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When Innovative Instructional Designs Are Too Innovative: Lack of Schema

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This paper presents a study of what happens when the innovation of an instructional design is too innovative. The study investigated an implementation process of a new instructional design in nursing education. The new instructional design should be a step away from a functionalist approach to learning, and it was developed to include, motivate and encourage students to engage in more situated learning processes. The course is infamous for low attendance and for demotivating the students. The new instructional design utilized teacher-produced video clips to qualify the students learning in preparation for the lessons and new pedagogical activities during lessons to make the learning process more situated. The video clips should also include more students for scaffolding the academic reading with video clips; however, the outcome was not as planned. The students did not recognize the video clips as a significant part of the preparation for the lessons, and therefore they were not prepared for the activities that the teacher had planned for the lessons. The paper dicsusses the students' lack of 'schema' and suggests ways of developing schemata to learn in a situated learning environment.

Introduction

The study presented in this paper was motivated by two factors: unmotivated students and an abundance of idle ICT in the classroom. Students are generally motivated by what seems applicable in their future profession and unmotivated to engage in academic activities that they regard as being on the periphery of the nursing practice (Huffman & Huffman, 2012). This study was carried out in a course on *Organization, administration and management* (6th semester, programme for Nursing) that suffers from low attendance and poor evaluations. The students generally regard the course as digressing into areas of low immediate interest to them. They feel excluded due to the organisation of the course and the teaching principles utilized in the course. They do not regard the course as a part of their professional identity formation process, hence there has been low attendance and low motivation. The course is a part of a module also involving acute and critical illness. The students perceive the two parts of the module as incoherent and contrasting in the sense that acute and critical illness is at the core of their budding nursing identity, and organization, administration and management is not. The teachers at the nursing college claim that the course on organization, administration and management could benefit from placement later in the programme; however, it is not within the power of this study to reorganise the entire programme. The reason that the nursing teachers suggest placing the course later in the programme is that by that time, the students have experienced the need for knowledge of organization, administration and management. Thus, there are two organisational issues beyond our control that affected the results in this study: the academic context of the course and the placement in the programme progression. Organization, administration and management is a growing part of the obligations of a nurse; however, it is not regarded as a part of the nurse's core identity. To overcome these challenges, the teacher and her action research group have developed an instructional design that is less functionalist and more situated. The aim is to steer away from a teleological 'means-ends' logic and move in the direction of a more deontological causal logic. The instructional design was an attempt to create a bridge between functionalism (Welch, 1985) and situated learning (Lave & Wenger, 1991).

Research design

The investigation in this paper was done through a critical realist lens. This means that we asked the ontological question: 'if this knowledge is obtainable of the world, what world is it, then'? This is a reciprocal relation to the epistemological question: 'how is knowledge of the world possible' (Elder-Vass, 2007; Bhaskar, 2008; Corson, 1991; Collier, 1994)? This implies that we should conduct a retroductivist investigation into the data of the study to identify the causal mechanisms that cause the events that we see in reality (Peirce, 1998). The research of a critical realist is similar to the work of a detective in the sense

that the researcher is recreating the traces and evidence of the event that has happened to determine which actors and mechanisms caused the event (McEvoy & Richards, 2003). The purpose of using a critical realist approach is that it is a good approach for looking beyond the immediately visible facts and concentrating on what may have caused the visible facts in the *event*. The aim of critical realist research is to understand how to change the research object for the better.

The instructional design that generated the *event* for the critical realist investigation in this study was developed in an action research cycle. The cycle was a quest for emancipation through inquiry and reflection (Lewin, 1946; Adelman, 1993). The cycle begun by identifying and pinpointing the problems (lack of motivation, exclusion and idle ICT) that were common, tacit knowledge amongst the nursing teachers but were not articulated. Then, an instructional design to improve motivation and enhance the use of ICT was developed. This resulted in a redefinition of the relay between preparation and lesson. It was inspired by *flipped classroom* studies in other nursing colleges (Schwartz, 2014) and the more general notion of utilizing video instead of F2F lecturing. The reason behind this was that the students said (in a preliminary survey) that they experienced more acknowledgment of learning from supervision than form lecturing. The aim was to create a situated learning environment in which the students would be motivated by collaborating in the activities and not only by the risk of failing the exam (Lave & Wenger, 1991). The activities included role-playing, teacher-produced video clips, real life cases, etc. The instructional design eliminated all F2F lectures. Instead, the presentation of academic content was done through teacher-produced videos. The purpose of the videos was to support the students' preparation for lessons in conjunction with reading and other activities.

