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EDUCATIONAL DESIGNS SUPPORTING STUDENT ENGAGEMENT THROUGH

NETWORKED PROJECT STUDIES - PrePrint

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Abstract

The chapter discusses how student engagement can be facilitated through educational designs that make conscious use of various online communication technologies. The discussions are based on cases from the practice at the Danish Master program in Information and Communications Technology (ICT) and Learning (MIL), where students from all over Denmark within a networked learning structure are studying in groups combining on-site seminars with independent and challenging virtually organized project periods. The chapter discusses the involvement of students as co-designers of how courses and learning environments unfold, and deals with the development of students' information literacy. Various teacher roles are addressed, as the implementing of new educational technology requires teachers who are flexible and aware of the different challenges in the networked environment. The aim of the chapter is to discuss the application of new technological possibilities in educational settings inspired by problem- and project-based learning.

Introduction

It is our aim in this chapter to discuss how educational designs that integrate various uses of digital media may foster the engagement of learners, especially focusing on the implications of organizing the pedagogical practice as networked project studies. By being 'networked' we refer to a double meaning in the sense of collaborating with other students, and in the sense of being connected to the online facilities and possibilities available for the study processes. By 'project' we refer to the traditions of student-directed and project-driven studies and activities.

The chapter begins by presenting our understanding of the concept of educational design and its relation to concepts of didactics and of instructional design. This is followed by a discussion of four areas of research. First, we discuss research on digital technologies for learning, emphasizing that new technologies do not by themselves guarantee an increased quality of learning. Second, we discuss the so-called Scandinavian approach to problem- and project-based learning and the use of information and communication technologies in this approach. The third area to discuss is the need for students to develop information literacy as part of their general study competencies. The fourth and last area to discuss in this part is the new roles of teachers in a problem- and project-based learning environment.

The second part of the chapter discusses cases of students involved in online learning activities in problem- and project-based learning settings. The cases derive from the Danish Master program in ICT and Learning (MIL).

The concept of educational design

The chapter will explore the development of educational designs that may engage students in taking responsibility for their learning process, and thus create productive learning environments.

By the concept of "educational design," we refer to the combined process of planning, motivating, carrying out, and evaluating processes of teaching and learning. This follows from the continental tradition of theoretical didactics, where reflections of the conditions for educational activities are seen as integrated with reflections of specific goals and content choices.

The word *didactics* itself may cause misunderstandings, because the continental (German and Scandinavian) approach to didactics addresses the entire context of an educational situation, while the Anglo-Saxon approach is more likely to regard didactics from a methodical point of view (Buhl & Flensborg, 2011; Hopmann & Riquarts, 1995). Furthermore, in English the specific word of being *didactic* often refers to a certain style of teacher-centered instructional lecturing, which is not implied in the theoretical concept of *didactics*.

The origin of 'didactics' comes with Comenius, who in the 1600s stated that the art of teaching is not a God-given ability, but a discipline. The educational philosopher Herbart, who is considered to be the originator of theoretical didactics, introduced in the 1800s the teaching-learning situation as a case of three components: the teacher, the learner and the subject matter – later called the 'didactic triangle.'

The didactic triangle can be criticized for having no place for the context. In a contemporary setting, where the conditions for every social practice must be negotiated and nothing can be taken for granted, this may be seen as a weakness, but might as well be an advantage, since ICT changes the contexts of teaching and learning spaces, in variations of synchronous and asynchronous time and physical and distributed presence. Thus, the didactic triangle changes over time, as the subject matter – the content of the teaching – should not be understood as fixed or given, but as negotiated every time teachers, students and a subject matter interact.

By using the notion of *design* in "educational design," we are not referring to traditions of "instructional design." Instead we build on traditions of integrating ICT in education in terms of 'didactic design' or 'design for learning' that have developed in research groups in Scandinavia (Andreasen, Meyer & Rattleff, 2008; Buhl, 2008; Rostvall & Selander, 2008; Selander & Svärdemo-Åberg, 2009; Sørensen, Audon & Levinsen, 2010). The concept of design is gaining ground outside its traditional fields of engineering, craftsmanship, fashion and graphics. When didactics – in the broader sense of the continental tradition – is connected with design, it becomes possible to emphasize didactics as *a dynamic* communicative practice. Being as well a noun as a verb, "design" refers to the interplay of designing seen as a process and design seen as a product.

We aim, in our understanding of educational design, to keep this double perspective, emphasizing that educational design is more than just a fixed design to be rolled out broadly. Instead it is a situated practice that unfolds according to the specific participants involved, the specific instances of technology and other relevant contexts, and the actual ways that the participants make use of the specific contexts. Depending on how people act and what they choose to do and not to do, the specific educational designs will develop differently. It is continually co-constructed through the actions of the teachers and the students engaged in it.

Digital technologies for learning

Globally, there is a focus on the potentials of employing new technologies in education. Digital media have become an integrated part of the everyday life of many citizens, and contemporary students may seem to float untroubled between different forms of media combining what in any given situation is suitable. In their use of media they will often rely more on advice from other peers than from authorities.

During the last couple of years various kinds of social software with the possibility of users to share, interact, produce and communicate have steadily evolved. Blogs appeared on the scene around the millennium as one of the first examples of social software, giving opportunity for easy creation and editing of personal web pages. Blogs have a dynamic appearance, and many blogs have the option for readers to comment on every posting. Thus blogs introduced an interactive and reader-involving dimension that made it easy for ordinary people to speak out in public (Andreasen, 2006).

