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## Design of a Networked Learning Master Environment for Professionals

*using the approach of problem based learning to establish a community of practice*

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# ***Design of a Networked Learning Master Environment for Professionals – using the approach of problem based learning to establish a community of practice***

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## **Abstract**

The paper is presenting the overall learning design of MIL (Master in ICT and Learning). The learning design is integrating the principles of: 1. Problem and project based learning 2. Networked learning / learning in communities of practice. The paper discusses how these principles interact productively in the design of a networked learning environment for professionals. The paper challenge the definition of networked learning focussing on connections. This definition has been important to throw light upon the importance of weak ties, and how much weak ties are used within networks. However in order to really use the potentials of the socio cultural understanding of learning as based in relationships and connections we need a stronger concept of networked learning as a socio-technical way of organising learning, which make learners interact, connect, engage, relate and collaborate on joint enterprises and activities, through both strong and weak ties, and to dynamically accumulate and rework concepts, artefacts and knowledge in a variety of forms and from a variety of sources. The MIL case based on problem and project based learning demonstrates how this understandings of networked learning can be organised for.

MIL is based on a pragmatic concept of problem and project based learning adapted to the virtual conditions of networked learning. The MIL model incorporates a series of integrated didactical principles: problem formulation, enquiry of exemplary problems, participant control, joint projects, dialogues, interdisciplinary approaches, and action learning. The approach requires that students and teachers (facilitators, supervisors, lecturers, and professors) engage in a shared enterprise – a project - within the thematic framework of the semester. The study program is organised around two main activities: 1. course work in order to get insights of the core disciplines and to build up a shared repertoire and 2. project work, where the students engage in collaborative research projects – as a kind of shared enterprise. From a learning point of view the pedagogical principles of PBL facilitates as well the individual learner's constructions of knowledge as well as the project group's construction of shared understanding through negotiations, confrontations and identification. Further more previous research has shown, that PBL facilitates inter-dependencies among the busy professionals, which help them to prioritize the study of work and also to establish kinds of community of practice.

## **Keywords**

Problem based learning, PBL, networked learning, learning in communities of practice.

## **Introduction**

Master on ICT and Learning (MIL) is an academic master for professionals in Information Communication Technology and Learning (MIL). MIL is based on the principles of problem and project based learning.

The presentation and discussion of the MIL learning environment builds upon experiences of the authors, who are also the founders of MIL, as researchers, managers, and teachers. Furthermore it builds on previous analysis using primarily a qualitative approach. Our insider-relation to MIL has strength and limitation. It has strength in the sense that we have in-depth and first-hand experiences from being participants in the learning environment, while the limitations may be that our involvement also restricts our critical reflection on the experiences. To avoid the blind spots we are systematically developing the learning environment through qualitative assessment procedures and development seminars. Further more, the learning environment is getting reviewed by external examiners every five years through the Danish Accreditation Service, the first time being spring 2010.

## Presenting MIL

Master in ICT and Learning (MIL) is an academic master for professionals. In order to enter to the program, students have to have at least two years of relevant practice and the formal requirements of a bachelor degree. The students have a very diverse background. Approximately two-thirds of the students come from the field of education (all levels) and one-third comes from business (human resource and ICT). The distribution between men and women are fifty-fifty. The students come from all over Denmark (including the Faroe Islands and Greenland).

MIL was established in 2000. As something very unique within a Danish context five universities worked (and still work) together in the realization of MIL: Aalborg University, Aarhus University, Copenhagen Business School, The Danish University School of Education, Aarhus University and Roskilde University under the umbrella of IT Vest. The rationale behind the collaboration was many-sided. Creating a joint and only one master program would provide volume; it would increase the quality of the learning environment, engage students in different and leading research environments and afford a framework for the founders to work together. Foremost it would give an opportunity to explore on a long term basis the strength, the challenges and the weaknesses of a virtual organization and of networked learning.