The instructional design was created on the basis, interviews, focus groups and observations. The data collection was based on how the new instructional design worked in practice. The data was analysed, and there were major issues with the new instructional design (Niels Bech, et al., 2014). For the second run of the course, the teacher made a few adjustments to the instructional design, and the data showed that some of the issues were eliminated. Finally, the results of the study led to these conclusions:

1. An island of *situatedness* (the course) in a sea of functionalism (the programme in general) requires considerable explanation and attention
2. The students need time to figure out how to learn in a situated, learner-centred context
3. The students need guidance to learn how to centre themselves in their own learning process

On the basis of these concluding comments on the instructional design, the critical realist investigation began. The interviews, field notes, focus groups and surveys were reviewed to generate a deeper understanding of why the instructional design was not an immediate success.

Lack of schemata

We used the Kantian notion of *Schema* to understand what is needed to learn in new circumstances (Radford, 2005). For this paper, we used Kant's three types of *schema*: empirical, pure sense and transcendental schema. Generally, the notion of *schema* is a cognitive framework for understanding and interpreting information. It is related to language through metaphors and stereotypes in what Lakoff and Johnson called *image schemas* (Lakoff & Johnson, 2008; Lakoff, 1990). Furthermore, it is related to *shared repertoire* in Wenger and Laves theory on *Communities of Practice* (Wenger, 1998).
The schema describes the cognitive competence to interpret information through metaphors in language, through stereotypes in behaviour and through *shared repertoires* in collaboration. The Kantian tripartition of the schema divides the schema into empirical, sensuous and transcendent schemata (Johnson, 2005).

- An empirical schema is an empirical concept that many perceive in a similar way.
- A pure sensuous schema describes the ability to think systematic abstract thoughts of concrete matters. It describes the abstract system of understanding the invisible complexity of things that appear simple (geometry: triangle, circle).
- Pure concepts of understanding refer to schemas coming from within and affecting understanding of what is experienced (intuition, for example).

The schema is a diagram for understanding the organisation of the event. In this case, the teacher's schema is somewhat expressed in the syllabus, and the actual experience of learning is the sense experience. The schema expressed in the syllabus is at best an empirical concept:

'Formal deduction removed from all empirical content, however, Kant argued, cannot yield knowledge. The question then was to explain how abstract concepts relate to their concrete content. In an important sense, the Critique of Pure Reason is an attempt to achieve this goal and the schema, in fact, was Kant's answer' (Radford, 2005; p. 147).

The syllabus is an abstract concept created through the teacher's deduction of prior experiences in relation to the outcome of new circles of reflection. The teacher reasoned that '*priming* an academic subject to the students is important. Letting students watch a video before lectures will *prime* the students' memories and make room for more motivating activities that seem more meaningful to the students'.

This deductive approach to reasoning was, unintendedly, used by the teachers when developing the instructional design. The design process was *passive* so to speak; it did not involve empiric experience. It was solely built on the theoretical deduction of an alleged relation between video, role-playing and motivation. Even though the syllabus gave instructions of how to use the videos, it did not mention why. Hence, the students did not have a clear idea of what purpose the videos served. The students were used to reading syllabi, and they had a fixed impression of what teaching meant; therefore, when bearing elements are changed, the students prior schema does not seem to fit the new design.

Analysis

This *passive* approach to developing instructional designs may be the causal mechanism that triggered the displacement between the teachers' expectations of how the students would engage in learning within the new instructional design and how the students actually reacted in the real *event*, the lesson. In Louis Radford's article *The Semiotics of Schema* (Radford, 2005), the schema is described as a vehicle for understanding that requires active interaction between information and the learner: 'The schema entails of an individual who, to acquire knowledge, has to become active' (Radford, 2005; p. 147). The schema is like a catalyst in chemistry, a substance that makes the process happen in a certain way without actually including itself in the process: '…in Kant's theory of knowledge, the schema exhibits or unveils its concepts – it does not produce it' (Radford, 2005; p. 147). If the schema is not present, the concept remains undisclosed or even uncommunicated.

The teacher stated that her intentions with the action research cycle were to create an instructional design that:

- Bridged functionalist and situated approaches to learning.
- Created an environment of 'concrete labour' that focuses on the intersection between theory and practice.
- Reformatted the teacher role to become closer to the learning processes work-groups.
- Made her (the teacher) part of the students' learning process more involved.
- Made her (the teacher) part of the lectures non-interchangeable with technology.

These intentions were only communicated somewhat in the syllabus and not at all during the lessons.

