



Conference
SILESIAN MOODLE MOOT

Faculty of Economics
VŠB-Technical University
of Ostrava

Čeladná, Beskydy
12. - 13. 11. 2009

Networked Learning and Approaches to ICT supported Education – Collaborative Learning in a Global Setting

Bodil Ask, Sven Åke Bjørke

University of Agder
bodil.ask@uia.no, sven.a.bjorke@uia.no

***Abstract:** Online education is undoubtedly increasing in importance – not only in Europe and the USA, but in Africa and Asia as well. Since the early 1990-ies online education has transformed from distribution of information material, electronic books and online quizzes to various stages of methods and pedagogical approaches. To many academic staff netbased education still seems strange and maybe even provoking or threatening. However, the majority now seem to accept ICT supported education as an inevitable part of the future, and that e-learning actually can enhance quality in education.*

This paper presents some of the theoretical background for the implementation of net based learning environments. Special emphasis is on experiences with collaborative learning theories and methods, challenges and feed-back during the past 5-6 years of practice. Practical approaches and experiences are related to the theories, with student feed-back from courses on a global scale.

Our findings presented in this paper originate from courses where social constructivism is the main pedagogical approach. One student group consist of university teaching staff who see the need for going online in order to fill the requirements for higher education in their respective regions. The other group consists of MSc students studying a fulltime, two-year programme in Development Management. The feed-back from so highly qualified “students” is of great value for further development of net pedagogy and methods.

One goal for both groups is capacity- and competence building in ICT supported education, particularly in developing countries, to learn about and practice online education at their home institutions.

Weak infrastructure and unreliable access to electricity and broadband services are arguments against the strategy of offering higher education to the broad public in Asia, Africa and the Middle East. Open universities and other interested parties have offered decentralised, flexible courses and study programmes, exchange programmes etc. instead of net based study programmes. World internet usage indicates, however, that the situation is changing. The usage growth is dramatic in the so-called developing countries.

Experience with the two main groups of online students described in this paper show that even fulltime; online, degree-giving studies over prolonged periods produce good results: The students report of high learning outcomes, maybe even higher than ordinary on-campus studies. They also report of high social interaction and a sense of knowing their peers very well. The drop-out rate has been exceptionally low.

This paper reflects on how to establish good online learning environments in an international network of cooperating universities. Some ideas are also presented for further adaptation of the learning environments, methods and strategy for implementation of online learning in higher education.

1 Introduction

During the 1990ies online education was associated with electronic books, online auto-correcting quizzes, taped lectures etc. However, this approach as a rule did not work well. In degree giving studies, the students tended to feel isolated, and did not get enough feedback (Simpson, 2002, p.88).

Research has shown that several factors need to be present in order to succeed in e-learning (see e.g. Stephenson, 2002). Good online education requires carefully designed courses (Biggs, 2003), well-trained tutors and continuous interaction and feedback. The technology is obviously a barrier to many, especially in countries with low bandwidth and unreliable electricity grids. A good learning management system (LMS) is of high importance, and the participants must become familiar in the use of the often alienating learning environment in an online ‘classroom’ when using the LMS. However, this skill quickly becomes natural – students work in the LMS without thinking much about it after a week or two. The next barriers are to motivate students and tutors to stay on - full time - for two years, and to ensure high learning retention. These issues are pedagogical, and can be quite challenging. Online and distance education is often associated with high dropout rates and low learning retention (Simpson, 2002, p.169). “For distance education to be successful, high levels of interaction typically need to be present for learners to have a positive attitude and greater satisfaction” (Desai et al., 2006). Methodology in itself is not enough; it must be balanced with content, reflect learning goals, and be carefully structured to ensure progress and measurable results (Ask, BJORKE & HAUGEN, 2008).

