

# Project Learning and Virtual Collaboration - A Master Program in ICT and Learning

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**Abstract:** This paper will introduce a master program in ICT and Learning (MIL) and present some of the experiences we have gained so far. MIL is a result of a collaborative initiative taken by five Danish universities, and it is an accredited part-time 2-year master program. It is unique in the sense that it builds on the pedagogical framework of project pedagogy and is based on online collaboration.

The paper will describe MIL, the universities involved, the administrative organization, and the profile of the students. We will discuss the pedagogical framework and the project collaboration in relation to the modularity and flexibility that characterize the study and allow admission of part-time students, full-time students and students who only sign up for one accredited module. The methodology will be illustrated through empirical snapshots from selected modules in the start-up phase, and the focus will be directed towards problems experienced by the students. From an analytical perspective, the paper will identify and discuss fundamental problems related to the organization, flexibility, and implementation of project pedagogy online.

MIL is organized around ICT and Learning and the study theme focuses on ICT and Learning. In addition, MIL provides a learning space where practice is under constant negotiation and reconstruction as an inherent, integrated part of the learning process. Consequently, we argue that MIL may be seen as an example of best practice in blended learning.

**Keywords:** Virtual learning, mixed mode, project pedagogy, student profile, methodology.

## 1. MIL – a Danish master program on ICT and Learning

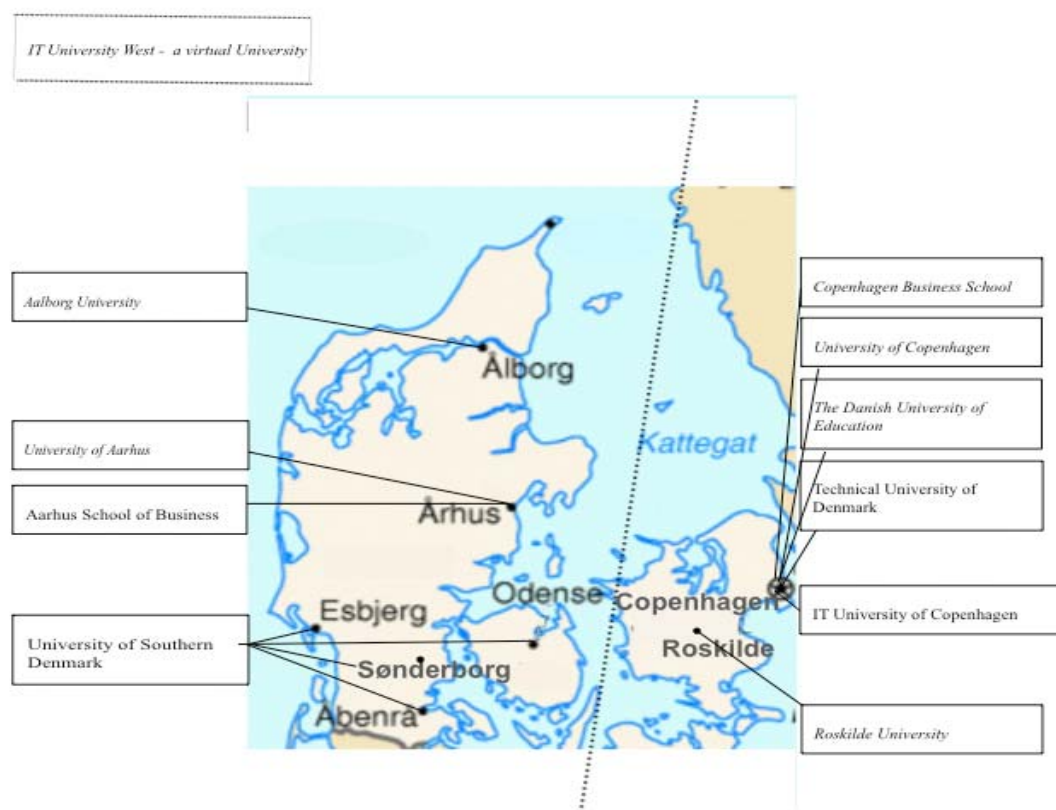
In Denmark, master degrees were established in the late nineties, partly as a result of a European initiative to coordinate and create correspondence between university study programs, and partly as an attempt to enhance cooperation between universities and business to provide people with an opportunity to pursue continued education and develop competencies in a knowledge-based society.

