use level, often failing to even examine and evaluate the initial use. However successful physical implementation does not necessarily guarantee achievement of institutional goals for the LMS deployment. The post deployment phase which matches Rogers' organizational innovation process stage of routinization emphasize the need for further institutional action to institutionalize the LMS and derive the anticipated benefits. The following are therefore worth considering after physical implementation.

### 9.4.1 Motivation/Rewards

Different things act as motivations to people in different contexts. For some people who simply want an opportunity to be a part of a particular community that requires use of an LMS, there will be a motivation to join that community either for financial rewards or for prestige. In other contexts where the system is perceived as something new and somehow disruptive however, institutions may need to motivate or reward its users for use of the LMS. This motivation comes on the backdrop of complaints by some users of their time and demanding nature of such developments and so feel there is a need for a reward. On the other hand, some institutions feel the directive to use the LMS is part of their job and so should simply comply. The tussle between these two views can obstruct the effective use of the LMS and so should be addressed delicately. Even when institutional resources have been adequately provided to cater for successful implementation, rewarding or motivating users can be a strategic tool for use, acceptance and routinization of the LMS.

### 9.4.2 Modification of governance structures to account for LMS use

A careful scrutiny of the structures of HEIs shows a governance structure regulating the daily activities of the institution and enforcing institutional requirements for the core purpose of the institution. Most institutions therefore have a general council, a president, rector, or vice

chancellor supported by management individuals such as finance, registrar, deans, heads of departments, committees (ad hoc and standing) in the conduct of their affairs. Institutions that have been in existence for a while often have structures that emphasize and perpetuate manual processes as enshrined in their existing practices and as catered for by their governance structure. These can be referred to by members and used as basis for compliance or non-compliance with institutional directives. The introduction of an LMS there may require a careful consideration and modification of some of these structures to enshrine provisions that demand compliance. This has the potential of increasing use and ensuring a deeper integration of the LMS' use in the daily activities of users. For institutions that come into existence with the LMS already being in place, this may not be necessary. When these governance structures such as requirement for recruitment of both faculty members and students, quality assurance in online delivery procedures, use in delivery of instruction, establishment of an institutional online committee, special budgets for LMS use etc. are visible, the institution would have made tremendous movement towards routinization, an indication that use of the system is perceived as normal.

### 9.4.3 Efficiency and expansion of access

At some point, the institutions should become more efficient in what they do. Having gained experience in use, the institutions should consciously strive towards efficiency in the system's application in all institutional tasks. This can be achieved through integration with other institutional systems and an increase in the use of the functions of the LMS in direct teaching and learning to widen participation and enrich the learning experience. Either in a blended or totally online use, students and instructors should have the flexibility of performing their roles and other institutional tasks like submission of results, marking of attendance, assessment of students, requesting for transcripts and introduction letters, fee payment and registration more efficiently through the elimination of human interventions which can save valuable time. Important reports can be generated on a timely basis to facilitate monitoring and enforcement of institutional requirements thereby enabling the institution to become more efficient.

When these are realized, institutions can open themselves up for access by people seeking further education and career advancement opportunities. All these can be successfully done through careful planning and implementation of an institutional LMS. Although huge exam-

ples abound around us, institutions continue to ignore and fail to consider these important actions.

## 9.5 Future work

Understanding how institutions implement LMS for e-learning purposes and the factors influencing the process is only the beginning of a bigger equation of how these information technological solutions are used to manage knowledge within the institution. As has been highlighted by the research, there is further need to critically look at how institutional structures are integrated into the LMS modification to better understand instructors' use and appropriation of such systems in HE. There is also the need to look at how students' use of the system is influenced by their perception of institutional structures and culture to understand their contribution to institutionalizing LMS in higher education institutions.

Much has been revealed by this research, but much more remains to be known. Institutions will continue to differ, contexts of implementation will vary, but important lessons, applicable in many contexts will continue to stimulate many discussions and investigations that will lead to more efficient knowledge in information technology implementation in HE.

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# Appendices

APPENDIX A

**An implementation of a Management Information System in a Higher Education Institution**

For more than 10 years, the Koforidua Polytechnic, a HEI in Ghana had no electronic information system to assist in its operations and management of its institutional processes. In particular, all information relating to students' admission processing, learning, accounts, examination, general administration and staff records were kept manually. Although most administrative offices had computers, these were not networked in any way, and were used by the secretaries mostly to type letters, memos and reports. The outputs from these computers were subsequently stored in files and cabinets which over the years have created huge volumes of difficult to access useful information.