2 Theoretical approaches for the implementation of net based learning environments

Information and Communication Technologies (ICT) supported education still seems to be a major challenge in higher education. Virtual Learning Environments (VLEs) seem scary, and at first sight, maybe impersonal. The lack of peer contact and feedback from tutors are factors often mentioned as negative aspects of online education. In practice, the reality might be that the worst obstacle is the requirement for detailed planning and advance preparation of study guides and learning resources; material that can be accessible on the net and open for scrutiny and criticism. Kirkwood & Price (2006) conclude that . . . the use of [Information and Communication Technologies] necessitates more than simply replicating or supplementing existing teaching practices: everything governing these practices must be reconsidered and reflected upon.

On the other hand, e-learning can be attractive due to the more flexible situation for tutors and professors, not being bound to a particular location at fixed hours. Online training may be performed from anywhere in the world as long as there is access to the Internet. More flexible and easier access to higher education for students, particularly in lifelong learning settings, ensures that e- learning is gaining in popularity. ICT support and flexible study programmes are by many deemed as an inevitable part of future higher education, some even regard ICT support necessary for attracting new students.

Weak infrastructure is used as an argument against offering higher education to Asia, Africa and the Middle East. Statistics now show, however, that the situation is changing dramatically:

WORLD INTERNET USAGE AND POPULATION STATISTICS						
World Regions	Population (2007 Est.)	Population % of World	Internet Usage, Latest Data	% Population (Penetration)	Usage % of World	Usage Growth 2000-07
Africa	941,249,130	14.2 %	44,234,240	4.7 %	3.5 %	879.8 %
Asia	3,735,439,436	56.5 %	461,703,143	12.4 %	36.7 %	303.9 %
Europe	801,821,187	12.1 %	343,787,434	42.9 %	27.4%	227.1 %
Middle East	192,755,045	2.7 %	33,510,500	17.4 %	2.7 %	920.2 %
North America	334,659,631	5.1 %	237,168,545	70.9 %	18.9%	119.4 %
Latin Am/Carib	569,133,474	8.6 %	116,847,600	20.5 %	9.3 %	546.7 %
Oceania / Austr	33,568,225	0.5 %	19,243,921	57.3 %	1.5 %	152.6 %
WORLD TOTAL	6,608,626,128	100.0 %	1,256,495,383	19.0 %	100.0 %	248.1 %

Figure 2 Internet statistics (Internet World Stats)
 (Copyright © 2000-2008, Miniwatts Marketing Group. All rights reserved worldwide.)

The *usage growth* is the highest in the so-called developing countries. It is thus reasonable to believe that access to Internet will be widespread also in the developing world in the near future. Therefore, current staff at higher educational institutions in these regions should be offered training in applications of the new learning arenas. This could be one way of meeting the enormous requirements for education without spending most of available capital on campus constructions, buildings and centralised facilities.

2.1 Pedagogical development

E-learning or net based learning has been developed over the past 10 – 15 years. From the initial transfer of traditional teaching to new media, e.g. lecture texts, assignments or video on the net, online education has transformed from being mainly communication between a human and his computer, to interactions between humans using technology as a tool, not a mean in itself. George Siemens (2004), pointed out that

. . . behaviorism, cognitivism, and constructivism are the three broad learning theories most often utilized in the creation of instructional environments.

These learning theories have been the mainstream approaches to education the last century. With the development of communication tools for online learning, constructivism has emerged as a foundation for the creation of online learning environments (Net Pedagogy Portal, 2006). Collaborative learning in communities and peer tutoring have opened up ways to deepen learning and understanding through the necessity of formulating own experimental points of view, the negotiation of meaning

and construction of common new knowledge. A social constructivist method seems to fit the net based learning environment perfectly.

2.2 Collaborative learning theories and methods

Bruner's (1960 & 1973) constructivist theory is a general framework for instruction based on the study of cognition and linked to child development research. Learning is an active process in which learners construct new ideas or concepts based on their current and past knowledge. The learner selects and transforms information, constructs hypotheses, and makes decisions, relying on a cognitive structure to do so (Kerlins). Constructivist theories and methods have been further developed and adapted to different learning environments, in particular in social constructivism.

