Taina Joutsenvirta & Liisa Myyry (eds.)

Blended Learning in Finland

Published by:
Faculty of Social Sciences at the University of Helsinki

Editors: Taina Joutsenvirta ja Liisa Myyry

Publication's name: Blended Learning in Finland

Publication's type: online publication

ISSN:	**ISBN:** 978-952-10-5943-8
Pages: 202	**Language:** English

Other information:

Production editor: Taina Joutsenvirta

Place: Helsinki

Year: 2010

Address:

http://www.helsinki.fi/valtiotieteellinen/julkaisut/blended_learning_Finland.html

CONTENTS

PREFACE

Graham (2006, 3) points out that the essence of blended learning is the combination of face-to-face instruction and computer-mediated instruction. The goal of blended learning should be to unite the best features of in-class teaching with the best features of online learning, to promote active, self-directed learning opportunities for students (Garnham & Kaleta, 2002).

Finland was a leading Information Society at the end of the 1990s with the Finnish Government and Ministry of Education investing a significant amount of money to enable Finnish education institutions to educate future citizens for the information society. Following these investments, the use of educational technologies has for a many years been a trend in the development of teaching in Finnish higher education. Blended learning was dealt with for the first time in Finland in 2005 in the online publication *Piirtoheitin*, where the authors translated the term “blended learning” in to Finnish as “*sulautuva opetus*”. This translation has resulted in a great deal of discussion but at the same time has been adopted very quickly all over Finland in higher education institutions.

The main obstacle to the transmission of blended learning in Finland is the fact that teachers’ work is very isolated. In many Finnish universities and higher education institutions teachers must create their own blended learning courses without support, models or guidance. This is why the Faculty of Social Sciences, the Educational Centre for ICT, and the Open University of the University of Helsinki together arranged the first national

one-day blended learning seminar (*Sulautuva opetus –seminari*) in March 2007. The main purpose of the seminar was that it would be a meeting point for teachers where they could share their own blended learning experiences with their peers. The first seminar was a success, as over 120 participants from higher education institutions attended and 16 different blended learning cases from all over Finland were introduced. Since then the seminar has been arranged every year in March.

The seminar has not been the only way to diffuse knowledge about blended learning. In addition, three publications about blended learning cases have resulted from it. The 2007 seminar produced a book entitled *Blended Learning – new ways to learn and teach* (*Sulautuva opetus - uusi tapa opiskella ja opettaa*). The 2008 seminar produced an online publication entitled *Blended learning in many ways and methods* (*Sulautuvaa opetusta monilla tavoilla ja menetelmillä*). These two publications were in Finnish. The third publication – in English – followed the third seminar arranged in March 2009, and entailed13 articles about blended learning. Most of these articles were about teacher's own blended learning cases, and featured 23 writers from various higher educational institutions in Finland, including the University of Helsinki, University of Tampere, University of Jyväskylä, Helsinki University of Technology, University of Kuopio, and Lappeenranta University of Technology. One article was from Canada. We thank all the contributing authors, as the publication would not been possible without their enthusiasm and desire to develop their teaching towards blended learning. They have shown the opportunities that blended learning opens for higher education teaching and learning.

The publication provides information for higher education educators, trainers, instructional designers and anyone else interested in how to blend traditional face-to-face and online learning environments. Teaching in a blended way is a new experience for most teachers in higher education. These examples offer ideas on how to design blended courses, and the courage to try new ways of teaching.

Taina Joutsenvirta and Liisa Myyry

Overview

The 2009 English-language publication is divided into five sections. The first, *Learning community,* includes two articles dealing with the general approach to blended learning environments. In the first article, *Norman Vaughan* describes blended learning environments in higher education and how the Community of Inquiry (CoI) framework can be used to design blended learning courses and programmes. In the second, *Eila Lindfors* writes about challenges and pedagogical solutions with respect to a successful learning community. She asks how the use of ICT and especially the shared work of a learning community might promote innovative solutions that would promote collaborative learning. The purpose of her article is to further the discussion on the pedagogical use of ICT in the learning community.