In 2008, an ICT policy was developed and adopted by the institution through an external funding. Then the head of the Computer Science Department, I was very active and instrumental in realising the ICT policy. Prior to my appointment as the HOD, I was the institution' Website Administrator charged with developing the institution' website. After the ICT policy was approved, an ICT committee was put into place. it constituted of people from different departments within the institution, and had the Registrar as its chair. After about 2 meetings, the committee never met again.

The latter part of 2008 saw an approval of a proposal for the implementation of an Institutional Management information system. This MIS was to manage all the information relating to the institution' processes: HR (Staff), Students, Accounts, and Library. After going through a prolonged procurement process, required by the state, a vendor was selected to supply and deploy the institutional MIS.

I was appointed as the site project manager while the registrar was appointed as the institution' project director. At different points in time, meetings were held with the vendor' representatives to discuss progress and milestones. The project was divided into two – the Accounting and HR system implementation (staff and administration) and the Students Information (OSIS) and Library information system. Several presentations of the systems' functionality were made to top management as well as various user groups. Requirements elicita-

tion was subsequently carried out with the intention to customize the off-the-shelf system with the specific institutional needs. Institutional resources like servers, racks, UPS, PCs and other equipment were procured and a server room created. While the accounts software was installed in the main administration block that was already networked, the OSIS was installed in the CSD block where the server room was located.

The institution' infrastructure at that time was made up of a networked administrative block that stood on its own and a CSD block that housed a server room and was connected to two other blocks via a cat6 cable. There was also a connection to an old block with a computer lab equipped with 100 machines and an internet access connected by a cat6 cable to the server room, as well as wireless networks. It was however important that the entire campus be networked if the MIS was to be maximised. This request was made by the Vendor but took quite a while for the institution to procure a fibre optic for installation. A number of meetings were held with network providers who were ready to do the implementation; but the institution could never commit to any one solutions provider.

The training sessions covered the accounts staff, the general students records, admissions, examination staff, the library staff, and faculty members. This training arrangement was usually coordinated between me, Mr Danso and Kwapong, the rep from the Vendor company. Many of the staffs did not show up making the whole process cumbersome. If I remember correctly, no date for going live was clearly determined. The students were also not prepared for the introduction and use of the system as no training or awareness had been provided to them.

The training for the staffs were provided for maximum one week. However due to the absence of an efficient network, many of these staff could not access the system and so forgot how to use the system overtime. A number of them had to come to the CSD to access the system away from their offices, a situation that created some discomfort. Not many internal technical staffs were available at the time of the implementation. Emmanuel, Uncle Ben and Seth were the three technical staffs who assisted in the implementation of the technical component of the MIS. The other IT staffs were responsible for the hardware and maintenance of the IT equipment. From the very onset, these IT staffs were not considered to be required to play a critical role in the deployment of the system.

When the OSIS was installed, the secretaries of various departments were brought together to enter past exam records onto the system. This took close to one month to complete. Some remuneration was subsequently provided to them as a form of motivation. The data entered was to be cleaned by a selected group but this was yet to be done.

Faculty members who were trained in the use of the OSIS for entering exam results and exam questions were provided with a Mobile sheet that was installed on their laptops for initial entry of the data at home and at their convenience. Subsequently these were downloaded onto the main system on campus.

Students are now able to check their results online. Also, when they pay their fees, the system automatically captures it and enables them undergo their registration.
There are security issues. These have been identified by a number of staffs. Some of the identified issues relate to access to the system and potential to nullify the integrity of the data. Yet not much has been done with respect to resolving this.

Intermittent challenges have been experienced with the HR and accounting Modules. Anytime this occurs, the staff at the accounts unit resort to the manual way of performing their tasks. This makes institutionalizing the new practice difficult.

In the latter part of 2009, an ICT director was appointed to facilitate the institution' ICT vision. The director has been very instrumental in getting the system to be used if only marginally.

It is important to note that prior to the roll-out of the system, faculty members had not been provided PCs in their offices. Many of them in fact did not have offices while the few offices available were not networked and as such could not access the central server. The wireless network was also not very reliable as the signals could not reach certain blocks. Coupled with major electrical problems on some blocks like the CSD block, FAST, FBMS, erratic power supply threatened to adversely affect the whole implementation.