### Pedagogical design

A networked learning environment for problem and project based learning is not only a piece of technology consisting of software and computers (Tolsby, 2009) or a number of slides made available on the Internet. A networked learning environment is situated in practice. It includes people working together on formulating and solving problems. It includes a curriculum to be studied. It includes an organization and a learning infrastructure, and it includes a pedagogical design to tie all this together. Inspired by Winograd's notion of design, a problem and project based networked learning environment may be described as "bringing the users, the context and the system together" (Winograd, 1996).

MIL is based on a pragmatic concept of problem and project based learning (POPP/PBL) adapted to the virtual conditions of the study programme (Kolmos, Fink, & Krogh, 2004). The MIL model (see below) incorporates a series of integrated didactical principles: problem formulation, enquiry of exemplary problems, participant control, joint projects, dialogues, interdisciplinary approaches, and action learning (Dirckinck-Holmfeld, 2002). POPP/PBL requires that students and teachers (facilitators, supervisors, lecturers, and professors) engage in a shared enterprise within the thematic framework of the semester. The study program is organised around two main activities: 1. course work in order to get an overview of the core disciplines and to build up a shared repertoire and 2. project work, where the students engage in collaborative research projects – as a shared enterprise. As such, POPP/PBL is a vehicle for the development of communities of practices (Wenger, 1998) establishing inter-dependencies among the participants (Fjuk & Dirckinck-Holmfeld, 1997). From a learning point of view the pedagogical principles of POPP/PBL facilitates as well the individual learner's constructions of knowledge as well as the project group's construction of shared understanding through negotiations, confrontations and identification (Dirckinck-Holmfeld 2002). Further more previous research has shown, that POPP/PBL facilitates that the participants in the shared project work establish inter-dependencies among each other, which help them to prioritize the study of work (Fjuk & Dirckinck-Holmfeld, 1997). The basic structure is illustrated below (fig. 1).

### A flexible and blended learning environment

MIL is organised as a flexible and blended learning environment with online module activities supported by residential seminars and workshops: three 2-days residential seminars, a one-day project seminar, and a day for the final examinations (see the stapled lines in the figure). The seminars take place at the different partner universities.

The program is made up of four course modules, one project module and the thesis – all in all 60 ECTS-points<sup>1</sup>.

The overall design of the virtual learning environment reflects some of the principles for dramaturgy as suggested by (Laurel, 1993). It has a clear marking of start and ending, it has a clear rhythm instantiated through the face-to-face seminars and tasks (Dirckinck-Holmfeld, Sorensen, Ryberg, & Buus, 2004), and it has clear roles between coordinators, teachers/supervisors and students (Byholm and Dirckinck-Holmfeld, 1999).

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<sup>1</sup> ECTS is the European Credit Transfer System to ensure transfer of credits from one study program to another and developed to enhance the mobility of students between universities in the EU member states.

The virtual learning environment enables students to form groups due to interests and they are not bound by geographical boundaries

