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The Global Classroom Video Conferencing Model and First Evaluations

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Abstract: This paper presents and discusses findings about how students, teachers, and the organization experience a start-up-project applying video conferences between campus and home. This is new territory for adult learning centers. The paper discusses the transition to this eLearning form and discusses pedagogical innovativeness, including collaborative and technological issues.

The research is based on the *Global Classroom Model* as it is implemented and used at an adult learning center in Denmark (VUC Storstrøm). VUC Storstrøms (VUC) Global Classroom Model is an approach to video conferencing and eLearning using campus-based teaching combined with laptop solutions for students at home. After a couple of years of campus-to-campus video streaming, VUC started a fulltime day program in 2011 with the support of a hybrid campus and videoconference model. In this model the teachers and some of the students are present on campus in the classroom, while other students are participating simultaneously from their home using laptops.

Although the Global Classroom Model is pedagogically flexible, the students are required to attend according to regulations from the Ministry of Children and Education to pass their exams. Evaluations show that the students are happy with the flexibility this model provides in their everyday life. However, our findings also show several obstacles. Firstly technical issues are at play, but also the learning design of the lessons, as well as general organizational and cultural issues. All these matters need to be taken into consideration when implementing the Global Classroom Model.

Through the start-up period of a PhD study and through a research-based competence development project with senior researchers, we have gained knowledge about the experiences, challenges, and potentials of the teaching and learning within the Global Classroom Model. Both studies are action research studies with a user-centered approach. In this paper we focus on the students experience and on the organizational issues related to the transition to the Global Classroom Model as well as on the continued development of the teachers' educational designs. The research is based on interviews, on utterances in feedback sessions, and on the observed interaction taking place.

Keywords: Global Classroom, video conferences, blended campus- and home-based education, adult education.

1. Introduction

This paper presents findings about to how students, teachers, and the educational organization experience a video conference start-up-project, where students attend class on campus and from home synchronously. This is a new field for adult learning centers, and as our literature study shows, the specific Global Classroom model is in general a new kind of setup, that influences the pedagogic and learning design.

Online-education has developed into many shapes, both concerning the involved technologies as well as in the use of different pedagogies and learning designs (Laurillard 2012, Rice 2011). The variations of on-line learning also involve the use of asynchronous or synchronous interaction in class. Videoconferencing is a technology that allows a more direct and immersive learning experience for the on-line students since it enables a simultaneous face-to–face interaction. Video-conferencing has developed into two main forms in education: The parallel form, that uses dedicated video-conference-hardware has existed for many years and is for example used for reaching two-three campuses or for reaching remote hubs of classes, international guest lectures etc. Whereas the laptop / web-based form, that uses personal devices as PC's or tablets and is a software-solution has the freedom for the students to choose to sit separately at home or together on campus, using live-streaming from everyone to everyone. (Andrews & Klease 1998, Freeman 1998, Kjær et al 2010, Roberts 2009). The two forms both has a major impact on the learning design as the first takes out-set in

the classroom and the teachers' physical location herein, and the second uses a shared laptop space as the starting point of the activity.

In the Global Classroom Model the two forms are merging. The teacher and students on campus use dedicated hardware solutions (Polycom Realpresence), but the students that are at home sign-in to the classroom via a laptop-software solution. Henceforth and unlike the literature describing technologies as Adobe Connect etc. this teaching process uses the classroom and the physical boards (whether a traditional chalk, whiteboard or a digital smart board) as reference point. The teacher both addresses the students in the physical classroom as well the students online via representations on the projected screens (see later), this being two distinct modes of communication. We have only found little research describing on-line education in this hybrid campus and home-based form (as Ellingson & Notbohm 2012) and this is why we recommend further research in the area.