**My experience as an undergraduate student**

Having grown up in the Ghanaian environment from my childhood, my experiences as a student in my secondary school days and during my undergrad studies were without computers.

I never saw a computer during my secondary school days up to 1995. Even when I got to learn about computers in the early part of 1998 during my undergrad studies, I still did not understand its use. Neither did I get any opportunity to learn how to use it properly. Although there was a course on introduction to computers, there was hardly any opportunity to practice or understand its power and potential. There was no use of computers for accessing information or conducting any assignment or project work (research). We learnt by copying notes in class, making small notes from lectures and buying learning materials from lecturers. Very little use was made of core textbooks. My earliest memories of students learning and support was one filled with challenges and an almost absent student support.

This could be attributed to the student numbers which made it virtually impossible for faculty members to meaningfully interact with students. My class then was over 200 students, and even when we chose various specializations in our second year, the class was above 70 students. Class sessions lasted almost three hours and there were very little opportunities for class assignments, one-on-one discussion with lecturers or tutorials. There was virtually very little opportunity for any meaningful feedback from a lecturer. A student therefore was virtually on his own and had to depend on himself and his friends where possible.

This was the experience for the three years that I studied for my undergraduate degree.

**My first experience with computers after my undergraduate studies**

Every Ghanaian is required to undergo a one year national service after completion of the undergrad programme. I was lucky to be sent to a computer training centre somewhere in 2000 where I had the opportunity to learn about it, use it and teach students to use applications on computers. I started to learn how to programme using VB while there.

This experience was to be very instrumental in my career path in the not too distant future. As the centre also developed applications for clients, I had the opportunity to learn about requirement elicitations and testing of software. Several visits were often made to the clients' premises where the software was installed and user experience observed. Usability and other technical issues were subsequently resolved before the software was packaged and delivered to the clients.

It was in this centre I learnt about emails, created my first email and learnt how to use the internet. Prior to that time, I had little or no experience in the use of these applications. This was in 2001.

At the end of my service, I left the centre with a good and working knowledge of computers, applications and the internet in particular. This was to be very instrumental in my next career which was as an instructor in a HEI.

**My earliest recollection of my engagement with computers in a HEI**

In 2002, as a result of my knowledge and competence in the use of computers, I was appointed as the department' examination officer. The institution had less than 10 computers in the administration section and about 15 computers in the Statistics lab for students. Due to the nature of students' results preparation and the absence of computers in the various academic departments, this work was done in the lab where there was a great risk of students gaining access. The results were entered into an excel sheet and passwords put on the documents. This was then stored on floppy disks with a huge risk for theft, destruction, etc.

Though there were students offering business programmes in marketing, accounting etc, these did not have the opportunity to use the computers. I also personally did not use it in my courses. Only statistics students were allowed to use the PCs, and this was seldom done. There was no integration of computer use in the various programmes. As such students did not get the opportunity to use them. Most completed without knowing how to use computers or the internet and had to go to private institutions after completing their education to learn how to do so.

At the administrative level, these computers were used as typewriters to get reports, letters and memos out and there was no strategy on educational technology use.

I was later to own a computer at home somewhere in 2003. This was mostly used to watch movies, play music and games. At that time it was not possible to have an internet access at home. From 2004, it was observed that some students were beginning to acquire personal computers which they used for nothing other than watching movies, playing music, games, and for final year students, typing their project works. Teachers were not into the habit of giving assignments for preparation on computers, or submission in typed form as they themselves had no access to computers.

**An experience with Computers at a postgraduate programme**

In 2003, I began a postgraduate programme at another university in Ghana. This programme required us to do research on the internet for information although training manuals and core texts were provided. There was also a course on Statistics and Computers which introduced us to the use of applications like SPSS. Given my competency in the use of computers, I had no difficulty studying this course.

An added advantage was the existence of a modern computer laboratory within this institution that had a good access to the internet and was also available to students. I sent my desktop at one point in time to school and could use it in the comfort of my room. When I go to the lab, I download materials from the internet and study them in the comfort of my room. However, there was no integration with most of the courses except for the one on statistics. There was also no requirement from the institution or programme requirement to integrate the use of computers, or any kind of application that supported students learning.

It was far better than the undergraduate experience though. Not long after that, my institution sent me to the UK to pursue a postgraduate programme on Information Systems. It was during this period I had my first encounter with LMSs.