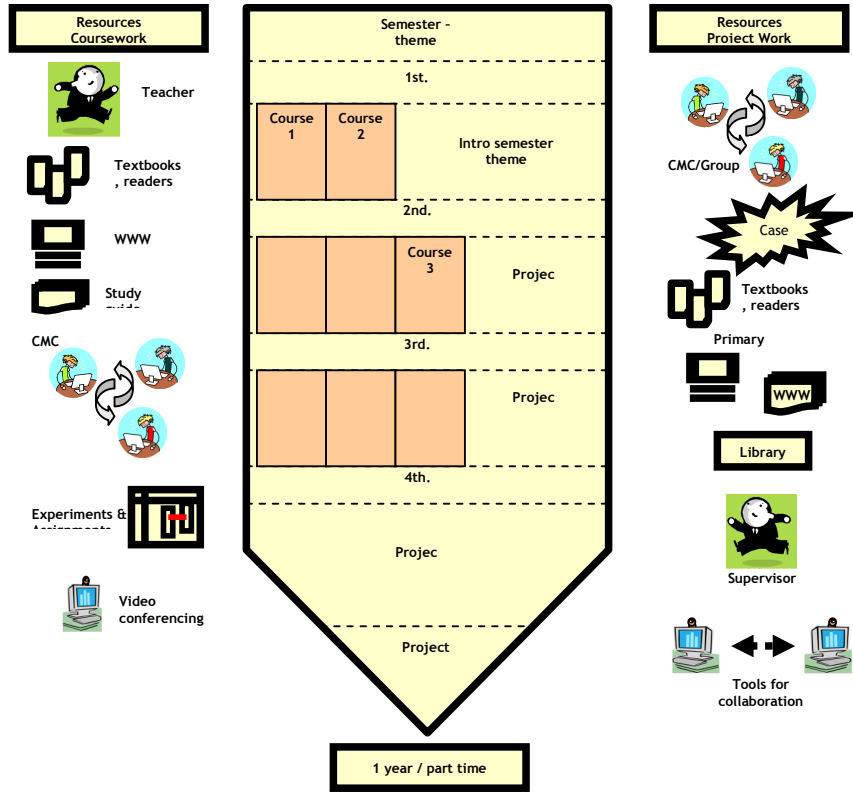


Fig. 1 A conceptual model for a networked learning environment based on POPP/PBL (first presented in Dirckinck-Holmfeld, 2002)

Fig. 1. MIL – a problem and project based networked learning environment

POPP/PBL is a dynamic pedagogy in the sense that students bring in new research problems to study from their own practice. This is beneficial for the research community as it broadens the empirical basis as well as beneficial for the professional practitioners to relate to theories, concepts and methods from academia. The networked environment further more makes the learning environment flexible, which are most needed for the participants. Many of them are busy professionals, which have demanding schedules and family life to take care of along with the study.

**Networked learning – communities of practice**

Dirckinck-Holmfeld and Jones (2009) claims that networked learning can take on a variety of meanings especially as it is taken up in different contexts. At times it has been interpreted broadly and used interchangeably with other terms such as e-learning, online learning and currently, technology enhanced learning (TEL). As it has evolved, networked learning has often emphasised the importance of the collaborative aspects of learning and the cooperative possibilities available in online learning (c.f. McConnell, 2000; Steeples and Jones, 2002). The most common definition comes from the Centre for Studies in Advanced Learning Technology (CSALT) team at Lancaster University in the United Kingdom based on a series of projects during the late 1990s:

Networked learning is learning in which information and communication technology... is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources. (Goodyear et al., 2004)

Even the term networked learning often is used as a synonym for online learning it is not simply a synonym for online learning or e-learning because it focuses on connections and emphasises human aspects of learning, even when that learning takes place in contexts mediated through digital networks.

The emphasis on connections allow networked learning to be less partisan about the nature of the connections than other theoretical approaches such as communities of practice and computer supported collaborative learning (CSCL). Some authors are concerned that CSCL and the theory of communities of practice when it comes to networked learning for professionals focus too much on networks composed of strong ties and as a consequence overlook the potential value of weak ties between learners and between learners and their resources (Jones, 2004; Jones, Ferreday, & Hodgson, 2006; Ryberg & Larsen, 2006). In this sense one characteristic of networked learning is that it does not privilege a particular pedagogical model (Dirckinck-Holmfeld & Jones, forthcoming) or is viewed as collaborative per se.

With respect to the concept of networking, the MIL-model is a combination of strong and weak ties<sup>2</sup> (Granovetter, 1973). Students are organized in “big groups” with 40 – 50 students in each year group, and within these big groups students are connected by weak ties, where they connect more occasional. Opposite in the project groups, where the students intentionally are connected by strong ties around a shared research project and a shared problem formulation. The model developed by (Burt, 1995, 2. print (org. 1992)) on structural holes illustrates very well the organization of a POPP/PBL-environment for professionals. At the ‘big group level’, the students connect occasionally with each other and share problems of common interests, while those in the project group work closely together focussing on shared research problems, activities, tools and artefacts as the central mediating principle of the learning process., both implying and developing strong ties. The relations among the students in the ‘big group’ can be seen as a ‘network of interest’ (Brown & Duguid, 2000), which is a much looser constellation, while the project groups make up a kind of ‘communities of practices’, sharing a common enterprise (the problem and the project), a mutual engagement (academic and social) and a shared repertoire (theories and methods).