In a review of the 50-years history of the Australian Journal of Adult Learning (which is also an international journal), Harris and Morrison found that "*The roles, characteristics and capabilities of educators have received decreasing interest*" (Harris and Morrison (2011) p. 42) and they show (figure 8) that the number of papers on students are relative stable (average of 25%), but the papers on teachers fell from 1960-2010 from 32% to a low 7%. Another trend (according to this journal) is a much higher (though fluctuating) degree of attention on evaluation than on curricula (Harris and Morrison (2001)). Little is known about how to enable teachers and the organization to establish curricula and designs for learning in video conference settings of, therefore intention is to use knowledge from students' experiences to support the competence development process of the teachers.

VUC (the case organization) is currently applying the global classroom model to the *HF* education. HF is a Higher Preparatory Examination Course (upper secondary general education program) that takes 2 years. To teach at HF requires *"a Master degree in at least one relevant subject and to have completed a Post-graduate teacher training course for upper secondary school teachers"* (Milana 2008, p.7). However, it is a recent phenomenon that the majority of the teachers use technology in the teaching practice, such as sharing digital materials and using traditional learning management systems. The distributed video conferencing will furthermore make technology constantly present during the teaching.

For the last 10 years, the Danish Government has focused on the implementation of IT in education, as a mean to increase the academic level and ensure that more people get an education. The argument is that IT provides better opportunities for differentiated and more flexible learning and evaluation forms (TDGME 2012). However, teachers lack an established practice and support (Riis 2012) when navigating in the many new opportunities within IT, whether it is by choice or as requirement of the job, hence, the need to return the focus to the teachers. At the same time, there is a need to examine what it takes to achieve a well-functioning communication and decision-making flow between the organization and teachers (Henriksen et al. 2011).

Global Classroom uses video conference equipment that allows the teacher and students on campus to see and communicate synchronously with the students at home and vice versa. Every other week students can attend from home, and every other week they are obliged to go to the campus. The equipment in the class is situated in a way that enables 1) the teacher to see and hear the class at campus and at home at the same time, 2) the students to see the whiteboard in class and to see and hear the teacher in class and the students at home 3) the students at home to hear the classroom, to see the whiteboard as well as the teacher or the students at campus depending on which camera is used at campus (see figure 1). It is also possible to establish virtual-group rooms for group-assignments.

Figure 1: The Global Classroom set-up.

This is the ideal situation, but as this research study shows, situations occur where the students' video is not on or there is trouble with the sound from the classroom and vice versa, all of which interrupts the planned designs for learning. However, our focus is primarily on the pedagogical possibilities when the system functions as intended, and technological discussions are primarily related to redesign of current setup to improve pedagogical processes.

In the school year 2010/11 VUC had approx. 5,500 students (VUC 2013). HF-Global Classroom represents a very small proportion of this (two classes respectively 10 and 26 participants (1.3.2013)). HF-Global Classroom is VUC's first initiative with a long-term strategy in a relatively low population density area with long distances. One of the purposes is to ensure each citizen access to education regardless of time and place.

2. Research objective and methodology

This is a joint research project between VUC and AAU. The overall research objective is to investigate: *the design of innovative methods, practices and evaluation tools in relation to the use of IT in Global Classroom settings, with a focus on how to enable teachers to create motivating and qualified learning design for the students.* The aim of the user-centered action research is both to add value to VUC as well as to develop theory and guidelines by investigating how to qualify the implementation of the Global Classroom Model in general.

The paper deals with the first two phases of the cyclic action research process, namely diagnosing and action planning (Susman & Evered 1978). Our understanding draws on the assumption that an innovative implementation of IT in formal learning situations takes place as an interaction between different actors, and that research of this kind needs to be grounded in mutual learning and dialogue. As such this is a participatory action research study.

The sub-questions for these particular phases become: *Which innovative methods and practices are sustained or emerge when a team of teachers are "thrown" into a global classroom setup? What are the consequences for the students? How do the students perceive learning quality and motivation? Can any guidelines and/or future steps be derived from these first experiences?*

Given the nature of the research focus and questions it is vital that the empirical data provides insights that deepen the comprehensions and arguments behind the actions, consequently we have chosen qualitative methods in support of the action research study. The empirical material provides insight into the diagnoses and action-planning phases as listed in table 1.