**An experience with a LMS as a User**

Immediately I arrived at the university in the UK and began registration, I was given access to an online LMS, WebCT, that could be accessed from my students hostel. It was an amazing experience. I had access to my courses and course materials prior to attending lectures. Assignments and deadlines were communicated through the system. I had access to an institutional email through which the institution communicated with me, and I could make enquires about anything that concerned me. An institution-wide implementation of e-learning had been rolled out in the form of blended learning. there were weekly meetings with lecturers while at the same time resources were made available online for further learning and communication.

Requirements of every course could be studied via access to the course on the LMS. The individual courses were linked to a host of other resources like the institution' library which was also online. Aside being able to contact the lecturers for physical meetings, the platform also enabled quick responses to pressing questions prior to meetings. For the first time, all the

relevant resources were left at my disposal. It was now up to me to make use of them. I could contact the international office, students' services, career office and all that. I attended lectures and had access to all the necessary support via the LMS.

There was also a student information system called MISIS that enabled access to my personal information including results. That system was linked to the WebCT in some kind of single log-on. All in all, my studies in the UK was adequately supported from a student' point of view and I could not help but compare with my previous experience and ask why we could not have such systems. From this time, I determined to introduce some at my institution.

**A departmental implementation of an LMS**

During the December break of 2008, I and a lab technician who then was doing his national service tested Moodle, an open LMS in the computer science department. The system was installed and configured to run on a server for students within my department. The idea was to pre-test the system in my department, gain some experience and then recommend it for institutional adoption. When school resumed in January, the system was ready but never got to be used. This was as a result of my tight schedules as an administrator, a lecturer, and other institutional engagements. Even though lecturers were encouraged to use, no one made any attempt to try it.

**An LMS implementation project involving two departments**

At some point another implementation was initiated through collaboration between my department and another department in the Energy systems dept. This was also to acquire some experience that could be used to inform the institution on an institution-wide implementation. The project was a pilot involving two faculty members in each department. A team was established to facilitate this involving faculty and IT staffs. The system was deployed on a server within the institution with some funding from the institution.

There were delays in making these funds available leading to delays in the roll-out. Finally when the system was rolled out, its usage was challenged. Though the faculty members were excited about the prospects, developing materials didn't come easy especially as the traditional system still emphasised the brick and mortar face-to-face interaction with users.

There were also challenges with computers and server access. Coupled with an IT staff that had other tasks aside manning the e-learning system, the development of this project was

brought to an abrupt end. The two faculty members involved in the project travelled abroad for further studies and this resulted in the end of the project. However, the institution has not requested for any accountability yet.

**My Pre-conceptions**

- *About IS/IT*
    - Information Technology is useful to man
    - IT can enable organizations increase their productivity
    - It should be easy for everyone to embrace an IT innovation
- *About HEI*
    - Responsible for training the manpower of a nation but do not do so adequately in developing countries like Ghana
    - They fail to adequately harness the power of technology for education
    - They demonstrate lack of commitment to integrating technology in teaching and learning
- *About HEIs support for students learning*
    - Lack the structures and resources to support students learning
    - Inadequate library resources for students
    - Faculty members do not encourage use of library resources
    - No institutional structures to check the learning process
- *About e-learning implementation*
    - Institutions lack appropriate deployment strategies
    - Institutions lack the commitment to e-learning implementation
- *Institutional implementation (top-down, bottom-up)*
    - Institutions need to adequately plan and support IT implementation
    - Institutions need to adequately staff the implementation team
- *About the nature of IS implementation in organizations*

An information system is the result of a mutual adaptation between a technological artefact and an organisation. The extent of this adaptation ranges on a continuum between the techno-

logical artefact' functions (embedded processes) and the organisation' functions (processes). The artefact can be developed in-house by an IT unit with the requisite staff, bought off-the-shelf, or developed by an external developer/organization (consultant). Whether developed in-house or by an external developer, the artefact' functionality is determined by the organization requiring it, and contains the underlying processes of the organization. The ability of an organization to identify whether an off-the-shelf artefact meets its requirement presupposes they already have in 'mind' the functions (processes) they need the system to perform (support). The functions being performed by the organization and the processes to be supported by the artefact may be multiple, interdependent, involve multiple users at different levels and units of the organisation. Nonetheless some technological artefacts required by organizations may be meant for an individual or unit whose function(s) is not dependent on other processes within the organisation.