The situation today is that a substantial part of the internet is characterized by not holding institutionally authorized content, but content produced and uploaded by ordinary users. This has also influenced established web sites, e.g. when buying at Amazon, you may read other users' reviews or comments on the items you are looking for, alongside the official descriptions and reviews. And when looking at online maps, information and pictures uploaded by other users may pop-up.

This general development has been summarized in the expression "web 2.0" which indicates that we are dealing with a new version of the internet that is qualitatively different, implicitly implying that what we previously knew may be described as a kind of "web 1.0" (O'Reilly, 2005). In web 2.0 it is to a far larger degree the users themselves who are creating content, sharing resources, and interacting with other users about whatever they may have in common. This may however also be seen as a re-focusing on what was one of the original ideas behind the internet: to be able to share, connect, discuss and develop across existing borders.

According to the Canadian e-learning researchers Terry Anderson and Jon Dron a main characteristic of web 2.0 facilities are that they provide a looser and more floating way of structuring social interaction (Anderson & Dron, 2007). This may in fact be a challenge when

trying to integrate web 2.0 facilities in educational contexts, as education is often organized around fixed groups, teams or classes.

Technologies and quality of learning

Common for all new technologies that have been introduced in educational settings throughout history is however that they do not in themselves guarantee an increase in the quality of learning. As summarized in a study by the Organisation for Economic Co-operation and Development's (OECD) Centre for Educational Research and Innovation (CERI): "ICT has penetrated tertiary education, but has had more impact on administrative services (e.g. admissions, registration, fee payment, purchasing) than on the pedagogic fundamentals of the classroom" (OECD/CERI, 2005, p. 15).

Furthermore, the acquisition of a learning management system or an e-learning platform – which has been the basic ICT-based activity of many higher educational institutions – does not in itself create new and challenging learning activities. As argued by Zemsky & Massy, the rapid introduction of course management tools may actually have the risk of reducing the impact of e-learning on the actual teaching practice, because it is almost too easy to transfer existing standard teaching materials to the web without a conscious remediation (Zemsky & Massy, 2005, p. 248).

A focus on dialogue and collaboration has been central to many developments of e-learning. Addressing the problem that online courses generally suffer from lower retention rates than campus-based courses, Poellhuber and Anderson have studied the readiness of distance students to engage in collaboration with their peer students. Based on findings that "access to peer work and peer relations improved both the perception of social presence and students' motivation" (Poellhuber & Anderson, 2011, p. 103), their study was comprised of more than 3000 students from four Canadian universities.

Regarding the students' previous experiences, it showed that male students and younger students reported a higher degree of experience with social media and a higher level of positive experiences with teamwork than female students and older students, respectively (Poellhuber & Anderson, 2011, p. 118). Regarding students' interest in using social media to collaborate with peers in a distance course, however, this interest was found to increase with the age of the students: "While being less experienced than their younger colleagues, older students show more interest in learning with social software." (Poellhuber & Anderson, 2011, p. 120).

Poellhuber and Anderson point out the dilemma that students often choose online or distance education in order to obtain flexibility and individual freedom in planning their studies, but that this might be compromised by the integration of collaborative tasks through social media, because this increases the need of time scheduling and synchronizing pace with their peers.

These communicative and collaborative aspects are especially in focus in the dialogically inspired traditions of e.g. computer-supported collaborative learning (CSCL), where net-based discussions and student collaboration on shared projects are used as key elements in a student-centered learning approach (Dillenbourg et al., 2009; O'Malley, 1995; Rambe, 2012; Sundararajan, 2010). The MIL program discussed in this chapter is located in this tradition.

Problem and project-based learning

New pedagogical approaches emphasizing collaboration or learning in networks have been developed following the introduction of new technologies, especially the spread of social media (e.g. Anderson, 2008; Siemens, 2005). We find that these approaches of building on networked student learning can be understood in relation to approaches of problem- and project-based learning developed at the Danish universities of Roskilde and Aalborg, stressing the

importance of collaboration and student-directed project work (Dirckinck-Holmfeld, 2002; Kolmos et al., 2004; Olesen & Jensen, 1999; Olsen & Pedersen, 2005). These approaches share certain characteristics with *problem-based learning (PBL),* but also differ from it.

Problem-based learning dates back to the early 1970s, developed primarily in the U.S. and Canada, but also in Maastricht, The Netherlands, and Linköping, Sweden. In PBL, students learn through working with a case or a problem. According to Barrett and Moore "a key characteristic of PBL is that problems are presented to students at the start of the learning process rather than after a range of curriculum inputs. The PBL problem can be a scenario, a case, a challenge, a visual prompt, a dilemma, a design brief, a puzzling phenomenon or some other trigger to mobilise learning." (Barrett & Moore, 2011, p. 4). Put briefly, in PBL it is the responsibility of the teacher as an expert to present the problems to be dealt with and demonstrate how students in a constructive way can relate curriculum and theories to praxis. Barrett and Moore thus explains: "It is important for us, as PBL practitioners, to continually find new ideas for selecting and designing relevant, motivating, challenging, interesting, multi-faceted and up-to-date problems for our students" (Barrett & Moore, 2011, p. 5). Within this framework students are offered the opportunity to deal with the presented problems.

In *problem- and project-based learning*, on the other hand, there is a bigger emphasis on the independent work of the student group. The starting point of a project is for the students to choose a topic or problem to investigate that represents a challenge for them, similar to what the cultural anthropologist Michael Wesch underlines as the importance of supporting students' ability to wonder. The process of defining a problem involves questions such as: "What is the meaning and sense of this problem in the first place? Why should I try to solve it? How did it emerge? Who designed it, for what purpose and for whose benefit?" (Engeström, 1987, p. 151).