The second section, *Promoting cognitive and interaction skills,* includes cases which concentrate on enhancing students' thinking and discourse abilities. *Päivikki Jääskelä* and *Marja Leena Böök* write about the research teaching methods and counselling practices used at the Open University

of Jyväskylä in Finland. The focus is on the continuum of practicing research skills as part of basic and subject-level studies. *Kirsi Kettula-Konttas* and *Liisa Myyry* describe the development of a blended learning course on professional ethics in the forest sector aimed to enhance students' ability to identify and resolve ethical problems. *Timo Portimojärvi* and *Leena Rantala* depict and evaluate the implementation of a blended (but simple course) in media education in the light of student feedback. In particular they were interested in the factors that enhanced learning in the course. *Ari Haaranen* writes about designing and implementing the study module Health Promotion Management, where the significance of interaction in blended learning was examined. The starting point of the module was to promote students' learning by means of interactive methods.

The third section of the publication discusses *Learning-supportive virtual environments*. Its two articles deal with virtual learning environments that support learning beyond traditional courses. *Lena Sjöberg-Tuominen* and *Kalle Romanov* describe the web-based virtual patient pool *VPP*, which was developed at the medical faculty of the University of Helsinki. This web-based software simulates the natural process of the clinical examination of adult patients, and allows students to perform extensive clinical examinations and investigations on virtual cases. *Viivi Virtanen* and *Jouko Rikkinen* address the open-access web-based biodiversity resource 'Pinkka' – used for teaching biodiversity as well as to support the independent study efforts of biology students –constructed at the University of Helsinki's Viikki Campus.

The fourth section of the book focuses on *Technical solutions and their problems in blended learning*. Here *Tapio Auvinen, Lasse Hakulinen* and

Ari Korhonen depict the challenges encounted in the Data Structures and Algorithms (DSA) course at the Helsinki University of Technology. The course blended face-to-face lectures and lab sessions with an interactive learning environment called TRAKLA2 used for assessing algorithm simulation exercises. *Kari Kosonen, Liisa Ilomäki* and *Minna Lakkala* examine the use of virtual collaborative working and learning environments in two qualitative research methods seminars. The purpose of the courses was the collaborative conceptual mapping of qualitative methods. *Antti Leino* describes his experiences of teaching computer usability in the Second Life -environment. He points out the possible risks of using unfamiliar teaching tools, such as making technical, social and pedagogical mistakes.

The fifth section, *Extensions of blended learning,* includes two articles. *Lea Kuusilehto* and *Päivi Kananen* write about the use of blended learning in the international Master's Degree Programme in Educational Leadership. The authors discuss how to build a community of learners with a dialogical dimension from participants who are initially total strangers. *Helena Forsman* introduces a concept in which the innovation projects of small enterprises were used to create entrepreneurial learning challenges for university students. Her article offers ideas on how virtual environments can support the learning process of students and the innovation development process of enterprises, as well as examples for assessing entrepreneurial learning.

BLENDED LEARNING AND COMMUNITY

DESIGNING FOR A BLENDED COMMUNITY OF INQUIRY

Norman Vaughan

Introduction

The idea of blending different learning experiences has been in existence ever since humans started thinking about teaching (Williams, 2003). What has recently brought this term into the limelight is the infusion of web-based technologies into the learning and teaching process (Clark, 2003). These technologies have created new opportunities for students to interact with course concepts, their peers, faculty, and external experts in university courses and programs. This article describes blended learning environments in higher education and how the Community of Inquiry (CoI) framework (Garrison, Anderson & Archer, 2001) can be used to design blended learning courses and programs.

Blended Learning

Blended learning is often defined as the combination of face-to-face and online learning (Williams, 2002). Ron Bleed, the former Vice Chancellor of Information Technologies at Maricopa College, argues that this is not a sufficient definition for blended learning as it simply implies “bolting” technology onto a traditional course, using technology as an add-on to teach a difficult concept or adding supplemental information. He suggests that instead, blended learning should be viewed as an opportunity to redesign the way that courses are developed, scheduled and delivered in higher education through a combination of physical and virtual instruction, “bricks and clicks” (Bleed, 2001). The goal of these redesigned courses should be to join the best features of in-class teaching with the best features of online learning to promote active, self-directed learning opportunities for students with added flexibility (Garnham & Kaleta, 2002). This sentiment is echoed by Garrison and Vaughan (2008) who state that

"blended learning is the organic integration of thoughtfully selected and complementary face-to-face and online approaches and technologies" (p.148) (Figure 1). A survey of e-learning activity by Arabasz, Boggs & Baker (2003) found that 80 percent of all higher education institutions and 93 percent of doctoral institutions offer hybrid or blended learning courses (p.2).