The syllabus was presented on the campus LMS as a resource webpage containing all relevant information about the course (Figure 1):

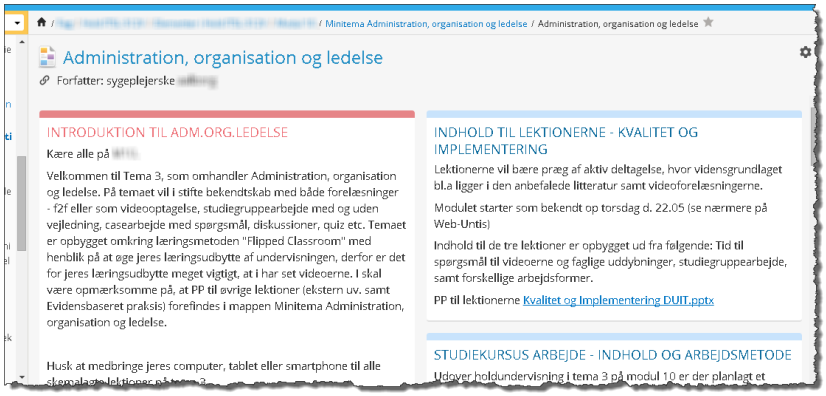

Figure 1

The introductory text refers to *flipped classroom* and other teaching principles/methodologies that the teachers sought to utilise in the course, and it also refers to the official curriculum for the course. These references are not that useful to the students. It would presumably have been more fruitful to align the expectations and demands of how to actually take the course.

The students in the focus group stated:

Student 1: 'I just logon, get the PowerPoints and logout again'.

The student tried to assimilate to the new instructional design by maintaining or recreating the instructional design that she is accustomed to in the new instructional design.

Student 2: 'If there are any notifications, somebody copies it and posts it on Facebook'.

The student illustrates a common tendency, which is that LMS is marginalized in favour of social media. The teacher's efforts to utilise LMS functionality to improve her instructional design proved to be in vain.

Student 3: 'We lack a connecting thread—we put something on the LMS, and we get feedback or comments—that never happens'.

The students wish for more online interaction and feedback. Connecting to LMS without getting feedback seems redundant and almost provoking to them.

Student 4: 'When posting a question on the Facebook group, you just know that 60 people will see it, and somebody will give an answer'.

The students used the rhizomatic, ahierarchical nature of networks in social media, which is in direct opposition to the arborescent, hierarchical organisation of the LMS. This notion is interesting in the sense that the intention of the instructional design was to produce a map of possible routes to learning and not a path to follow. The intentions of the instructional design were not communicated clearly or understood by the students in either case. It seems as though both the students and the teacher wanted the same thing: a plateau of intensity in a rhizomatic network of learning (Deleuze & Guattari, 1987); however, they did not quite communicate with each other in terms of how to construct the plateau.

The syllabus is very well-organised, and it presents the resources and content of the course very clearly; however, it is done in a functionalist way in the sense that one element has a specific function, and it is a means to achieve a specific goal from the curriculum. The different elements are not situated in the intended context. The syllabus centres its focus first and foremost on content and second on form. It does not describe what the students are expected to do.

According to Biggs, the teacher is in the process of 'obtaining an armoury of teaching skills' (Biggs & Tang, 2011; p. 19), which is moving from level 1 to level 2 in Biggs and Tang's levels of recognising

one's role and obligation as a teacher towards the students' learning needs. The levels could be described as follows (Biggs & Tang, 2011, pp. 17-20):

1. Is concerned with what the students are: lazy, unprepared, good, creative etc. Teaching revolves around content, and possibilities are limited because the teacher is fixating on what the students are. Teaching style: lecturing. Technology: PowerPoint.
2. Is concerned with what the students do in relation to teaching: make videos, cooperate, appear active, participate etc. Teaching revolves around form and activities, and the possibilities are unlimited. Anything could be a learning resource. Teaching style: facilitator. Technology: any.
3. Is concerned with how and what the student is learning: heutagogic study skills, feedback, content channels, alignment etc. Teaching revolves around a synthesis of content, form and learning skills. Teaching style is problem-based, reflective and relational.

In the interviews and in the first action research cycle, the teacher expressed a desire to move away from blaming the students for poor attendance and low motivation and to instead take on the challenge of changing her teaching to develop a new, more inclusive way of teaching the curriculum for the course. Now, she would be moving to level 2, and she would be the one to blame for any unsuccessful evaluation of the course, according to Biggs. The intentions with the new instructional design were to centre the student in his/her own learning process and decrease the teachers' experience of the students being at the periphery of their own learning process. In the teacher's opinion, the students only immersed themselves in the learning process if the content was relevant for exams or for immediate use in a basic understanding of the nursing practice. The teacher's shift in teaching principles could be visualised in a model used to describe learning in an *Open Source Learning Stream* (Kjærgaard & Sorensen, 2014) (Figure 2) (Kjærgaard, 2015).