A national initiative was taken to secure continued education within information technology: 1) a new IT University was built in Copenhagen and 2) a networked IT university was established building on the

existing universities in the western part of Denmark in 2000 (figure 1).

Although the political decision resulted in two regional IT universities, the master program in ICT and Learning (MIL) ignored this national division and established collaborative bridges between five Danish Universities: Aalborg University, Aarhus University, Roskilde University Center, Copenhagen Business School and the Danish University of Education in Copenhagen. The research communities have contributed with different but complementary competencies and form a unique background for the master degree in ICT and Learning. Thus, MIL has been established as a national master degree under the auspices of the IT University West, but also in cooperation

with three universities outside the IT University West (fig 1).



**Figure 1:** The dotted line shows the division of Denmark between the IT University West and the IT University of Copenhagen. The map also shows the geographical location of universities in Denmark. The *universities* written in *italics* are partners in MIL.

MIL was established for a four-year experience period. Based on the positive experiences from the first period, the Ministry of Science and Technology extended the cooperation for an additional four years. The administration and the legal protection is located at Aalborg University, but the responsibility for developing and running the curriculum is placed in a steering committee with representatives from the five universities involved.

MIL may be viewed as a forerunner of the virtual university concept in Denmark. The first challenge was to build the organizational collaborative framework, which turned out to be a major challenge. MIL was placed “in the middle of nowhere” without any relations to existing legal, financial or administrative systems. A steering committee constituted by senior researchers from the five universities was established. The researchers had a long tradition for cooperating on research in ICT and Learning and a common language related to the research area. Thus, they already constituted a research

community with a holistic and coherent foundation for designing the MIL master program.

## 2. Profile of the students

MIL aims to offer educational opportunities to people working in the public and/or private sector. We think of the potential students as teachers, publishers, project or human resource managers, etc.

Since the program started in 2000, we have had 209 students. 60% of the students came from the public sector and the rest from the private sector. The fact that the course fee for attending MIL is generally lower than for master degrees addressing the private sector more directly may account for the high number of students from the public sector. Approx. 50 % of the students’ basic competencies related to education, and approx. 25% of the students had high level skills related to IT. Nearly all the students had a leadership background in organization or in various projects.

Apart from the challenge of making five universities' organizations collaborate, the wide gap in competencies was one of the basic problems in planning the curriculum. An interdisciplinary master program may attract students with expert knowledge of IT, but only little knowledge of learning, students with a general knowledge of both learning and IT, or students with a learning background, but only little knowledge of IT. Besides, some students returned to school for the first time after spending more than ten years working. The curriculum had to capture all these profiles in addition to diversity in age and study culture. In other words, it had to support the development of "reflective practitioners"(Schön 1987).

The drop out rate has been close to 25%, the main reasons being work pressure (most of the students study part-time combined with full-time jobs) and the high number of on-line activities. Typically, the students do not study to make an academic career. They are very engaged in their professional work, and advancement within their organization or getting a new job are the main factors in their motivation for studying. From our evaluations, we know that dropping out also is related to the students' equal ambitions in terms of both studies and work.

Participating in a master degree program on ICT and Learning with the use of ICT calls for a different kind of engagement from the students. They bring actual problems from their professional life and organizations into the study and collaborate with fellow students working on similar problems. The context of the study transforms them into a group of experienced practitioners in a shared reflective endeavour.

### **3. Study program**

To plan a curriculum for students with full or part-time work from different parts of the country requires a focus on flexibility in time and space. In Denmark, a master degree has a value of 60 ECTS (European Credit Transfer System) in a normal year of study. The MIL curriculum is organized as a part-time study covering 30 ECTS annually (part-time).

To secure flexibility, the study program has been developed in mixed mode

combining face-to-face seminars and on line activities. It is organized with four seminars of two days' duration per year of study (two in the eastern part of Denmark and two in the western part of Denmark). In between the seminars, the students collaborate virtually.