Working with questions like these can be a challenging, but productive process. Furthermore, it is interdisciplinary in that it combines knowledge and ideas from different kinds of academic fields (Olsen & Pedersen, 2005).

Problem and project-based learning is characterized by collaborative project work in groups; following the development of the research question, the group members embark on a dialogically organized process in which they collect relevant material, data and information; analyse it; and, guided by relevant theories and methods, work to transform this material with the goal of investigating and answering the research question; while continually reflecting on and clarifying this research question. Hereby the students learn how to plan, manage, and evaluate projects. Through this process the students are engaged in a dialogue with a teacher as their supervisor. The supervisor's role is to give the students critical constructive feedback and facilitate them in their learning processes.

Frank and Barzilai states that students working in a problem-based learning environment are likely to engage themselves in processes of active learning and gain multidisciplinary knowledge. They note that "project learning increases motivation to study and helps students to develop long-term learning skills. Students […] share the responsibility for the learning process" and "the PBL environment […] increased students' self-confidence, motivation to learn, creative abilities, and self-esteem" (Frank & Barzilai, 2006, p. 40).

We find it important to acknowledge that problem-based study processes are however also characterized by contradictions and challenges for the persons involved. During study periods the level of frustration can be high. Students participate with different backgrounds, skills and qualifications and the processes of dialogue, discussion and negotiation may be laborious. One aspect of this is elaborated by the Danish learning theorist Knud Illeris: "The

learning process may take the form of coming through a crisis, in which the learner struggles for a certain length of time with a problem which is of urgent subjective importance" (Illeris, 2004, p. 58). Illeris draws parallels to concepts like Engeström's expansive learning, or Mezirow's transformative learning (Illeris, 2004, p. 59), which also deal with processes that are characterized by reflection and meta-learning. It is important to have in mind the contradictions at play for the students involved in such learning processes.

From a dialogic perspective on education, inspired by Bakhtin, differences between students can be seen as having a learning potential (Bakhtin, 1986). The Norwegian psychologist Rommetveit emphasizes that asymmetry between participants in a dialogue can be supportive of discovering new perspectives (Rommetveit, 1996, p. 95). A creative learning environment is thus not necessarily characterized by harmony and consensus, but rather by asymmetry and difference. In reflections on a course helping new teachers taking advantage of technological resources for teaching and learning, Mahiri notes that they were helped in changing their perceptions through the dialogic relationships in the class and their collaborative writing of texts (Mahiri, 2004, p. 230). Wegerif and De Laat argue that designing groupware that focuses specifically on facilitating the collaborative learning processes may help students in developing group dynamics and regulate their discussions (Wegerif & De Laat, 2011, p. 322).

In problem- and project-based learning, the students ideally work with theories and concepts to achieve an understanding that goes beyond the specific project, thus helping them to build and consolidate a broader study competence. This may prove beneficial in the students' future work and activities, as according to Barrett and Moore "[e]mployers regularly highlight the importance of key skills, which include: communications, teamwork, information literacy, critical and creative thinking, and problem solving, together with self-awareness, self-

assessment, ethical behaviour, reflection, and responsibility for continuous development."
(Barrett & Moore, 2011, p. 7). In the following part, we will discuss information literacy as an
integrated part of students' study competence.

Developing information literacy

When students are involved in self-directed study practices as discussed above, their
reflective processes of searching and selecting information and building new knowledge are
central. Information literacy is therefore part of the development of the students' study
competence. In the problem- and project-based learning approach, where students are themselves
responsible – in continuous dialogue with their supervisor – for identifying which problem to
work with, the very act of formulating a problem is a large part of the learning process. To work
in a group means that students must learn to work together in order to make decisions, to share
and coordinate work, and to handle the large amounts of information that are within reach
through libraries, databases, and the Internet.

Information literacy requires not only that students are able to locate data and information,
but also that they are able to select critically within the huge body of information, to judge and
evaluate its use, and to let the information contribute to their construction of knowledge within
the group. This understanding builds on the American Library Association's definition of
information literacy:

> To be information literate, a person must be able to recognize when information is
> needed and have the ability to locate, evaluate and use effectively the needed
> information […] information literate people are those who have learned how to learn.
> They know how to learn because they know how knowledge is organized, how to

find information, and how to use information in such a way that others can learn from them. (American Library Association, 1989).

This definition emphasizes that the concept of information literacy does not only deal with how to search for information and literature, but more generally with learning how to learn. In library contexts, this definition paved new ways through its coupling of information handling and learning. Libraries were able to orient their practice closer to the practice of educational institutions (Egeland, 2004, p. 37-38), and to change focus from merely being a provider of information to being actively supporting learning processes. In practice, however, information literacy is often used in a narrow sense of learning to search and find information. Even though this is indeed an important aspect of the learning process, there is – according to the definition above – a crucial step before this: before being able to search for something, you must have reached the understanding that there is something you need to know.

Only when you are aware what kind of non-knowledge you have, you may start acquiring knowledge on how this can be met. The development of information literacy is, therefore, according to our view, a way to handle finding out what it is that you do not yet understand. This has implications for the specific ways of searching that you engage in.

We see information literacy in relation to the modern, complex society, which demands as a fundamental quality being able to reflect on your knowledge in relation to new developments and challenges. For students, the development of information literacy can be seen as closely related to their broader study competence, for example when students are developing their project work, defining a specific field of study, and formulating the research questions to investigate further through the project.