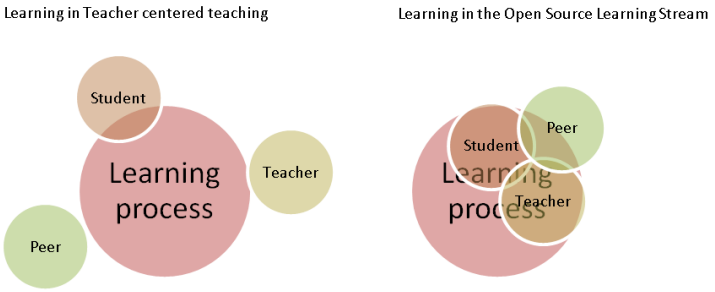

Figure 2

The model shows how students relate to learning in a teacher-centred lesson and how they relate to learning in an Open Source Learning Stream (shared learning process in a synchronous stream of learning). In the teacher-centred lesson, they mostly off-load (Salomon, 1997) throughout the lesson; they do not really engage in cognition. Off-loading is the process of documenting the lesson in a system that is not proved to work without the purpose of later cognition:

'What would we say of individuals who off-load some of their cognitive processing onto a computerized expert system without having learned to provide it with appropriate inputs or to read its outputs properly, without having learned to doubt the system's accuracy or without mastering the skill needed to weight the alternatives it provides' (Salomon, 1997; p. 127)?

The computerised system could be LMS or note-taking in PowerPoint, which is very common for these students. They off-load the overload of information that the lecture provides into systems that they may not be capable of operating properly. In the Open Source Learning Stream, it is quite different because off-loading and cognition become one and the same in the learner's route from a legitimate peripheral participant to a member of a community of practice (Lave & Wenger, 1991).

The teacher wanted to establish a situation in which the students would be forced to take centre stage in their own learning process. The video clips should solve the problem with unreflected off-loading because

the video clips created the opportunity to take some of the stress of the synchronous learning situation that lecturing creates in the sense that the students now had the opportunity to revisit the teacher's presentation of processed academic content in a cognitive progression.

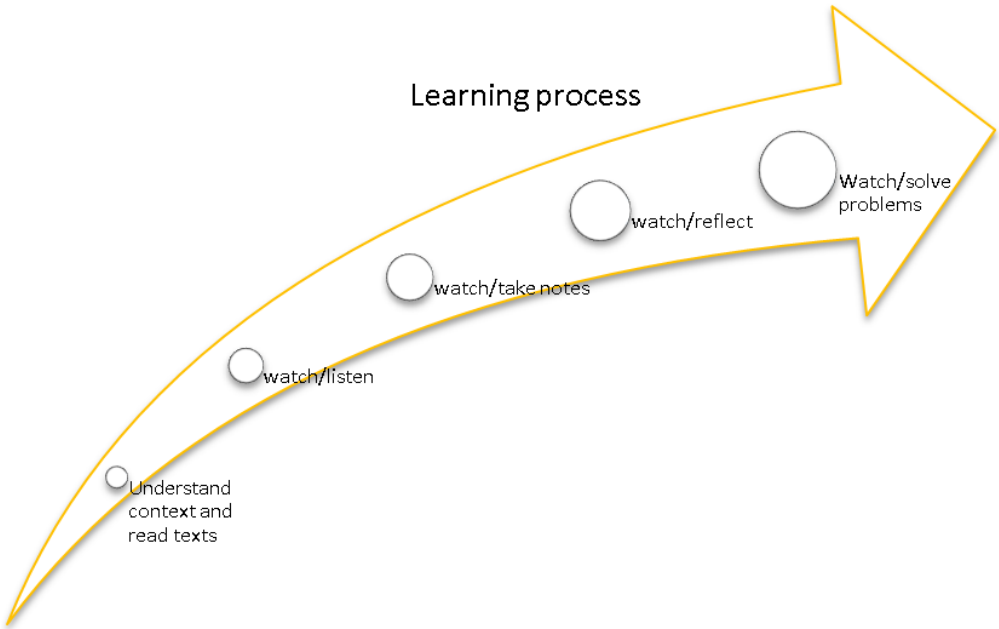

Figure 3

The new lessons had no forward momentum; there were no lectures tracing the route of the lesson, which meant that the students/groups had to generate momentum in the learning process themselves.