As mentioned previously, MIL is based on collaboration between five Danish universities, each of which has brought different study cultures into the master program. Some of the universities have a strong tradition for lecturing, case-based learning and well-defined curricula. Other universities are fundamentally based on the notion of projects and actually identified as project universities. The basic principle in MIL is project learning, which integrates the best from the two cultures in a combination of course modules and projects. The course modules integrate the two cultures in mini projects or case studies to secure the integration of theory and practice (Dirckinck-Holmfeld 2002, Dirckinck-Holmfeld et al. 2004). Only few other programs of similar curricula share this approach (McConnel 2002).

For people with a full-time job in addition to their online studies, a clear structure with well-defined goals for every part of the curriculum is vital. MIL is structured as a modular system divided into smaller courses. Every course module typically contains 2 or 3 sub-courses. It is possible to finish a course in a relatively limited span of time. However, it is a challenge to establish a subtle balance between flexibility in time on the one hand, and to ensure learning, i.e. knowledge acquisition, reflections and integration in practice, on the other.

The modular structure is also a result of many different needs for further and continued education. Basically, the curriculum is planned as a part-time study, but full-time students and students who only sign up for one accredited module are also accepted. It is anticipated that more and more students want to combine modules from different master programs to construct their own "flexible master" curriculum. This vision is supported by the Ministry of Science and Technology.

The basic course modules reflect the epistemology of the curriculum. In the first year, the students attend two basic

modules. *ICT based learning processes* covers intra psychological and mediated interpersonal learning processes and learning in communities of practice. *ICT and Interaction Design* focuses on analysis, design, test and evaluation of human-computer interaction. It takes its point of departure in theories on human

beings/users and the mental processes. Interaction is understood as taking place in the interface, which is multimodal (text, images, sound, etc.). The two modules form the foundation of a *project work* within the thematic frame ICT and learning processes: use and meaning.

		1. semester		2. semester	
1. year		Module 1: 8 ECTS point <b>ICT-based learning processes</b>		Project: 10 ECTS point <b>ICT in learning processes use and meaning</b>	
		Module 2: 7 ECTS point <b>ICT and interaction design</b>			
		ICT-workshop 5 ECTS point			
		3. semester		4. semester	
2. year		Module 3: 7 ECTS point <b>ICT and organizational learning processes</b>		Module 4: 8 ECTS point <b>ICT and pedagogical design</b>	
		15 ECTS point <b>Master thesis</b>			

**Figure 2:** Study program

In the second year, the students also attend two basic modules. The main theme of *ICT and organizational learning* is knowledge sharing and knowledge management in the learning organization. The module focuses on intra and inter-organizational learning processes and ICT in communication and continuous learning. *ICT and didactic design* takes its point of departure in pedagogical theories and works with graphics and scenographic design in addition to dramatic and narrative dimensions as a basis for design of virtual learning resources.

Both in the first and second year, the students are offered different courses in ICT tools and workshops in epistemology, research methods and writing of academic reports.

Based on the first year of project work and the four course modules, the students write their final master thesis. The master thesis may be theoretical, analytical or based on product development (from prototype to final application). Normally, however, the thesis will include elements from all three dimensions.

#### 4. Pedagogical framework

To secure flexibility in relation to time and space, MIL is organized as blended learning with online studies and four annual face-to-face seminars.

The ideology of MIL is based on the notion of “communities of practice” (Wenger 1998), and MIL students come from different enterprises and organizations. From the perspective that learning is an authentic and social process, the study program is fundamentally based on collaboration in projects. This approach is not only valid for the first year project and the master thesis; it also penetrates the pedagogical thinking behind the four course modules. With this approach, we attempt to facilitate an integration of theory with the students’ work experiences.

In the educational context of MIL, the students are encouraged to use their diversities as sources of inspiration and turn them into strengths in the collaborative work. Furthermore, we encourage students to establish groups across their specific experiences and interests. This is a challenge for both group members and facilitators, as it requires a high degree of awareness and knowledge in the constitution of groups, the organization of groups and the group process.

#### 5. Methodology

In the following, we will present empirical snapshots from MIL. The aim is to give an impression of the work in MIL and highlight some of the problems related to the virtual organization.

The different cultures at the different universities may be illustrated by the two course modules in the first year: *ICT based learning processes* and *ICT and Interaction Design*. Both modules take their starting point in introductions and lectures at the first seminar, and the course work continues online. The module on ICT-based learning processes is based on and experiments with the features of collaborative online dialogue, while the module on ICT and interaction design is based on collaboration in groups designing a product online. The difference between the two modules is reflected in the structure of the online forums, the role of the teacher, and the evaluation criteria (Sorensen 2003). Both modules operate with a forum for meta-discussions.