A study on information literacy

As part of a project exploring the relations between educational institutions and educational libraries, we conducted in 2006 a study on information literacy in students' project work (Nielsen, Andreasen, & Jørgensen, 2006). In the study we carried out a small survey of the experiences and search practices of 21 students from Roskilde and Aalborg University enrolled in classes that were involved in the project. The study showed that the students had limited knowledge of some of the central library services that were available; for instance only half of the students knew at the time of the study that they had online access to the electronic resources of the library from their homes, and only ten percent had heard of an online 'ask-a-librarian-service' that were available through e-mail or chat. The study also showed that some of the students' problems on finding relevant information dealt with not knowing where to search, and with difficulties in phrasing search terms that would bring useful search results (Nielsen, Andreasen, & Jørgensen, 2006, p. 16-17).

The study indicated a need for developing ways of improving students' knowledge of finding relevant information. One way of learning how to search effectively would be to develop the traditionally technical and abstract library courses (Skov, 2004) in a way that would make them more relevant to the students' project work. Instead of introducing to the general principles of search queries and how databases work, the students need time during a library course to explore what would be relevant search terms and databases in relation to the research questions they are currently working on. It might be a challenge for the students to be specific in phrasing relevant keywords, and it might be a challenge for the librarians to target the specific groups of students and their questions, but such library courses would be more closely related and productive in relation to the students' study processes.

Breen and Fallon argue accordingly that the acquiring of information literacy should be connected to the students' actual study level, and should be integrated "within the context of course curricula, and not separated from it" (Breen & Fallon, 2005, p. 182). Information literacy is hereby tied to a reflecting and critical attitude towards the information one is seeking.

Teacher's roles: lecturer, facilitator, and mediator

When students are involved in their self-directed study processes, they are continually in contact with a teacher, who acts as a supervisor in relation to their project. Within the framework of project studies the role of the supervisor is different from the role of the traditional teacher.

A teacher acting as a supervisor have to be facilitating, dialogically minded, capable of assisting the students in their work, and receptive to the needs of the students. At the same time a teacher should be able to act as a coach, mentor, discussion partner, who supports *and* challenges the students in their project work. A productive supervisor can be understood as functioning as a catalyst that initiates processes. He or she take the background and experience of the students seriously, and have a readiness to engage in new technologies or applications that are suggested or introduced by the students. This may not be an easy task for professional academics who have in mind a traditional expert role.

Donald Schön outlines this traditional expert role in contrast to that of a democratically oriented, reflective practitioner in his discussion of two different notions or contracts between the professional and the 'client'. In our context, these two types of attitudes can shed light on the teacher–student relationship. According to Schön, the professional person taking on a traditional *expert role* has the conviction that "I am presumed to know, and must claim to do so, regardless of my own uncertainty". Furthermore he or she deliberately maintains a distance from the client and holds onto the expert's role, looking for deference and status in the client's response to his or

her professional persona (Schön, 1983, p. 300). A contrasting approach can be seen with the *reflective practitioner*, who finds that "I am presumed to know, but I am not the only one in the situation to have relevant and important knowledge. My uncertainties may be a source of learning for me and for them". This kind of supervisor will allow the student's respect for the supervisor's knowledge to emerge from the student's discovery of it in the situation (Schön, 1983, p. 300).

As a supervisor facilitating the students' project work, the teacher should at the same time be capable of showing and demonstrating for the students possible ways to go, and being initiating without taking too much responsibility in relation to the students' projects. The reciprocity in the teacher-learner relationship is of great importance, as is also pointed out later by students in one of the cases discussed. In general, we can outline three different positions of a supervisor: being instructive, methodological, and social mediator.

The first position is *lecturing,* giving professional advice as an expert, stressing the importance of the students' report being coherent and an expression of sound academic work with the 'right' answers to the research question at stake. This instructive teacher position primarily focuses on the students' final project (Nielsen & Danielsen, 2012, p. 263).

A second position is *facilitating*, and more related to methodological aspects and the continuing evaluation of the process. As a supervisor, the teacher will aim to guide the group towards the final project through stimulating discussions, supporting the students' effort to reach a fruitful integration of the empirical data and relevant theoretical positions. Important in this type of supervision is the students' heightened awareness of their study and work styles. Stressing this dimension of the supervisor role, the teacher should support students in being able

to constantly reflect on their way of acting and working with the material, what kind of choices they make, and what they are writing (Nielsen & Danielsen, 2012, p. 264).

A third position is more related to the difficult and challenging elements of collaborative group work. When members of a group can talk at cross-purposes or even patronizing one another, the supervisor as a *social mediator* can intervene, for example, if students have difficulties making decisions or embarking on constructive dialogical processes. A mediating supervisor will mainly be inquiring and questioning in order to facilitate student engagement in explorative dialogues (Nielsen & Danielsen, 2012, p. 265).

In practice a good teacher acting as a supervisor should be able to take on all three kinds of positions depending on the phases of the project work and the situation of the students.

Teacher Acting within an Online Learning Environment

When dealing with online learning activities, new roles and tasks for the teacher appear compared to the well-known practice of classroom teaching. Kahiigi et al. points to this change: "The paradigm shift from teacher-centeredness to student-centeredness has greatly influenced the higher education learning process. In this case, the teacher takes on a facilitator role while the students take ownership of their learning and personal development" (Kahiigi et al., 2008, p. 82). The topic of teacher roles was the focus of a seminar for teachers at the Master program in ICT and Learning (MIL) in April 2012, from which the following points are inspired.