Table 1: The material from the diagnose and action plan phases

Meetings and on-going conversations with project owners, management and (IT) pedagogical consultants at VUC	From early Autumn 2012 to Spring 2013
Workshop with teachers, incl. project owners and pedagogical consultants	26 November 2012
Written input from teachers – on challenges and future plans	December 2012 and January 2013
Formal conversations between teachers and researchers – i.e. scheduled and planned activity	29 January 2013
Student evaluation workshop – a qualitative workshop, 14 participants	22 February 2013
Informal conversations with teachers	Spring 2013
Interviews with teachers – based on semi-structured interviews	15 April – 8 May 2013
Observation of Global Classroom teaching	Spring 2013

3. Theoretical and Grounded Analysis of the empirical data

Based on the three groups: students, teachers and organization (project- and pedagogical management, as well as technological personnel).

3.1 The students

The Global Classroom Model consist of the video conference as a mediated learning process, and also comprises the use of other forms of IT in education including digital materials, software, and processes because of the changed environment for the learning design. For example, all the instructional materials should be accessible online (Rice 2011). In this way, the Global Classroom concept has inspired some of the teachers to implement new kinds of IT in their teaching practice. These new ways of involving IT in the teaching may, together with the Global Classroom concept, potentially help to create a more relevant and motivating learning for the students (Somekh 2008).

According to the German professor of pedagogy Thomas Ziehe there has been a "de-conventionalisation" - a change in young people's knowledge, behaviour, and motivation (Wiborg 2009). Today, young people are choosing what they want to learn, and young people's behaviour has changed because they have become major media consumers. The student's motivation helps establishing interest in the subject matter and is therefore an important contributing factor to the learning process (Koster 2005; Weitze & Ørngreen 2012). The following three main driving forces underlie the motivation to learn and at the same time they cover the basic human psychological needs: 1) Curiosity, 2) The desire to achieve competence, and 3) Reciprocity: the desire to be an indispensable part of the community (Gärdenfors 2010). The argument is: if the learning is planned in a way that enables the student to achieve one or more of the three main motives, it will help the student to feel an inner motivation to learn (Gärdenfors 2010; Wiborg 2009).

Motivational elements: In this study, the students explain that they find a number of aspects of the Global Classroom concept motivating. For example the students own choice of environment helps them manage their family and everyday life by not always having to be present at school. Several students are also pleased with being able to vary their classroom environment during a day by changing geographical location, and when sitting at home they have the feeling that the school-day ended sooner. The format also creates a new "intermediate solution" for some, when they feel "sluggish" and normally would have taken a sick-day. In this way, the concept contributes to their ability to complete their education.

Technological-pedagogical issues: The students experienced technical problems and many of these problems were solved along the way. Problems were partly due to Global Classroom being a new concept developed through a bottom-up approach, and partly due to the fact that students and teachers, had to learn how to use the system from scratch.

The Global Classroom seems to provide a transparent experience (Dourish 2001), giving the feeling that it is possible to simulate a traditional classroom. Therefore the teachers plan to apply various educational activities equivalent to what takes place in a traditional classroom to make the students at home engage in class conversation without causing noise in the class, and with the least possible delay in audio and photo. Because of the delay students often perceive it as disturbance when they speak. In addition, the human ear cannot filter sounds in the same way in online space as in physical space; all sounds are mixed and more difficult to

differentiate (voices, moving of chairs, coughing etc.). Similarly, it has proved difficult to create groups across home and campus because of technological problems as well as issues with too much noise in the class. Pure home-based-groups also have problems in detecting when to "return" to the classroom debate. We see a need for the teachers to experiment with various ways of working actively across the constellations of home and campus.