Socio-constructivism is a variety of cognitive constructivism that emphasizes the collaborative nature of learning. According to the Berkeley Graduate Student Instructors' Teaching Resource Centre (Berkeley GSI), socio-constructivism was developed by the post-revolutionary Soviet psychologist, [Lev Vygotsky](#). Vygotsky, though a cognitivist, rejected the assumption made by e.g. [Piaget](#) that it was possible to separate learning from its social context.

Socio-constructivism means that students join a knowledge-generating community and in collaboration with others solve problems and assignments in a context as close to reality as possible. In a socio-constructivist environment the generic skills of collaboration, problemsolving and creation of new knowledge are important goals by themselves. The tasks will be processing and assessing information, negotiating meaning and generating and co-constructing new knowledge. Learning is a social activity where the students have to use the information they gather actively by applying it in discussion with others. The students must support their statements by referring to reliable and verifiable sources. The demands to academic rigor are the same as for the more traditional instructivist, lecture-based courses. Studies should in principle be undertaken for a purpose, and the participants should critically assess information according to relevance and usefulness in solving the task at hand.

3 Two student groups

Our experience mainly builds on two different groups of students. The first group consists of teaching staff in higher education who has received training in a part-time, fully online 10 ECTS course in online tutoring. This course has been running for several years and has been offered worldwide. The majority has been over 40 years old, and had to combine their working fulltime with studying. This group does not meet face-to-face.

The other group consists of MSc students in the age-range 24-40. These students have been studying fulltime, approximately 40 hours per week. They meet on-campus in Norway for the first 2-3 weeks, being introduced to the LMS, the pedagogy, studying techniques, and scientific methods. The remaining of the semester they work online in virtual class- and group rooms. Then they again meet face-to-face for one month at a partner university in Africa or Asia.

4 Establishing good online learning environments in an international network

The MSc DM study programme of the Agder University, Norway, operates within an international network, with partner universities in four African countries and Sri Lanka. Students are recruited at these universities, each university has a special coordinator in charge of communication in the network and assisting 'home' students if that is deemed necessary. The coordinators also cooperate on revising and updating the curriculum. Working in an international network adds extra dimensions that are highly valuable for studies in a globalised world. Schlais and Davis, 2001, confirm this:

A network, by its international design, provides a global perspective much needed by students and their professors to help build a tolerance between people of diverse cultures and value systems. A networked multi-nation educational system facilitated by instructors, coordinated by network administrators and guided by participating institutions will create new and powerful learning opportunities

4.1 Online tutoring

Before venturing into online education, teachers and tutors will need to develop skills in online tutoring. United Nations University – Global Virtual University (UNU-GVU), the University College of Stord / Haugesund (HSH) and the University of Agder (UiA) have developed a training programme consisting of two courses; E-teaching 1 and E-teaching 2. This training is offered to educators in general, to lecturers, professors, developers of learning environments, and to subject professionals to whom e-learning is new. Professors can often benefit from training in ICT, including the use of a Learning Management System (LMS), in pedagogy and in e-course development. The focus on learner-centred instruction is supported by other practitioners, e.g. Gunawardena and Zittle, (1998, p.106) who describe "learnercentred instruction; interaction; social presence; and collaborative learning" as crucial.