Teaching online creates a need for technological as well as social awareness, where teachers should be visible and accessible through online discussion periods, in other words mobilize tele-presence. At the same time, the teacher should allow adequate space for students to operate and navigate. Especially in online activities it is important to assist the students to stick to their work and hold on to their plans. Another challenge for the teacher is to provide clear

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criteria and standards to make sure students understand the tasks and activities. When providing written feedback, it is important to write concisely and clearly, in order not to be misinterpreted. An online supervisor must be capable of giving constructive feedback, either face-to-face or through synchronous communication programs such as Skype or Adobe Connect, and sometimes being available at flexible or odd hours.

Earlier a clear distinction was seen regarding online and on-site activities. We often find that the gap between acting online and on-site seems to be not as great as assumed. With the multi-faceted communication modes within reach today, the distinction is to a lesser degree whether people are online or on-site, but may follow other lines, for instance whether one prefers to communicate synchronously or asynchronously.

Within the networked learning environment of the MIL program there has been a need to create and further develop the role of the teachers involved. We see the team of approximately 20 teachers involved as being part of an evolving community of practice. Kim asserts that "a community is a group of people with shared interest, purpose or goal, who gets to know each other better over time" (Kim, 2000, p. 28). According to Wenger communities of practice share a mutual engagement, a joint enterprise or practice, and a shared repertoire that is the "pool of resources that members not only share but contribute to and therefore renew" (Wenger, 1998, p. 388). From the MIL teachers we have learned how important it is to be part of a supportive and social community, where it is possible to share experiences, challenges, and thus inform our teaching practice. We share ideas, pose questions, and together reflect on the challenges e.g. related to different kinds of communication technologies. As participants we share our understandings of work, responsibility, and knowledge in relation to our mutual practice.

The master program in ICT and learning (MIL)

The cases to be discussed in the following derives from the postgraduate Master program in ICT and Learning (MIL), where students with a couple of years of working experience, who wants to qualify themselves further, study within a networked learning structure. The students come from all parts of Denmark, and most of them are employed, full-time or part-time, while studying. We will shortly introduce the program, in order to present the context of the cases.

The MIL program was established in 2000 as a continuation of a cross-institutional research network and is today a joint program between four Danish universities. The program combines on-site seminars (four during a study year) with independent and challenging virtually organized online periods of course activities and project work. The Master program is based on a concept of problem- and project-based learning, which is adapted to the virtual study environment. The pedagogical model builds on didactical principles of student engagement in problem formulation, enquiry of exemplary problems, and interdisciplinary approaches. The MIL program can be seen as an example of a dialogue-oriented and discussion-based approach associated with the social constructivist approach of networked learning (Dirckinck-Holmfeld & Jones, 2009, p. 261). The students bring in research problems from their own work practice to study, while using theories, concepts and methods from the academic practice (Fibiger et al., 2004). Half of the modules at the Master program are organized as courses, and half are organized as project studies, where students work in small groups around joint research projects (Dirckinck-Holmfeld, 2010, p. 554).

The study program implements new educational technology, with a virtual learning environment based on the First Class system, which holds conferences for asynchronous and synchronous communication, a Who-is-online facility, individual mailboxes and profiles.

Student groups have their own folders within First Class, which they are free to design, and where they can write, share, and organize their contributions. Furthermore, they have access to synchronous video meeting facilities (Adobe Connect), peer-to-peer tools and web 2.0 facilities (Skype, Messenger, Google Docs, blogs), and tools to support project and course work (Camtasia for screen recording, Zotero for reference handling).

Methodological considerations

As teachers and researchers we have been engaged in the MIL program for 11 years. Thus, we have first-hand experience from the learning environment, and the following cases to be discussed are to be seen as generalized examples from our practice. The first case on a study group's use of synchronous communication have been gathered and described through our observations and feedback as teachers at the program, here focusing on the work of one project group. The next two cases derives from two courses at the MIL program; one is a course on ICT and Learning in Organizations, which takes part in third semester of the four semester program, and the other an introductory course on Learning Theory at the beginning of first semester. The educational design of the two courses are presented and discussed. The second case discusses students' reflections on their project work in the third semester course that took place in September and October 2009 with 19 students participating. The third case analyses students' online discussions in the first semester course in September 2009 with 30 students participating. In the second and third case data were gathered through collection of log files from the online discussions, employed content analysis of students' postings on the discussion boards, and examined the themes and discussion threads, analyzed the students' participation, activities, and patterns, e.g. how learners' responded to each other's contributions. Furthermore we made use of observations done concurrently during classes and in study groups, and feedback of both

qualitative and quantitative art in order to gain understanding of their impression of the activities in the MIL program. Additionally, in relation to the data from the previously discussed cohort of students from the study on information literacy we used questionnaires in order to obtain information on the 21 students' habits of searching information and their use of library resources. Responses were gathered through an online survey tool, and the questionnaire contained fixed as well as open-ended questions. In the following part of the chapter we will present and discuss the three cases.

Students' innovative ways with technologies

The first case will deal with how sometimes seemingly simple technologies can be used in innovative pedagogical ways to increase learners' involvement.

From our work as teachers at the MIL program, we have observed various ways for students to use synchronous audio-based communication to organize their group tasks. As mentioned, the students are collaborating in groups, while being located all over the country. Therefore Skype meetings are a widely used way of organizing group work processes, usually as an audio-conferencing tool supplemented by the text-based chat facility of Skype. One way of implementing this is to organize virtual meetings in the style of a formally organized physical meeting, with an agenda, a moderator, etc. Such a formal Skype meeting can be a way of carrying their task forward, sharing information, keeping up-to-date, discussing key issues, taking decisions, and other tasks that are continually due in a group project work.