Given that technological artefacts are developed by, or requested by people who require their use, an understanding of what their motivation and purpose is can provide some insight into the system' introduction and use in an organization. However, when a system developed elsewhere is to be introduced into another context, the original intentions of the developers and those considering its adoption raise issues for concern. A fit must be found between the system' functions (including what it can do and how it does them) and the organization' needs (what it needs solutions to and how it needs it to be done). The foregoing discussion suggests there are embedded processes within the technological artefact and the organization that require some form of adaptation for the expected benefits to be realized. This adaptation may be done independent of the users, with the users, or with representatives of the users. Whichever approach an organization chooses to use, there are implications for the outcomes expected.

The decision to introduce an Information System into an organization has implications for its existing processes, tasks, users and the associated interdependencies. This requires careful consideration and in-depth assessment before a final decision is made. In particular, those who have access and control over organizational resources, and make decisions about their allocation, in other words managers, exert much influence over the outcome of an IS introduction. Much of this influence often plays out through the perception of organizational members expected to the system. The organization and what it does is seen through the lens of the decisions and actions (activities) taken by its managers, and those to whom certain re-

sponsibilities are delegated. Through delegation of their authority to other organizational units like the IS department, or an implementation committee comprised of individuals selected from different units within the organization, the problems and needs of the organization can be identified, assessed, available technological solutions identified, alternatives compared against their costs and benefits, recommendations made for consideration, and finally, a decision made to either adopt or not. The outcome of this process is an organizational adoption of an IS about which organizational users may not be aware of, or sufficiently aware of to make a decision in a voluntary situation. At this stage, the organization operates on an assumption that users will automatically embrace or make a decision to adopt the IS, a situation highlighted by the decisions and actions taken in direct consideration and involvement of the intended end users by the organization. The end users in an organization cannot be expected to act rationally in accordance with the organization' expectations. Even when preliminary training is provided to acquaint users with the system' functionalities, the length of the training, its frequency, and other important considerations can influence the outcome of the organization' expectations.

APPENDIX B

**Important philosophical hermeneutic interview considerations utilised in the research**

The philosophical hermeneutic interview is a common source of gathering data for qualitative research grounded in the philosophical hermeneutic tradition (Diekelmann & Ironside, 2006 cited in Vandermause & Fleming, 2011). In this form of interview, the interviewer seeks to uncover what it means to be as it shows up or reveals itself in a story through the interview. As the stories are elicited, the interpretation begins. In this mode of interviewing, the researcher stays open to unexpected or unfamiliar responses, making space for an interactive exchange to manifest (Vandermause, 2008 cited in Vandermause & Fleming, 2011) – a shift away from positivist thinking is inherent in the process. Underlying this way of interviewing is the goal of understanding meaning and the sense making of experience. The approach thus enables an exchange of language to emerges/evolves as the narrative text is co-created between the researcher and the participant(s) (Crist & Tanner, 2003).

The goal of the researcher is to co-create the findings with the participant through an engaged conversational process (Crist & Tanner, 2003). A 'fusion of ideas' takes place and a narrative text emerges. In other words there is a dialogic intersection involving the integral interaction of two worlds, perceptions or stances. According to Vandermause & Fleming (2011) the dialogic intersection can describe any engagement with another, whether the other is in the form of a conversing person, a text, or an idea. This then brings us to Ricoeur' framework for understanding and interpretation. This give and take process requires openness and flexibility, a characteristic of philosophical hermeneutics as a methodology or method in all its stages.

**Interviews**

The interview here is open and unstructured, audio-recorded and transcribed verbatim with identifying features removed.

Field notes and demographic information provide additional sources of data for analysis.

- The field notes denote events that are observed e.g. vocal intonations and physical gestures, which might not be clear from audio-recordings (Crist & Tanner, 2003)
- According to Vandermause & Fleming (2011), such affectations may add to our understanding though they are not needed to ascertain an objective representation of fact.
- These affectations facilitate deeper consideration of meaning related to the narrative expressed.

**Use of pseudonyms**

The use of pseudonyms in philosophical hermeneutics to refer to participants are selected with particular attention paid to the nature of the study. This is important because of the attention paid to language and meaning. This is supposed to add interpretive meaning to the understanding of the phenomenon. An important reason they are selected however is to protect the participants' identity.

**Listening in hermeneutical interviewing – the art**

- Attentive listening while remaining silent is important for the elicitation.
- This is important if what is said is to be understood – noting what is hidden, responding sensitively to the cadence of the interview, while actively acquiescing to the participants' direction is important to the process of moving the interview along with inquiring questions as the narrative text is co-created.
- The phenomena therefore reveals itself in a dialogic context that is reciprocal, multifaceted, historical and dynamic.