The students tell that they have been frustrated in relation to the communication with the technicians when something is wrong with the technology. Some problems are of so vital importance that the teacher or student should be able to get immediate technical assistance, as some types of technical breakdowns has the effect that the teaching cannot be carried out. Uncertainty about deadlines for repairs and corrective actions are inconvenient in everyday life and has concerned the students.

Learning Design: The students' experience that the teachers are very different in their approach when activating the students at home. Some teachers are very aware of home-students asking them very directly to participate in the debate, while other teachers hardly pay any attention to the students at home. Some students find it difficult to make the teacher aware that they want to answer a question. This makes the students at home frustrated and uninvolved. Therefore, the students feel it is important for teachers to take this issue into consideration in the learning design and to be aware that the students at home would like to be invited more into the class activity. The students at home are using different strategies to solve this problem like writing to the campus-students on Facebook. In our dialogues with the teachers we have also found that the class from August 12 who participated in the qualitative student evaluation is very different from the class from August 11 In the 2011-class the students at home are always very active and also often the "diligent" ones in the class. Consequently, it might not be the teachers that ignore the students at home, it may also be that students at home are less active and not so easy to activate.

Another consequence of the Global Classroom setting is that it is important for the students to have access to all instructional material as well as assignments on-line before the lesson begins. This gives the students a chance to participate actively in the current lesson by solving these assignments in spite of any technical difficulties that might arise.

Rules in Global Classroom: The students are satisfied with the rules of conduct in Global Classroom regarding the recommendations on behaving as in a traditional class, e.g. not to attend in pyjamas from bed, no smoking etc. These rules have been developed bottom-up as such situations did happen, and are changed regularly according to new experiences. One can, however, consider whether it would be beneficial to develop pedagogical recommendations on for instance: active participation, working in groups etc.

Pedagogical Innovation: The students have been pleased with the learning designs that involved working on the Internet, as this gave equal opportunities for students at home and on campus, as e.g. preparing multimedia presentations. However, when inquiring about ideas for other initiatives the students had difficulties articulating new ideas. Thus so as for teachers it can be hard for students to think beyond the traditional educational culture.

It is important to acknowledge that in spite of the many problems, in terms of technology, in relation to pedagogy, and mental stress issues the students' perceive the video conference as advantageous and want to continue.

3.2 The teachers

The teachers have not been employed specifically as Global Classroom teachers. Though they received initial training in the concept, it was, at first, difficult to imagine how it would be to work with. The IT-pedagogical project group chose different approaches: short seminars, and later involving researchers conducting innovative workshops, but all the time also with a bottom-up/ learning-while-doing approach. At times this was frustrating for the teachers, but considered necessary by the IT-pedagogical project group, since this was new terrain. Somekh stresses that adopting to change is learning and, "*like students, teachers need to learn actively and have opportunities to try things out and evaluate the outcomes on the basis of evidence, with the support of strong leadership and a community of peers*" (Somekh 2008 p. 9). What sometimes is regarded as "teachers resisting to be innovative in their pedagogical practice" is indeed a complex and cross organizational issue, since teachers, students, managers, and project groups in the organization are all embedded in an

educational culture that at the same time supports and restrains its members. Pedagogical innovation does not only concern and involve the teachers but the entire learning organization.

Motivational elements: At the moment the teachers primarily regard Global Classroom as being beneficial for the students, and they appreciate that it makes it possible for some of the students to complete their education. The future development of the pedagogical aspects in the concept will hopefully also contribute to the teacher's own motivational experiences within this frame.

Pedagogical-Technological issues: In the initial phase at VUC the teachers often had to spend a large part of their time and attention on making the videoconference technology work, experiencing that they wasted valuable teaching time. However, in our latest observations and interviews with the teachers, we note that several of the teachers tell that the technology now is running most days.