The student groups usually combine the Skype facilities with shared documents, calendars and other online resources of the groups' own choice. They regularly try out new technologies, and sometimes they develop untraditional ways of using them in their study processes. For instance by summarizing hundreds of contributions from an online discussion

through creating a Wordle, which is a kind of tag cloud that highlights the most frequently used words, or for instance as the following example shows by finding new ways of using tools like Skype in their daily studying practice.

Using Skype as a Shared Online Office

A group of five students were living in different parts of the country while they were working together on a student project as part of the Master program. During a specific work-intensive period of the group process, the students developed a daily habit of everybody working at the same hours in the morning, and during this period they also developed a special daily routine of using Skype in a special way; not for ordinary meetings.

In this routine, all of the students were working at their desks in their own homes. They started their working day in the morning by opening a Skype audio connection with each other, so everybody could talk to each other, and stayed with the connection open for several hours each day. They all had flat-rate broadband internet connection, therefore they had no extra costs going online calling each other and staying with the channel open all morning.

During these mornings they sometimes held short online meetings to discuss and plan their activities. Most of the time, however, they would just sit working while their Skype audio connection was turned on, each working on their own tasks as part of their bigger project. In this situation they could hear each other typing their computer, turning pages while reading a book, or even pouring coffee – as if they were actually sitting in a shared office. Sometimes one of them would pose a question, which one or more of them would answer or discuss, after which they would return to their working mode. The audio connection was thus used to establish a shared informal space, where the group members could keep connected as if they were sitting physically together working, talking and concentrating.

The students developed this use of Skype as part of their educational practice in the project work. For a first glance such a way of using technology would probably not be considered relevant when discussing how to utilize new technology for educational purposes. From our point of view, however, this was actually exactly what the students were developing. By using Skype to establish a shared virtual room, where they could study, concentrate, and discuss what was needed in a spontaneous way, they found a way of organizing their study work and establishing a study environment, that helped them keeping on track and motivated them in their commitment to their shared practice. In this way, they used Skype in new ways to increase learner engagement and learner outcome.

Reflections on group processes and supervisor roles

The next two cases deals with the design of online learning environments, where students are active contributors and co-designers of the actual educational design. Both of the courses were based on virtual dialogues and collaboration and were designed in a flexible way in that the students could choose, within the overall structure, when it was most convenient for them to make their contributions. The courses had a focus on meta-learning, which mean that the students were encouraged to continually reflect on the organization of the courses and their outcome of the virtual dialogues. The following case to be discussed is as mentioned the third semester course on ICT and Learning in Organizations as it took place in 2009.

Educational Design of the Course

The course activities started at an on-site seminar where students met for presentations, workshops, discussions, and group work. The remaining two months of the course were conducted online, structured in four phases:

- Contemplating and developing questions. After the seminar, the students had some time to focus on the course literature. Furthermore they were asked to discuss in groups what specific themes should be reflected during the course, and drawing on their own work practice they prepared the specific questions to be discussed in the following online discussion period.

- Student-initiated discussions. For each opening question raised by the students, a discussion board was established. In the following two weeks, each student contributed individually with his or her reflections on the raised questions. Hereby the students explored the course topics through online dialogues reflecting on experiences from their own professional practice.

- Small projects. Each group of students then conducted an empirical investigation. This small project took place over four weeks, and was often carried out in relation to an organisation where one of the students had their professional practice. The specific question to investigate was defined by the students. As the students could come from all over the country, some groups organized their work with this task fully online, while others also arranged physical meetings.

- A final reflective forum. After the project reports were handed in, a final discussion forum was created for the students to look back on the project they just made, reflect on the methods they used, exchange and evaluate experiences, and build knowledge to be used in their upcoming work on the final thesis. Below, we will discuss the students' use of this final reflective forum.

Discussions during the final reflective forum

The final online discussion period was meant as an opportunity for the students to reflect on the course and their small project work: What insights did they achieve? What did they learn during the process? What would they eventually do otherwise next time in a similar situation?

To have the time for elaborating such reflections in a discussion with other participants of the course was used as a didactic means to have the students go one step further than usually; not

just finishing the task and quickly heading on to the next activity. Through this elaboration, the intention was for the students in interaction with each other to learn from their experiences. Such a time for reflection can often be hard to find the time to do; therefore we established it as an integrated part of the course.

During this final reflective discussions among the 2009 group of students 116 contributions were added by 19 participating students. A review of the contributions shows that especially two themes were raised. The first of these themes dealt with reflections on the students' group processes, and how to handle working together online in a group, and to maintain an overview of the work, the deadlines and decisions. The second theme dealt with questions regarding the relation and interaction between students and supervisors online.

Managing group processes

In relation to the theme of managing group processes one of the points discussed was the tension between discussing orally and producing written text. A student, whose group had found it difficult to find a direction for their work, explained that "we were not good in putting things down in writing, but on the other hand we were really good at talking and talking at our Skype meetings." (Male student, third semester, our translation)

It is an interesting perspective raised here by the student that talking and discussing a number of things can be found easy, as opposed to the hard task of writing down the insights that were reached on the way. Etienne Wenger points out the importance of the interplay between participation and reification, between the momentary process of creating ideas and the longer stretch of forming products and results (Wenger, 1998). Both processes can be seen as necessary parts of productive group collaboration, but some groups face more challenges than others in maintaining and processing in written form the insights from the oral discussions.