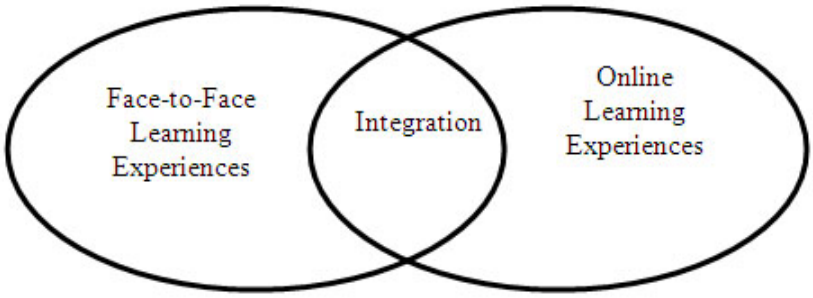


Figure 1. Campus-based blended learning approach

With the development and growth of web-based synchronous communication tools Power (2008) argues that a campus-based definition of blended learning needs to be expanded. He has coined the term Blended Online Learning Design (BOLD) to describe the simultaneous and complimentary integration and implementation of an asynchronous-mode learning environment (e.g., a course management system, or CMS) and a synchronous desktop conferencing environment (e.g., virtual classroom) (Power, 2008). Figure 2 illustrates the distinction between campus-based and blended online learning environments.

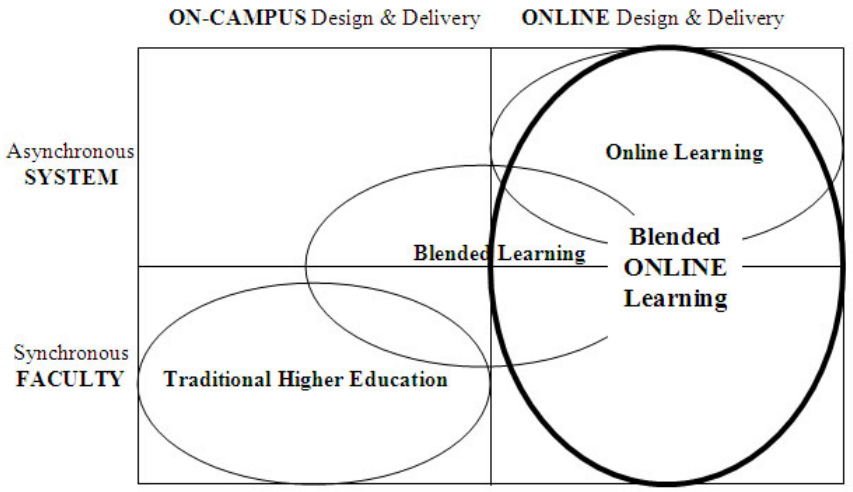


Figure 2. Blended online learning environment

Campus-based environments have their roots in traditional higher education systems where classes have been delivered by faculty in synchronous lecture settings. Initially, blended learning has been used to complement these synchronous lectures through the use of asynchronous discussion forums and learning management systems such as Blackboard and Web CT. With the advent of synchronous tools, such as Elluminate Live! and Adobe Connect, opportunities have been created to provide students at a distance with both synchronous and asynchronous communication possibilities.