Cognitive demands: The teachers experience sudden interruptions in the middle of a sentence in class, when students at the videoconference cannot see or hear the teacher clearly and therefore interferes out of the teaching context. Students use different strategies to solve this problem as writing to campus students on Facebook, since there are no chat facilities with the teacher. At the same time, the teachers experience mental overload due to the many media at play and the many points of attention. Many teachers experience an immense fatigue after a Global Classroom lesson. The student evaluation showed that it would be advantageous and less disruptive if the students used chat to submit information to the teacher during a lesson, but this is not necessarily the teacher's desire. On the contrary, many teachers expressed reservations about getting one more media to communicate in and keep an eye on, though a few forerunners seemed to have the energy to work with multiple media and students at 2 locations at the same time.

Learning design and activity level: Just like the students, the teachers find it possible to carry out teaching in a traditional manner in the Global Classroom Model, and they see this as an advantage. There are communicative difficulties partly due to lack of the valuable flow and synergy that can be experienced in a traditional classroom discussion; due to sound delay and poor lighting; and due to some students that deliberately choose a passive role. Depending on where the most active students are, the "centre of gravity" in the activity level in the class or at home shifts. This is an interesting aspect in the debate since this highlights the importance of student engagement and study skills in general instead of only focusing on trouble with the technology.

Facial decoding: Another problem occurs when the teacher cannot read students' facial expressions on the screen. Sometimes the teacher can only see the student's silhouette if he sits with the light coming from behind. One of the interviewed teachers did not want to humiliate the students that might be unable to answer. When in doubt it is generally much easier for the teacher to observe the facial expressions of the students. By reading facial expressions the teacher can evaluate whether the student does not know the answer, or if he's just shy and the teacher just needs to ask. "*They are all adults, and the moment you ask them a question and they don't respond; then I can't see any point in going on.*" a teacher utters in an interview, with reference to the students' having to take responsibility of their own learning process.

Visual attendance: In Global Classroom it is a problem when a student at home "disappears" from the screen (the student leaves his laptop, turns of the web cam or logs-off the system during a session). The students have to attend at least 80% of the lessons, and they can be expelled if they do not. When a student cannot be seen on the screen, some teachers choose to ignore it, others comment on it. At the student evaluation, some of the students expressed that the teachers were violating their trust if they commented harshly on how often they walked away from the screen. The students felt this only happened when they needed to, to go to the bathroom for example. The teachers, however, feel that they are facing a rather big responsibility evaluating whether the students are still participating in the lessons, and they frequently choose not to react when students disappear from the screen in order not to lose their trust, but they doubt whether this is the right strategy. This is an example of a stress-creating issue that underlies the teaching and runs as an additional point of focus for the teacher during the teaching.

Rules in Global Classroom: with respect to the issues of *facial decoding* and *visual attendance,* the organization could consider making additional rules. A simple solution concerning facial decoding would be to require that students at home have their face lit so the teacher is able to read their facial expressions. The

teachers could also decide to discuss and agree on how common rules concerning visual (non)attendance should be.

Pedagogical Innovation: Research shows that apart from a few enthusiasts, it is in general difficult for teachers to be innovative in their use of IT in the teaching. Teachers often settle for transferring their existing and inherent practice. This practice can certainly be really good, but according to the Danish Evaluation Institute teachers do not fully utilize the pedagogical and academic possibilities lying in front of them concerning the use of IT (EVA 2012). This indicates that teachers need to learn to work with IT learning tools, but also that they need support for the process of innovation and for the development of innovative thinking (Darsø 2011).

3.3. The organization

Conversations and meetings with the organization's project owners has, along with the other empirical activities, illuminated classical issues in the change processes in which project managers at times are well ahead of the rest of the organization since they already understand the ideas within the process that they themselves have developed. This was evident in the SWOT analysis with the teachers, where the teachers articulated that they had a fundamental lack of insight into and influence on the process, as well as a frustration with the basic challenges in technology, pedagogy, and the organizational setup. This was in contrast to the project owners' first dissemination about the situation to us as researchers at the first meetings.