Another point discussed by the students concerned the difficulties in establishing and maintaining an overview throughout a complex group process. This might be influenced by the specific technologies used, as can be seen in this reflection: "Like all other project groups who work 99% through mail or conferences in e.g. FirstClass, we have in our group had difficulties in maintaining overview of our work. I think we have been constrained by not having met face-to-face to clarify deadlines and other questions that needed to be decided." (Student, third semester, our translation). This student points at difficulties arising when working asynchronously through mail or conferences. Interestingly, the student does not suggest supplementing their online communication with synchronous tools that might facilitate their decision-making processes better, but instead wishes for more face-to-face meetings.

A final point in relation to the theme of managing group processes is the meeting of practices and habits that happen when new participants meet, here described by a group member: "I have experienced it as incredibly relieving and challenging to try this way of collaboration. (..) Ann and I have never before started our Skype meetings by discussing last weekend's matches in the football league, while the boys did not have the habit of ending each meeting by writing a song. In this way we have all been enriched .. I think :-)" (Female student, third semester, our translation). Sometimes group processes means experiencing new ways of working together.

The relation between supervisor and students

The other main theme discussed by the students in the final reflective forum dealt with the role of a teacher as supervisor and the relation between students and their supervisors. This was triggered by the question "What will I do differently next time?". One student indicated that their group had made too little use of supervision. Another student pointed out the pitfalls of turning on the 'automatic pilot' and not reflecting independently when being supervised: "A

supervisor meeting may cause a kind of tunnel vision, because you have a tendency to follow the guidelines from the supervision very strict." (Student, third semester, our translation). There is a delicate balance for a supervisor between being outwardly pushing or patiently waiting, a student writes: "The ideal supervisor is a person that understands how 'to feed', but also to hold back, in order for the expertise of the group to unfold." (Student, third semester, our translation). This highlights the reciprocity of the teacher-learner relationship discussed earlier.

One of the students reflects on how easy it is to fall into a traditional student role, even though she feels that through her daily work as a teacher and supervisor she 'should know better':

It is just so strange that we often as students at MIL do all the mistakes that we tell our own students not to do! For example, I always want to send the whole pile of papers to our supervisor, 'just to hear that we are on the right track'. Even though I know that it is completely impossible for a supervisor to answer that type of question, and even though I get so tired of it when my own students do it.

Maybe it is because the world just looks different on the two sides of the fence: as a student, you need to know that it is okay, and that you are on the right track; as a supervisor, you are interested in being informed as precisely as possible what the student is writing and what you as supervisor can assist with. Furthermore, as a supervisor you are in contact with many students, and cannot read half-finished drafts all the time, where you almost have to guess what the student thinks; while students have only one dedicated task that makes up a huge part of their life.

In fact it shows that one should problematize the view that knowledge of what is right necessarily should cause the right thing to be done. (Female student, third semester, our translation)

She points out here that the two situations of being a student and being a teacher/supervisor are so different, that it is very difficult to transfer knowledge from one situation to the other, even for the same person. This is a meta-reflection on being a student and a teacher at the same time, which also is reflected by Nielsen and Danielsen (Nielsen & Danielsen, 2012, p. 262-65). What seems logical in one situation may seem very different when situated otherwise. The student's phrasing of this dilemma as part of the final reflective forum may be an important step in the ongoing effort to achieve alignment of expectations between students and supervisors.

Engaging new students in online discussions

The last case of the chapter is an example of creating an online learning environment in a short introductory course on Learning Theory. One of the authors of this chapter was a teacher at the course. The students at the course had just joined the MIL Program.

Educational Design of the Course

When meeting on location for the program's first seminar, the students had an introductory lecture in support of the main activity of the course, an online dialogue-based discussion that took place over three weeks, ten days before and ten days after the seminar. The educational design chosen for this discussion period was as follows:

The specific themes to be discussed were defined by the contributions from the students, and not by the teachers. Participants contributed individually, and were not assigned specific roles in the discussion. The participants were encouraged to discuss whatever came to their mind of relevant questions. The course texts were seen as a starter – a trigger for their discussions.

Students were encouraged to relate their discussions of the texts to their own practice, and to create at least four contributions during the discussion – among them one initiating a new discussion. Teachers made explicit that students here were given the opportunity to throw themselves in at the deep end, which could provide risks of experiencing a sense of chaos, but also opportunities for improvisations.

The online dialogues at the course took place in September 2009. 30 students were participating in the discussions. During the three-week period 218 student contributions were created in 31 discussion threads with headlines such as: 'Dewey and the concept of experience', 'Global knowledge sharing', 'Forget the teacher in the virtual learning environment', 'Constructivism', 'Rethinking learning', 'Documentation of virtual dialogues', 'Use of interactive whiteboards', and 'Reflection and boredom'. In these threads, students reflected on topics from their own daily practice, on specific philosophies of learning, or on other empirical questions.

Online Discussions among the New Students

Only some of these discussions unfolding among the new students can be treated here. In the thread on constructivism a discussion took place regarding the use of computers in the Danish elementary school. One student stated that: "A traditional curriculum-based pedagogy still prevails even though the teacher uses a computer. […] There is a focus on transmittance of information and rote learning, and only little room for creativity and communicative work. This form of information processing cannot be seen as an example of constructivist approach cf. Dewey." (Student, first semester, our translation).