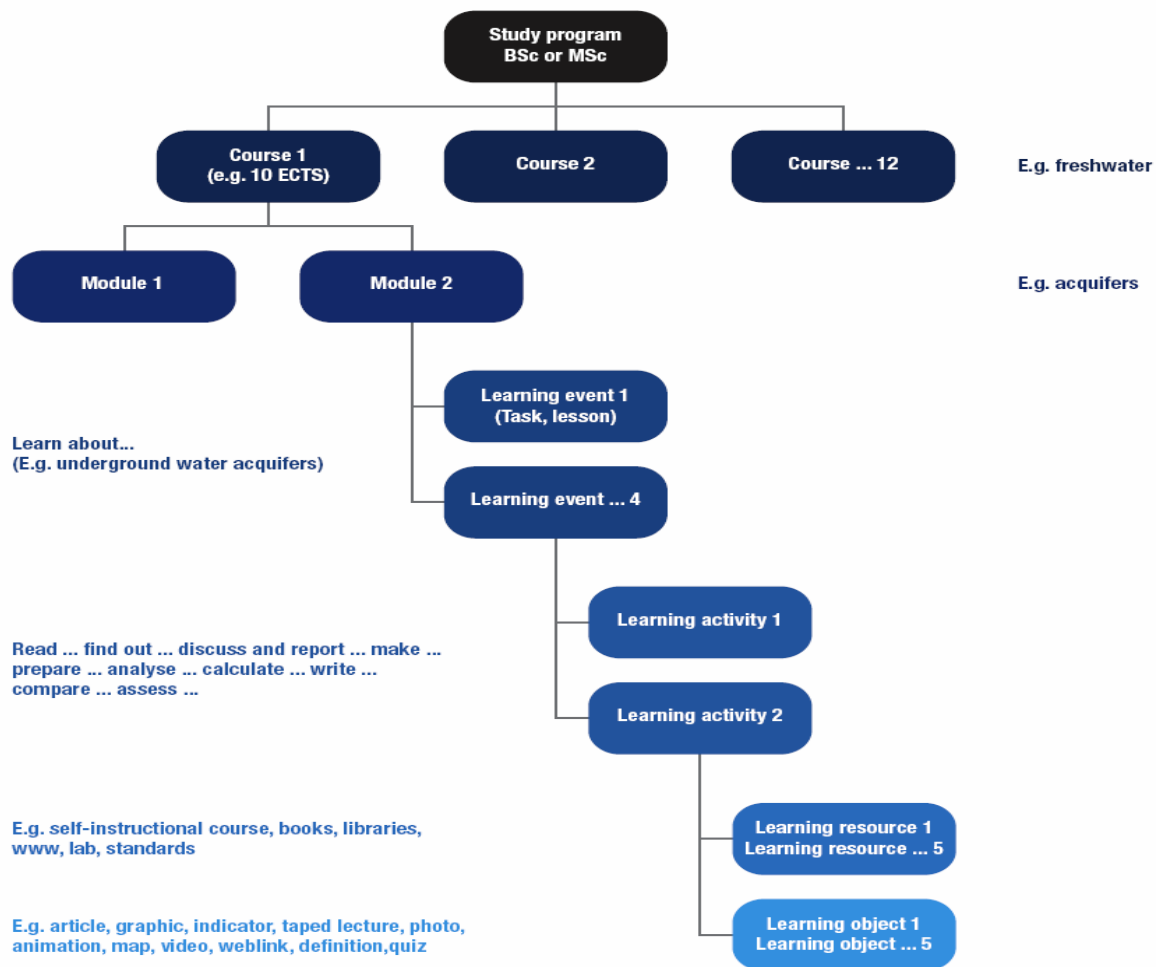
4.2 Asynchronous threaded discussions

A main pedagogical tool for these courses is asynchronous, threaded discussions arranged and structured in a discussion forum in a LMS. Asynchronous discussions enable an intercontinental study programme to overcome the complex time frames. Asynchronous interaction encourages reflection and gives room for critical information gathering before expressing opinions. It is also more including for those who are otherwise timid and quiet in groups or classes. The asynchronous approach gives flexibility in time, enabling those with externally fixed schedules to participate. The approach is less demanding on reliable electricity, Internet connections and bandwidth than synchronous alternatives. On this background we argue that asynchronous, tutor-guided peer interaction is conducive to intercontinental cross-cultural and cross gender communication. The culturally very heterogeneous groups of course participants have been challenging but also very rewarding and highly appreciated. Otherwise quiet women raised in patriarchal societies realise that nobody can prevent them from contributing as equals. African men and women learn – after some time - to discuss with European peers and vice versa, and appreciate each other's contributions. See table 5.