**Framing of the questions for the participants**

- Calling forth a participant' thoughts and feeling in relation to a phenomenon has been found to have direct impact on the quality of data obtained (Dinkins, 2005)
- Questions should be engaging and focused on the participants' experience in the enactment of hermeneutic interview
- How a question is posed regarding the phenomenon of interest takes precedence
- It is important to ask questions in a way that draws out the story without leading the participant into a set of answers
- When understanding is unclear, paraphrasing what the participant has shared can clarify any uncertainties and avoid putting words in the participants' mouth (Benner, 1994)
- It is important to note that participants feel the desire to give facts and opinions in the story they share, and
- The investigator takes a stance as a facilitator and translator of the shared meaning being generated
- For the remaining questions that follow, the researcher
    - Should remain focused on the participants' account by posing questions that are open and reflexive.
    - Hermeneutic questions are therefore framed differently from other qualitative interviews in that the researcher and participant work together to generate an understanding as narrative texts emerges and language is interpreted.

**Critically analysing hermeneutic interviews**

Interviewing is an integral part of the analytic process. Vandermause & Fleming (2011) suggest a reading of interview transcripts for content, followed by an intensive review of ques-

tions, and finally a thorough review of the responses in the context of the conduct of the interview. In particular, the following areas are characteristic of philosophical hermeneutic interviews:

- Setting the tone of the research
    - Purposive sampling is used so participants know the topic of the research
    - They have been selected because of their involvement and experience and story they have to tell
    - They have had time to mull over the experience and think about the phenomenon
    - The researcher' task therefore at the time of interview is to help participants recall storied events , and to relate their experiences of the phenomenon without an overlay of conscious explanation but rather, an ontological expression
    - The researcher sets the tone of the research by generating an opening question that is representative of the phenomenon and asked using a reflective affect or voice quality. The aim of this approach is to elicit a response from the participant, inviting them to think along as they articulate their experiences
    - The questions must be open and reflexive I addition to:
        - I am interested in…….and your experience and opinions about the events that unfolded and the processes followed is the focus of this study. And so I wanted you to think generally, to begin with, about what comes up for you when you think about how the institution has gone about its implementation right now. How did the institution get to where it is?
    - Through this conversational introduction, the pace and tone for the rest of the interview is set by the researcher. In particular:
        - The participant is invited to talk about 'how the institution introduced the technology, the participant' role in it, and reflective impressions about the process followed.'
        - In this way, the conversation established is participant driven and the interviewer takes the lead from the participant rather than structuring the content or presuming the focus.
        - What stands out to the participant is often a story telling or narration of his recollection of activities, decisions and particular events that shaped observable outcomes, irrespective of the facilitating or inhibiting influences during the process.
        - The participant may not be overtly aware of the meaning of the events prior to the interview experience
        - This is very different from other forms of interviews where the representation of events in a journalistic fashion is sought.
        - The hermeneutic interview on the other hand relates to a phenomenon that has meaning in itself, may be variously interpreted, and elicits understanding by its very nature as a description of significance.

- Using incomplete sentences
    - As the interview evolves, the dialogue that evolves must be guided to allow the data to be uncovered in a naturalistic fashion, rather than the interviewer leading the discussion (Dinkins, 2005).
    - By using incomplete sentences, the participant is allowed time to respond, to add to the dialogue without feeling the pressure to respond in a particular manner. An example is:
    - This techniques allows the participant to be drawn into the conversation without signalling a presupposed response
    - The participant is therefore allowed to narrate a story that is relevant at that material time, not cause-effect related, explanation or even subject matter related.
    - The existing understanding of the phenomenon in the participant' memory is the story the interviewer facilitates.
    - The representation of the phenomenon therefore evolves from the participant's initial recollection and interpretation of the phenomenon that is evoked by the research process.
    - This is the unique aspect of hermeneutic interviewing grounded by an ontological orientation.