## **Challenges in networked learning organised as problem based learning**

In the following I’m focussing on a number of issues related to the pedagogical design of MIL:

- the issue of space and place and geographical anchoring
- the socio cultural notion of learning based in relationships and connections

### **The issue of space and place and geographical anchoring**

The Danish Accreditation Institute (ACE) uses geographical anchoring among researchers as quality criteria for the educational learning environment. These criteria can not be fulfilled in the case of MIL. This criterion is based on at least two lines of thoughts: 1. that the physical environment is superior to the virtual and 2. that educational programmes has to be anchored in one institution.

In the case of MIL we have no evidence that the physical environment is superior to the virtual. Opposite, it seems as if we have found a good blend bringing the students together in a virtual environment supported by a few seminars, which fit busy professionals. In the MIL approach the physical environment is not superior to the virtual or vice versa. But it’s different modes of communication and being, which supplement each other. Expressed a little simple, you can feel very isolated and distant in a physical environment, for example mass educational programs organised around mass lectures in big auditoria versus the feeling of connectedness in virtual learning environments organised around collaborative learning principles. Therefore, the critical issue of relatedness is not a question of physical or virtual presence, but more a question of social relations and engagement, and how the pedagogy organises for this. The different modes of communication and collaboration, virtually and physically, have various qualities which can be used to support the social relatedness and engagement.

The second issue of institutional anchoring is challenged in the case of MIL. As mentioned in the beginning of the article five institutions cooperate in the establishment and running of MIL. What constitutes MIL is its own constellation, and not MIL as formally related to one of the universities. Behind MIL is a collaboration model

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<sup>2</sup> Following Granovetter : “the strength of a tie is a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie” (Granovetter, 1973 p. 1361)

based on mutual engagement and responsibility from the five partner universities – in realising and running a joint programme. The obvious strength of this approach has been the establishment of new educational program and joint research programme on ICT and Learning. Following Engeström (2004 p. 16) the success of MIL can be understood from the concept of ‘knotworking’ and co-configuration.

“It is horizontal and dialogical learning that creates knowledge and transforms the activity by crossing boundaries and tying knots between activity systems operating in divided multi-organizational terrains (see Engeström et al., 1999, 2003b). This horizontal aspect of learning in co-configuration puts a heavy emphasis on actions of bridging, boundary crossing, “knotworking”, negotiation, exchange and trading. This is the structure of situationally constructed social spaces, arenas and encounters needed in new forms of expansive learning at work”.

(Engeström, 2004 p. 16)

The collaboration among the research centers from the different partner universities engaged in MIL can exactly be understood as horizontal and dialogical learning, which transforms the activity of the single department and institution by crossing boundaries and tying knots between the different research groups. This horizontal aspects of learning puts a heavy emphasis on actions of bridging, boundary crossing, knotworking, negotiation and trading. We aim not just to establish a compromise between the different institutions, but work hard to establish a new curriculum integrating the strength and expertise of each partner, which has resulted in a certain constellations of core disciplines and the organisation of MIL. With respect to pedagogy and culture we further more aim at making the student aware of the institutional differences, so they can use this actively to reflect on various approaches to teaching and learning. MIL has become an institution in itself, a network of strong and week ties based on mutual commitment, engagement and lots of boundary crossing work. Many academics have worked together to establish shared educational programmes across institutions; however have failed in the long run. The recipe behind MIL is multiple. First of foremost, MIL was established on top of a research network with the coordination group of MIL as the core participants. Second, the organisation is based on equal responsibilities and an equal fair economic base; third the academic culture within MIL among coordinators, teachers, and administrative staff are based on friendship and an enthusiastic interest in ICT and learning. Further more, because of the institutional set-up, we are not in day-to-day competition with each other on positions etc., but can use the collaboration to learn from each other and strengthen each others research group.