IT-pedagogical roles: The IT-pedagogical project department at VUC has a tripartite role since they are 1) visionary designers for future learning, 2) helping with the actual implementation process in cooperation with the department managers and teachers, for example by participating in the organizing of training courses for teachers and 3) contributing to the evaluation and anchoring of the many IT-in-education-initiatives, e.g. by involving researchers in the development and documentation of the project, as well as in the dissemination of these results.

Organizational challenges: The teachers get frustrated when they are faced with new challenges from the organization, and when they are asked to think in innovative ways in relation to the implementation of the new systems. The teachers feel that they are being asked to redefine their teaching role and thereby themselves. Furthermore the teachers miss that the organization decides, establishes, and announces a more general framework on “how we do Global Classroom", rather than each teacher using a personal approach that needs to be negotiated with the students every time.

4. Discussion and findings

Our analysis reveals four primary themes:

1) That the students perceive Global Classroom as motivating because of the freedom / agency to select their own educational environment with the flexibility this provides in their everyday lives.
2) That the teachers find that their teaching can be carried out in a fairly traditional way, in the Global Classroom setup, but at the same time they find it difficult to change their teaching practices.
3) That both students and teachers are experiencing communication difficulties and that some of the problems arise because the Global Classroom concept is so close to a traditional classroom that they consequently have high expectations to the communicative "flow" in the learning situation.
4) That after this start-up period there is a need for the organization in collaboration with teachers and students to elaborate a more detailed framework that defines and helps establishing a culture of “how we do Global Classroom at VUC”. A culture that works on finding ways to establish clear and sufficient communication and to build upon the good examples of innovative cooperation between the different agents in the educational institution.

Certain characteristics of the VUC students make VUC particularly challenged by dropout issues (VUC 2009; VUC 2011; EVA 2013). These issues make the findings of the students’ positive experiences of the Global Classroom concept essential.

For the students and the teachers the start-up process of the Global Classroom concept has involved so many technical problems that the quality of the teaching was affected. However, evidence from our observations shows that Global Classroom for most teachers today (spring / early summer 2013) operates with few

technical problems in daily life, contrary to what the teachers expresses verbally which is perhaps sparked by occasional problems leading to unpleasant loss of control during a lesson.

There is an interesting paradox in the different views of the students and the teachers in relation to class activity. Many teachers express that this HF class has students who make a deliberate choice to be at home since this allows them to be somewhat passive in class. While the students suggest that teachers tend not to activate them at home. Both parties may well have the "right" perception of this experience, as this might be an example of self-reinforcing pedagogy built on assumptions about a specific group of students without it necessarily being an explicit and chosen pedagogy of the teaching staff.

5. Conclusions and future perspectives

VUC Storstrøms transition to the Global Classroom Model has been challenging but has also contributed to the organizations consciousness of needed skills in supporting innovative developments. At the same time, the students have found the Global Classroom concept to have motivational aspects because they have obtained freedom to design their own learning environment.

Although students who have chosen the HF-Global Classroom class to begin with want to continue with this model, there are still technical difficulties. Our study showed that one or more sessions between teachers, students and the technical staff would provide the technical staff with more knowledge about which pedagogical and learning design activities they particularly need to support.

Our analysis among other things suggests the need for an enrollment culture showing "this is how" we use video conferencing, while also providing room for a sandbox approach. Moreover, it is essential that the teachers have the opportunity to practice new designs in safe-zones to get a better sense of what it takes to create activity and motivational training in the Global Classroom concept. The purpose of phase 3 and 4 of the action research process is to implement those activities with workshops and design-based research approaches.

Future perspectives: The use of innovative IT-pedagogical elements inside the Global Classroom frame could provide further opportunities. Based on the analysis, we argue that play and gamification, and bodily activation with the purpose of motivating the students is worth investigating. This could be explored through the use of learning games, students' digital productions, role playing, or complex multimodal presentation forms etc. (Koster 2005, Weitze & Ørngreen 2012).

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