Findings

The students were expected to lack schemata, but the interesting finding is that the teacher actually also lacked schemata. She also had to determine how to operate the new instructional design. During the action learning cycles leading up to the design process, she was influenced by the other members of the research group. She was new to many of the suggestions in the action research conferences, which meant that she was to an extent assimilating her own practice to the new design without fully adapting the principles of the new design. This led to a discrepancy between her expectations of what the new design could bring to her teaching and what actually happened. In the interviews, the students stated:

- 'I just gave up reading those 70 pages–I was thrilled watching the videos'.
  Videos were a substitution for reading, which is an unwanted side effect that calls for reconsidering how the videos should support the students' preparation for lessons.
- 'We don't need more literature. We just need a connection between what the teacher says in the video and the texts'.
- 'They [the teachers] just mention all those theories and models. What we need to learn them is explanations, examples and generally elaborations of what is already in the text'.
  Videos do not bring the putative quality to the preparation that the teacher intended.
- 'In the video, you just saw the PowerPoint. I need to see who it speaking'.

The students relied on a phatic connection between the video clips and the teacher.

The second run was better than the first, and the third run was a success. This means that the teacher's own schema building was just as important as the students' schema building.

The teacher stated:

‘The change that I have made from the 2nd to the 3rd time is that I have tried to make the relations between all of the elements in the course more obvious. I referred systematically to the work that the students did the day before and asked them to consider what they learned in the next day’s lessons. Last, I reinforced the theme by trying to get the students to draw on the knowledge they have acquired through the process by asking them to substantiate their responses/reflections with theory’.

She also said:

‘Moreover, I can mention that after the third time, I have become more familiar with this way of working and have an overview of all the details/elements, which I didn’t have the first time’.

The findings suggest that there are quite a few considerations in implementing instructional designs created through action research. The findings also suggest that a radical change in a teaching principle requires a substantial intersection of understanding between teachers and students.

Conclusion

Action research as a developmental model in teaching has shown a few downsides. The students felt excluded and bewildered. It would have been beneficial to include the students in the action research process. The aim of the new instructional design was to include more students and to motivate participation. It would have been fruitful to involve the students in the process of designing the course.

The instructional design lacks elements of schemata building. The lack of schema as a conceptual catalyst results in misconceptions of how to engage in the instructional design. The syllabus presented was an agenda for the lessons and a functionalist resource collection. The situated activities that should motivate and include the students were presented as functionalist, teleological ‘school assignments’ and not as situated problem-based cases, even though they were in fact both situated and problem-based.

The students had already established an Open Source Learning Stream on Facebook. The students said that the campus LMS is useless and lacks feedback from teachers and that Facebook always delivers feedback from peers. This limbo between LMS and social media is not new, and a proper solution does not lie in a new ‘perfect’ system but rather in the individual. If the learner/group takes centre stage in the learning process, then a ‘perfect’ system is not that important. A combination of systems, including social media and LMS, has proven to be fruitful in other studies. An added benefit is that when the students are involved in the selection of digital tools, then they will have to analyse and discuss the affordances of the digital tools in the actual context. While analysing digital tools, the students would engage in a shared meta-learning process that would sharpen their perception of how digital tools can enhance learning processes.

The study also showed a few pitfalls, such as the students using the videos as short-cuts for easier preparation for the lessons. This is positive if the alternative is no preparation, but in an ideal context, it is negative because the videos only deal with the summary of the texts. It also shows the importance of making relations between videos, texts, context and activities. The study shows that the videos should:

- Contain instructions on how to use other resources in relation to the videos.
- Contain footage of the teacher presenting the video.
- Elaborate on the content of the texts.
- Not paraphrase texts or other resources.
- Not make texts redundant.
- Be approximately 10-15 minutes in length.
- Contain articulation of the intersection between video, text and activities.
- Be personal to the teacher.
- Be accompanied by activities that necessitate all resources for preparation (test).

The study also shows the importance of developing the students’ understanding of how they learn and which digital tools are helpful and in what ways. The implementation of a new instructional design should address meta-learning as a part of the new design. Inclusion also involves inclusion in the process of

designing the lessons. The teacher is the theoretical expert and the specialist in nursing practice, and the students are in the process of becoming nurses. Within the intersection between the two positions, students and teacher share the desire of acquiring new skills, competences and a higher reflective level. The conclusion of the study is that if the teacher does not address this in her reflections on how to design her teaching, the shift between a functionalist approach and a situated approach is difficult.

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