### **The socio cultural notion of learning based in relationships and connections**

The socio cultural notion of learning as based in relationships and connections fit very well with the pedagogical principles of POPP/PBL. Organising students in project groups with mutual responsibility for a project forces students to work together. This way of working is based on the same assumptions about learning as presented by Engeström above. Organising the students in teams invite the students to work together in a horizontal and dialogical manner, and to create knowledge, which transcend the knowledge of them as individuals. The adult professionals represent various activity systems Bringing them together in a systematic learning environment gives them an opportunity to get detailed and close insights into various activity systems and to transcend them and establish new knowledge. To do so requisite hard work from the participants of the group and put a heavy emphasis on actions of bridging, boundary crossing, “knotworking”, negotiation, exchange and trading. The students are provided with pedagogical tools to support this process, and many of the students also know how to handle these processes because they are quite similar to project work in most professional settings. The project work is supported both virtually and physically.

Most of the students want to work in groups, however for some students it is difficult to organise, because they at the same time want to work with research questions from their own practice. We try to convince them from a socio cultural learning point of view that collaboration strengthen their individual learning process as well as make the study life more fun and also more easy to maintain, when you are responsible to others and not only yourself. In most cases it works, and also strengthen the relationships in a life long networked learning perspective between the students, and between students and professors.

On each physical seminar the students prepare the project work. First they learn the basics about the method, second seminar they start to brain storm about various topics and problems, third seminar they have formed

groups, and they start to formulate the problem and research questions and make an outline, forth seminar is a midterm seminar, where groups and peers give and receive feedback, finally the fifth seminar is the “big examination day”, where all the students present their work

Based on the experiences from MIL I would like to challenge the definition of networked learning:

Networked learning is learning in which information and communication technology... is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources. (Goodyear et al., 2004 p. xxx)

I find that the focus on connections is too weak with respect to learning. I think the definition has been important to throw light upon the importance of weak ties, and how much weak ties are used within networks, however in order to really use the potentials of the socio cultural understanding of learning as based in relationships and connections we need a stronger concept of networked learning as a socio-technical way of organising learning, which make learners interact, connect, engage, relate and collaborate on joint enterprises and activities, through both strong and weak ties, and to dynamically accumulate and rework concepts, artefacts and knowledge in a variety of forms and from a variety of sources. Networked learning is as a consequence ever changing, with new constellations and relationships evolving depending on the engagement, interaction and contributions of the participants (Dirckinck-Holmfeld & Jones, 2009)

In Dirckinck-Holmfeld & Jones (2009) we claim that networked learning is not reserved for any particular pedagogy, however it turns out in the MIL environment, that taking the problem as the point of departure for the professional learner as in POPP/PBL, is a productive approach to a networked learning environment.