- Looking for assent
    - The interpretation of the text generated from the interview needs to be credible (an explication of the phenomenon that 'rings true'). Thus as the interview progresses, the interviewer should question his/her understanding periodically, looking for participant' affirmation that the growing understanding is correct.
    - Vandermause & Fleming (2011) argued that this was plausible since it honours an experience genuinely told because of its meaningful representation of the human experience.
    - The reader therefore will be able to trust the interpretation since it is skilfully elicited rather than just an acquisition of responses to leading questions.
    - The researcher watches out for whether the participant' responses are weak affirmation, simply going along, or asserting an idea and clarifying an understanding of the story being told.
    - The participant is therefore able to correct an idea or misunderstanding being suggested by the interviewer given his/her knowledge of the phenomenon and the cadence of the dialogical interaction taking place in the style of interview.

- Returning participant to the story
    - Its important to keep the story proceeding forward
    - If participant veers off the story, the interviewer must quickly evaluate the distraction' relevance and gently bring the participant back to the phenomenon being explored.

- The hermeneutic interviewer is a guide who takes cues from the participants as the interview progresses, determining whether a particular line of inquiry is uncomfortable and should be pursued or kept focused.

## APPENDIX C

### (Re)conceptualising LMS implementation by HEI

In the e-learning literature, two distinct but interconnected conceptualisations of institutional LMS implementation can be observed. Firstly, it is conceptualised as a technological innovation in teaching and learning whose successful or effective implementation is dependent on the appropriate application of pedagogical principles and frameworks. Secondly, institutional LMS implementation is conceptualised as a disruptive technological nuisance that affects the traditional way of life in academic settings. This second conceptualisation addresses institutional efforts aimed at introducing and integrating LMS into their traditional educational environments, highlighting the obvious challenges faced in the process, and the outcome of the implementation effort. The emergence of an LMS used to support students' learning can be considered as the outcome of institutional decisions and actions, directed towards the realization of this objective. However these institutional decisions and actions that shape the outcomes of the implementation efforts often do not adequately take into consideration the underlying expectations and tensions of the expected users required to facilitate the institutional implementation. These users tend to be considered in research studies that seek to understand adoption, acceptance, perception, attitude etc. A holistic conceptualisation of the implementation process that encompasses decisions and activities by the institution prior to the physical deployment of an LMS, and after, can deepen our understanding of institutional LMS implementation. Such a holistic conceptualization is relevant as it reveals the process nature of implementation along with contextual factors that both exist and emerge with the process.

The successful or effective use of an LMS in teaching and learning is interconnected with an institution's implementation process. Through its provision of an enabling and congenial environment using its resources, an institution can bring its members up to speed with the effective use of an LMS. This is relevant as the institutional members (faculty, students, support staff (e.g. IT department)) involved with the LMS implementation often have a background of experiences from their culture, history and language which they bring to bear upon the implementation. Their understanding of the institutional agenda and subsequent interpretation of it can reveal much about institutional implementation of technologies aimed at supporting teaching and learning. This would enable management utilize existing institutional structures (e.g. IT department, implementation committee), to direct its resource allocation for successful and effective implementation. In this regard,

the availability, adequacy, and timeliness of the resource allocations can facilitate as well as impede institutional implementation efforts. A careful examination of the way and manner in which institutions implement an LMS can therefore provide insight into how new practices can be institutionalized in a user community and explain why some institutions struggle (take a long time) to achieve institutionalization.

In reconceptualising the predominantly pedagogically situated LMS implementation perspective and the disruptive technological nuisance perspective, where the individual user's consideration of the technology' pedagogical usefulness and other perceptions are key and where users would rather do without it respectively, Gadamer' and Ricoeur' hermeneutical perspective of understanding through language is drawn upon. Language, according to Gadamer, is the fundamental mode of our being-in-the-world and the all-embracing form of the constitution of the world. He contends that it is through language that we come to know ourselves and others. In Gadamer' view, understanding comes about as a result of being in the world, and we come to know all that we know through language. Thus being-in-the-world and understanding occurs through language, which according to Gadamer is fundamental. This language, Gadamer argues is part of one' tradition which constitutes one' cultural and historical background from the past, influencing the present, and shaping the future. To Gadamer therefore, tradition prefigures understanding and what we come to know. Our culture, history and language (tradition) however are not experienced in isolation but always with others. As Gadamer contends, this tradition is shared and inter-subjective. It involves people interacting, making meanings and shaping their future based on experiences from their past. The understanding we obtain therefore is inter-subjective and shared, developed through mutual agreement which takes place through conversational exchange using a language.