This posting lead to a sequence of reflections in relation to the understanding of Dewey's concept of experience, where a female student suggests that Dewey's "concept 'Learning by

doing' should not be understood as involving a person in concrete physical kind of work activity to be able to learn. Rather learning should be seen as mentally coupling between past and future experiences." (Female student, first semester, our translation).

A third student referred back to this contribution: "Your contribution inspired me to new thoughts. There is no doubt that he believes that learning is achieved through concrete experiences […]. But he probably also thinks that education must be based on students' previous experiences, as long as you consider experience as being 'flowing, undeveloped, vital'." (Student, first semester, our translation).

This small excerpt of the discussion shows the students' ways of relating to each other's contributions. The topic of the discussion engages them in jointly exploring the meaning of Dewey's concept in relation to their practice. This interchange can be seen as an example of dialogical "interthinking" where the students relate to and build on each other's thoughts (Mercer, 2000).

Using or misusing interactive whiteboards

Another thread of the discussions dealt with how a tool like the interactive whiteboard has been received in the students' actual practice in their schools. The discussion was opened by a female student, who in her daily practice was a teacher herself: "Smartboards have just been installed in most of the classrooms at my workplace. I see it as a great advantage ... however Smartboards are greeted with much skepticism among my colleagues. I find that with whiteboards, it is possible to supplement the texts in the books and the spoken word with pictures and animations. […] Thus it paves the way for an educational design that includes the aesthetic dimensions. […] The new tools are met with skepticism from teachers […] many of them feel uneasy and hesitating to the new challenges." (Student, first semester, our translation).

A male student – also a teacher himself – discussed the skepticism of some teachers and invited to further discussion: "Students are enthusiastic and do not understand teachers' reluctance. […] Based on the Norwegian learning theorist and philosopher Dale's theories on self-reflection and meta-learning, my approach to motivate the teachers to use these boards has been advocating to develop a strategy around the use of the boards, but often this does not happen and the boards are not being used. […] How do we change such attitudes – do any of you have fruitful ideas regarding this?" (Male student, first semester, our translation).

A number of participants answered this question. One student reflected that it is a question of using – and getting used to using – the whiteboards: "My experience is that we as teachers need motivation and confidence and most of all: Daily use. We have a lot of interactive whiteboards and they are only used to present film by and nothing else. The teachers do not feel at ease using these technologies in practice. Daily use would, however, ease this transition process and make it easier for teachers to expand their field of action … and gradually become exploratory teachers." (Male student, first semester, our translation).

A female student found that not only the amount of use, but also the context of the use was important for teachers in need of developing new practices around the interactive whiteboards. She therefore developed the following advice: "First, let us create an organizational culture which will make it possible for skills and competencies to spread within community of practices (classes, teams and cohorts..). Second, KIS "keep it simple" – let us create small catalogues with a few simple and effective advices. Third, let us create a secure workspace with possibilities for legitimate peripheral participation!" (Female student, first semester, our translation). As can be seen, she implicitly referred to Wenger's concept of communities of practice in her suggestions.

Another female participant had not met the amount of skeptical teachers mentioned by others: "It's fun with your findings - I can't recognize the arguments. I come from a vocational high school where we recently have installed Smartboards in several classrooms and […] most teachers would like to start using this new tool. […] Ample time should be reserved to be fully conversant with the new tools." (Female student, first semester, our translation).

A last participant, whose work is to help schools implementing new technologies, pointed to the risk that tools like interactive whiteboards can be used in ways that promote a re-traditionalization of the educational practice. He stated that: "Interactive whiteboards (and IT) should be used not only by the teacher, but also by students. A student at a school said that the boards are "a teacher thing" and that students may not use them, as the school is afraid that students will destroy them. In other schools students are allowed to use the interactive whiteboards, for example to hear music during breaks, and here it is the experience of teachers and pupils that such an approach are opening up for greater engagement and that there is no signs of vandalism. If the interactive whiteboards predominantly are used by the teacher, there is a risk that the board will contribute to a traditional one-way teaching style." (Student, first semester, our translation).

The participants of the discussions represented a varied spectrum of experiences and views on the use of interactive whiteboards. Besides extensively referring to their own practice, they also drew on theories and concepts with which to reflect practice. The discussions show the potential of educational designs that encourage students to reflect on their experiences from practice when discussing the subject matter of the course.

Conclusion

Educational designs based on problem- and project-based learning approaches emphasize the involvement of students in the actual unfolding of a learning environment. This may happen in courses where students are involved as co-designers in relation to which specific topics to focus on, or in projects where students relate their experiences from practice to theoretical approaches. Teachers may interchangeably apply different strategies and positions as lecturers, facilitators, or mediators in their daily practice of supervising students in their independent collaborative project work. For students to act and learn in modern, complex societies, they need to reflect on their knowledge in relation to new situations that develop. Thus developing their information literacy as an integrated part of their study competence is a key area. Educational institutions and libraries can support this process by treating information literacy not in general terms, but as an integral aspect of the students' activities.

The traditions of problem- and project-based learning highlight the students' active role in co-designing the educational environment or acting as mediators during course activities. Coping with and engaging in real-world problems also promote the development of student engagement. In the present context with rapidly evolving new social media and active user involvement, problem- and project-based learning approaches gain new relevance in the interplay with new technological possibilities. It is part of the educational design to incorporate and allow these possibilities to develop.

The discussions of using synchronous and asynchronous online communication in learning processes show that not all types of e-learning activities can be designed and planned in advance, as the example of the study group's unorthodox use of Skype shows. Even though not

easily planned for, such unplanned activities may be important parts of a study environment that

support students in meeting the expectations of an educational program.

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