## References

- Brown, J. S., & Duguid, P. (2000). *The social life of information*. Boston MA: Harvard Business School.
- Burt, R. S. (1992). *Structural holes: The social structure of competition*. Cambridge, Mass.: Harvard University Press.
- Bygholm, A., & Dirckinck-Holmfeld, L. (1999 2. edition). Pædagogik i det virtuelle læremiljø - metodiske overvejelser : (pedagogics in the virtual learning environment - methodological reflections). In O. Danielsen, L. Dirckinck-Holmfeld, B. H. Sørensen, J. Nielsen & B. Fibiger (Eds.), *Læring og multimedier* (2.edition ed.). Aalborg: Aalborg Universitetsforlag.
- Dirckinck-Holmfeld, L. (2002). Designing virtual learning environments based on problem oriented project pedagogy. In L. Dirckinck-Holmfeld & B. Fibiger (Eds.), *Learning in virtual environments*. Frederiksberg C: Samfundslitteratur Press.
- Dirckinck-Holmfeld, L., & Jones, C. (2009). Issues and concepts in networked learning. In L. Dirckinck-Holmfeld, C. Jones & B. Lindström (Eds.), *Analysing networked learning practices in higher education and continuing professional development* (pp. 259-285). Rotterdam: Sense Publishers.
- Dirckinck-Holmfeld, L., Jones, C., & Lindström, B. (Eds.). (2009). *Analysing networked learning practices in higher education and continuing professional development*. Rotterdam, the Netherlands: Sense Publishers.
- Dirckinck-Holmfeld, L., Sorensen, E. K., Ryberg, T., & Buus, L. (2004). A theoretical framework for designing online master communities of practice. In *Proceedings of the networked learning conference*. Lancaster: Lancaster University <http://www.shef.ac.uk/nlc2004/Proceedings/Contents.htm>.
- Engeström, Y. (2004). New forms of learning in co-configuration work. *Journal of Workplace Learning* [www.emeraldinsight.com/1366-5626.htm](http://www.emeraldinsight.com/1366-5626.htm), Vol. 16(No. 1/2), 11-21.
- Fjuk, A., & Dirckinck-Holmfeld, L. (1997). Articulation of actions in distributed collaborative learning. *Scandinavian Journal of Information Systems*.
- Goodyear, P., Jones, C., Asensio, M., Hodgson, V., & Steeples, C. (2001). *Effective networked learning in higher education: Notes and guidelines*. Lancaster: Csalt, lancaster university. Lancaster: CSALT, Lancaster University, Available online at: <http://csalt.lancs.ac.uk/jisc/>.
- Granovetter, M. S. (1973). The strength of weak ties. *Americal Journal of Sociology*, 78(6), 1360-1380.

- Jones, C. (2004). The conditions of learning in networks. In L. Dirckinck-Holmfeld, B. Lindström, B. M. Svendsen & M. Ponti (Eds.), *Conditions for productive learning in networked learning environments*. Retrieved from: [http://www.ell.aau.dk/fileadmin/user\\_upload/documents/research/kaleidoscope/jeirp\\_publications/02\\_The\\_conditions\\_of\\_learning\\_in\\_networks\\_Jones.pdf](http://www.ell.aau.dk/fileadmin/user_upload/documents/research/kaleidoscope/jeirp_publications/02_The_conditions_of_learning_in_networks_Jones.pdf) 15.08.2007: Aalborg University / Kaleidoscope.
- Jones, C. (2004). Networks and learning: Communities, practices and the metaphor of networks. *ALT-J, The Association for Learning Technology Journal*, Vol. 12(No 1), 82-93.
- Jones, C., Ferreday, D., & Hodgson, V. (2006). Networked learning a relational approach - weak and strong ties, *Networked Learning Conference 2006*. In: Banks, S., Hodgson, V., Jones, C., Kemp, B., McConell, D., & Smith, C. *Proceedings of the fifth international conference on networked learning 2006*. Lancaster: Lancaster University.
- Kolmos, A., Fink, F., K., & Krogh, L. (Eds.). (2004). *The aalborg pbl model – progress, diversity and challenges, aalborg university press*. Aalborg: Aalborg University Press.
- Laurel, B. (1993). *Computers as theatre*. Addison-Wesley Publishing Company.
- Ryberg, T., & Larsen, M. C. (2006). Networked identities - understanding different types of social organisation and movements between strong and weak ties in networked environments. In S. Banks, V. Hodgson, C. Jones, B. Kemp, D. McConell & C. Smith (Eds.), *Networked Learning Conference 2006*. In: Banks, S., Hodgson, V., Jones, C., Kemp, B., McConell, D., & Smith, C. *Proceedings of the fifth international conference on networked learning 2006*. Lancaster: Lancaster University.
- Tolsby, H. (2009). Virtual environment for project based collaborative learning. In L. Dirckinck-Holmfeld, C. Jones & B. Lindström (Eds.), *Analysing networked learning practices in higher education and continuing professional development*. Rotterdam, the Netherlands: Sense Publishers.
- Wenger, E. (1998). *Communities of practice - learning, meaning, and identity*. New York: Cambridge University Press.
- Winograd, T. e. a. (Ed.). (1996). *Bringing design to software*. New York: Addison-Wesley Publishing Company.