Conceptualizing implementation in this way enables both the processes followed and the contextual factors (existing and emergent) to be revealed and understood in the descriptions of those experiencing the phenomenon, as in reality, the two are interrelated and not separate. This conceptualization of e-learning implementation using an LMS by HEIs in Ghana is different from current conceptions of the phenomenon as it highlights how the decisions and actions of institutional leadership influences and shapes the outcomes of LMSs implementation for supporting students' learning. This conceptualization thus allows the processes followed by the institution and its actors to be grasped along with how certain contextual factors directly or indirectly influence implementation outcomes in a

holistic way. When the outcomes of institutional implementation is seen to be the result of inter-subjective interactions among the members of a community with diverse backgrounds, institutional efforts and their outcomes could be better understood and the achievement of desired outcomes enhanced. The different backgrounds constitute their traditions (culture, history, language) which they bring to bear upon the institutional implementation, agreeing on what certain directives and actions may mean. These meanings and understandings which are embodied in the organisational members are there to be engaged with in order to facilitate new understandings of a contemporary phenomenon. This enables institutional implementation to be understood in the context of its environment, its origin, and its tradition. Tradition, in hermeneutics is not static, singular or all embracing. On the other hand it is shared, plural and changing in nature.

Researchers and practitioners in the e-learning field that conceptualize institutional LMS implementation focusing on their pedagogical usefulness as a technological innovation in teaching and learning, tend to draw on the research insights from Davies credited with the technology acceptance model (TAM) and others like Venkatesh et al credited with the unified theory of acceptance and use of technology (UTAUT) as well as Rogers' diffusion of innovation (DoI). These factor oriented approach often involves the identification of a group of variables that are potentially relevant to implementation outcomes. To conceptualize implementation from this perspective is to ignore that implementation outcomes are shaped by a myriad of factors that both exist and arise as a result of a process and interaction among a group of people who attempt to make sense of what is going on around them. Behind all these sense-making is tradition which underpins people' actions. Implementation outcomes are therefore shared and inter-subjective.

**My pre-understandings about institutional LMS implementation**

Institutional implementation of LMS for e-learning purposes is inter-subjective, shared, embodied and communal. This is because information systems in organizations are essentially the outcomes of institutional decisions, actions, through interactions among the resource providers, developers and users involving traditions of shared and embodied culture, history, language and socio-political experience. Institutional LMS implementation outcomes are not fixed and unchanging, but shaped by constant interaction, meaning and sense-making among the members of an institution within a tradition of the past and present decisions and actions, that continue to shape the future. In consonance with interpre-

tation which is never final, complete, or static, understanding of institutional implementation outcomes is open, changing and incomplete. A conceptualization of institutional implementation in hermeneutic terms enables us to situate it within a more specific context of its development, Ghanaian HE environment, and also allows a broader context of understanding institutional implementation by enabling both processes and contextual factors to be grasped.

## My forestructures and Pre-understandings

This section outlines what my forestructures and pre-understandings are and how they are brought to consciousness with respect to institutional implementation of LMS by Ghanaian HEIs. In doing this, the forestructures were worked out in terms of the things themselves (institutional implementation), where my beliefs about the implementation of LMS were taken into consideration prior to the interviews. Also, my pre-understandings were addressed through the writing of my experiences as a student, instructor and head of department in different higher educational institutions both in Ghana and elsewhere. This was necessary in order to avoid premature interpretive closure.

### *Approaching the hermeneutic circle the right way*

According to Heidegger, to approach the hermeneutic circle the right way, one needs to work out forestructures in terms of the things themselves, the phenomenon under investigation. This he contends consists of three issues: forehaving, foresight and foreconception. Forehaving has to do with background experiences from the lifeworld that makes interpretation possible. The foresight has to do with background experiences that carry with them a point of view from which an interpretation is made. While foreconception is the background experiences that create expectations about what might be anticipated in an interpretation. The aim of bringing my forestructures to consciousness was to clearly identify what I believed to be the nature of institutional LMS implementation. Statements were generated about my beliefs, interpreted and reconceptualised into forestructures of the research (Geanellos, 1998).

This process enabled me become conscious of the potential influences I could have on the data collection and interpreting processes in order to minimize its influences and allow the data to speak.

**Statements**

- Institutions initiate the implementation process
- Institutions determine the purpose of the system
- Institutions decide to adopt
- Institutions provide adequate resources
- Institutions involves stakeholders throughout the entire process
- Institutions encourage use of new systems
- Institutions motivate staff to use system
- Institutions demonstrate leadership and drive
- Institutions understand core users and their needs
- Institutions need to enforce usage