4.3 Framework system for course structures

During the last six years, the involved teaching staff at the University of Agder, its partner universities and some of the participants in the EU project called 'model for a European Networked University for e-learning (mENU) have developed a framework system for course structures, a course description template, a quality enhancement and audit system ensuring that the quality criteria according to the European Credit Transfer and accumulation System (ECTS) are met, while also adapting the course to an online or blended environment. The system does not interfere with content itself, but gives the course developers a structuring procedure to follow when making course descriptions and study guides. Emphasis is given to fulfil the requirements of standardisation according to the Bologna process and the European Credit Transfer and Accumulation System (ECTS). The study guide template follows the guidelines of the European Quality Framework (EQF) with formulation of intended learning outcomes defining the level of learning to be achieved rather than content delivery.

The course description presents a detailed overview of the course according to the philosophy of 'constructive alignment' (Biggs 2003), with items like title, workload, aims, objectives, content, methodology, intended learning outcomes etc. The study guide, with a calendar, provides the course content, with detailed goals, tasks, activities, pacing in the form of timeframes and cut-off dates. There is also a library of online learning resources with e.g. videotaped lectures, articles and website collections giving participants some degree of autonomy and selfdetermination. Tutors are guiding and facilitating the learning process. An essential learning resource is the participants themselves.



The framework system for the online study programme and course structure (Bjorke, 2008)

5 Experience

Professors and other academics responsible for study programmes and courses applying tutor-guided, paced and collaborative approach to online learning, report that there is a high degree of student cohesion. Due to the intense collaboration, peer feedback and mutual dependence in the virtual communities of learning and practice, there seems to be a positive and supporting group pressure. This is fed by frequent and continuous tutor interaction and feedback. It leads to a creative and social learning environment, nourishing a good learning process with high learning outcomes. Statistics from the full time studies indicate a remarkably low drop-out.

The Director of Centre for Development Studies, University of Agder, Norway, professor Arne Olav Øyhus, has been in charge of a master study programme since 2005, and has the following experience from the methods applied:

... The first cohort starting 2005, completed their MSc in spring 2007 with average or above average grades, reporting surprisingly high student cohesion and good learning outcomes. The dropout rate was below 10%.

The description above relates to full time students at master’s level from different parts of the world. The experiences from other courses may differ. Most part time course participants are adults, as a rule fully employed and with family responsibilities, and have a somewhat higher drop-out rate. However, those who manage to overcome the initial barriers of technology and their own time management, get caught in the group dynamics and support, and will most likely also complete the course.

Replies taken from questionnaire:(NB! Since the questionnaire has varied somewhat between the cohorts, the number of respondees can vary)

Table 1: Student rating of study approaches

The collaborative and at least partly constructivist approach has been:	
..decisive for my motivation to go through with the study programme	47
.. not had any influence either way	9
..mainly been a waste of time, preventing me from really studying the material	0
Not answered	2
Total	56

Table 2: Main problems mentioned

The mandatory group work has been challenging and problematic because:	
Some group members seem not to understand how to collaborate. They have just been ‘free-riders’, not taking responsibility. They seem to just want to take advantage of the group, contributing little or nothing.	23
Some group members are very dominant and impatient, and do not want to collaborate on equal terms	9
Total	32

Table 3: Some positive factors mentioned

The mandatory group work has been rewarding because:	
You have gained experience in cross-cultural communication	21
You have gained experience in expressing your own thoughts	19
Total	40

Table 4: Cross-cultural communication

Do you think that you have increased your ability to communicate efficiently cross-culturally during the study programme?	
Yes, very much so	25
Yes, to some extent	32
Uncertain	10
No	0
Total	67

Table 5: Equal opportunities

Do you think that this study programme has given equal opportunities to all admitted to the programme regardless of gender, nationality or race?	
Yes, very much so	30
Yes, to some extent	20
Uncertain	7
No	2
Total	59

6 Conclusion

Good ICT supported education can be a driving force for quality enhancement in higher education. To develop a functioning network of collaborating institutions, a system for common course development procedures and facilitation of joint degrees is crucial. Our experience is that collaborative, tutor-guided online courses built on socio-constructivism can be successful. Most remarkable, perhaps, are the low drop-out rates and student satisfaction with the learning outcomes.