An extensive evaluation carried out in 2003 showed that this difference caused some confusion among the students. When promoting such pedagogical diversity, it is important to communicate the differences and illustrate what we are preaching in practice. But there is also a need for introducing more virtual tools to handle different types of collaboration and more appropriate tools to help students manage their portfolios.

The first project work enhances the students' competencies in project management. The students learn to carry out the basic planning on face-to-face seminars, use chat to handle specific problems (making decisions etc.), and use asynchronous written forums for collaborative discussions and reflection. In addition, they employ other types of communication software for synchronous communication (visual, audio and text-based).

*Pedagogical design* is the module involving experiments on learning objects and learning resources. One of the experiments related to the university library where the traditional course book was replaced by an electronic version. In collaboration with the university library, both copyrights and payment for use were negotiated for the experiment. The library uploaded the literature in a resource portal on the web. However, a questionnaire showed that only 35% of the students perceived this as an improvement.

It is important to make the electronic library more attractive to the students. This may be done by implementing added value to the course materials and resources. One of the advantages of web resources is that they may be supplemented with tools for annotations (e.g. guidelines from the teacher, reflections from the students, etc.). At the moment, we are collaborating with a software producer to explore the possibilities of group-based annotations.

Another experiment has been the development of video based course material. MIL has produced resources in the shape of online lectures using streaming videos stored in the course archives. Furthermore, video-based interactive lessons for courses on PhotoShop and Dreamweaver have been developed. Also, the streamed lectures and screen shots have been manipulated into small segments representing a single problem, which can be accessed from a menu and combined with tasks (Fibiger 2003). The responses from the students are positive, and the exploration of the potentials will continue.<sup>1</sup>

In a number of ways, videoconferences are also represented in the curriculum: at face-to-face seminars to include researchers from abroad as guest lecturers and as a tool for specialized activities bridging three regional sites. In our experience, videoconferences require extended preparations related to both the set up and the content. Videoconferences are not tools for presentation, but tools for discussions. Taking these preconditions into account, videoconferences may represent an excellent way to expand the classroom.

## **6. Studying in virtual environments**

MIL has now existed for 4 years and served 200 students. The students have been between 30 and 60 years old, studied on a part-time basis while holding a full-time job, and have had a background in pedagogy or ICT.

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<sup>1</sup> We are collaborating on a project supported by the board of universities on the use of video resources in higher education. The project will result in a web portal on the use of video in education.

The way in which the students interact and collaborate falls into patterns that may be characterized by three profiles: the enthusiast, the main-streamer, and the pragmatist. They differ basically in their relation to information in the virtual learning environment.

The *Enthusiasts* make up 15 % of the students. They are interested in all items of information and very active in forums on a nice-to-know basis. They are on the web daily, often more than once, and also during the weekends. They read all contributions to the forums in which they participate, and they are very active in meta-forums and social activities on the web.

The *pragmatists* also make up approx. 15% of the students. The pragmatists go for need-to-know information, and they are only on the web once or twice a week. They focus on the obligatory scientific forums and participate only in debates as part of the curriculum.

The rest of the students: *the main streamers* make up approx. 60-70%. They are online nearly every day, depending on their need for information and their activities in their private and professional lives. They are involved in the scientific forums and the meta-forums, and from time to time they are active in forums with nice-to-know information.

## 7. Best practice and pedagogical design

In our experience, virtual learning is not a simple matter. It suggests a diversity of pedagogical approaches. Different scientific disciplines and interdisciplinary approaches call for different learning cultures, which in turn must be seen in relation to several parameters: different students with different aims and with different plans in time and space. Different students with different learning and communication styles, different social behaviors and different needs for information and collaboration.

We argue that MIL may be seen as an example of best practice<sup>2</sup> in blended learning. In addition, MIL is a learning

space where best practice is under constant negotiation and reconstruction as an inherent, integrated part of the learning process.

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<sup>2</sup> The Ministry of Science in Denmark have nominated MIL as an example of best practice, see [http://www.e-kompetencer.dk/rapport\\_03.html#3.2.3](http://www.e-kompetencer.dk/rapport_03.html#3.2.3)