Students and tutors need training and special support to function well in an online environment. Administrative officers at educational institutions need the training necessary to make multilateral agreements ensuring the possibility for credit transfer and accumulation, mutual recognition of competence and interchangeability of course modules and learning objects.

The challenges and problems of developing good e-learning may be formidable, but well worthwhile to venture into. Experience indicates that quality, competence and capacity can grow quickly. As a spin-off, the methodology and structured approaches can also be applied to more traditional on-campus, education.

References

1. ASK, B., BJORKE, S.A. and HAUGEN. H. (2008) Online Learning Superior to on-Campus Teaching
2. *Student Engagement and Course Content Central for e-Learning Outcome*, in Bonk, Lee and Reynolds: *E-learn (2008) World Conference on E-learning in Corporate, Government, HealthCare and Higher Education*, AACE, Las Vegas
3. Berkeley GSI. Graduate Student Instructor Teaching Resource Centre: <http://gsi.berkeley.edu/resources/learning/social.html> [accessed October, 2009]
4. BIGGS, J. (2003) *Aligning Teaching and Assessment to Curriculum Objectives, Imaginative Curriculum*
5. BJORKE, S.Å. (2008) *Challenges and training needs of E-supporters*, in *Sharing Good Practices: E-learning in Surveying, Geo-information Sciences and Land Administration*, FIG International Workshop 2008
6. http://www.fig.net/commission2/enschede_2008/Html/session2.html (Accessed October 2008)
7. BRUNER, J. (1960). *The Process of Education*. Cambridge, MA: Harvard University Press.
8. BRUNER, J. (1973). *Going Beyond the Information Given*. New York: Norton
9. DESAI, M. et al (2006) *E-learning: Paradigm Shift in Education*, *Education*, Vol. 129, No. 2, pp. 327-334
10. European Commission (2004) *European Credit Transfer and Accumulation System*
11. http://ec.europa.eu/dgs/education_culture/publ/pdf/ects/en.pdf (accessed April 2009)
12. EQF - European Qualifications Framework for lifelong learning
13. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:111:0001:0007:EN:PDF>
14. GUNAWARDENA, C. N. and ZITTLE, R. H. (1998) *Faculty development programmes in distance education in American higher education*, in Latchem, C. and Lockwood, F. (eds.) *Staff development in open and flexible learning*, London, Routledge.
15. KERLINS: *Kerlins.net* <http://kerlins.net/bobbi/education/teachonline/pedagogy.html>, link to Constructivist theory, Bruner: <http://tip.psychology.org/bruner.html> (viewed January 5, 2008)
16. KIRKWOOD, A. & PRICE, L. (2006) *Adaptation for a changing environment: Developing learning and teaching with information and communication technologies* <http://www.irrodl.org/index.php/irrod/article/viewArticle/294/624>
17. *Model for a European Networked University for e-learning (mENU)* <http://ans.hsh.no/lu/inf/menu/>
18. *Net Pedagogy Portal* <http://www.thewebworks.bc.ca/netpedagogy/Evolution/evolution.html>
19. SIEMENS, G. (2004) *Connectivism: A learning theory for the digital age*. From:
20. <Http://www.elearnspace.org/Articles/connectivism.htm> (Accessed October 2009)
21. SIMPSON, O. (2002) *Supporting students in online, open and distance learning*, Kogan page
22. STEPHENSON, J. (2002) *Teaching and learning online: pedagogies for new technologies*, London, Kogan Page