Community of Inquiry Framework

John Dewey, the American educational philosopher, suggested in his book *Democracy in Education* (1916) that the development of community is essential to a successful educational experience and that community is created through meaningful association, which is based on common interest and endeavor. He further stated that the essence of community is meaningful communication and dialogue. The Community of Inquiry (CoI) framework developed by Garrison, Anderson and Archer (2001) has been instrumental in helping researchers and practitioners appreciate the

core elements of online learning and what it takes to create and sustain collaborative communities in blended learning environments. The CoI is a generic framework that directs attention to the process of constructing and confirming deep understanding. The three main elements of the CoI framework are social presence, cognitive presence, and teaching presence. Each of these elements and their overlap must be considered in the design and delivery of blended learning activities and outcomes.

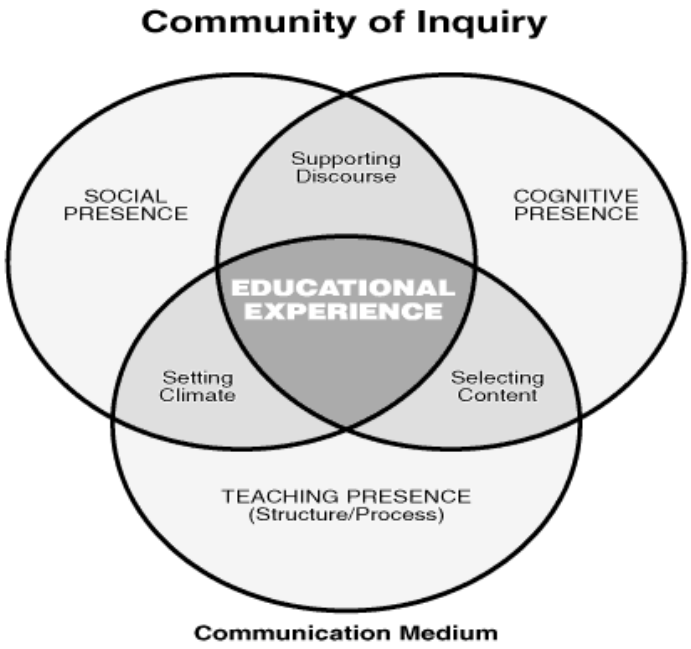


Figure 3. Community of Inquiry Framework (Garrison, Anderson & Archer, 2001)

Social presence is defined as the ability of participants to identify with the interests of the community (e.g., the course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of participants projecting their individual personalities. The CoI framework is about deep and meaningful learning experiences operationalized through cognitive presence. Cognitive presence is defined in terms of a practical inquiry approach. Practical inquiry represents phases (problem identification, exploration, integration, and resolution) of a colla-

borative-constructive educational experience. The final element, teaching presence, provides the leadership that focuses and sustains a productive collaborative community. Teaching presence is responsible for the design, facilitation, and direction of the educational experience.

Designing Blended Learning Courses and Programs

Communities of inquiry are places where all voices can be heard while testing and rejecting unproductive contributions. Historically, this has been the ideal of all learning environments in higher education. In order to help achieve this ideal, the CoI framework can be used to design blended learning courses and programs. This framework is based on an inquiry approach to learning. Inquiry learning is problem or question–driven learning involving critical discourse, self–direction, research methods, and reflection throughout the learning experience. This process is outlined in the four phases Garrison, Anderson & Archer's (2001) Practical Inquiry model.

Table 1. Practical inquiry phases

Description	Category/Phase	Indicators
The extent to which learners are able to construct and confirm meaning through sustained reflection, discourse, and application within a critical community of inquiry.	1. Triggering event	1. Inciting curiosity and defining key questions or issues for investigation
	2. Exploration	2. Exchanging and exploring perspectives and information resources with other learners
	3. Integration	3. Connecting ideas through reflection
	4. Resolution/ application	4. Applying new ideas and/or defending solutions

Interactive learning technologies, such as Web 2.0 applications, can be used to support communities of inquiry by helping students actively en-

gage in deep and meaningful learning experiences. For example, social bookmarking applications can be used to share personal collections of web-based resources to complete group projects. Blogs can facilitate student self-reflection and peer review of course assignments. Students can use wikis to collaboratively summarize course discussions, refine research papers or even co-create online books. Social networking applications, such as FaceBook and MySpace, can be used to extend the boundaries of the classroom to create online communities and discussions/debates that include past students, potential employers and subject matter experts. Audio, graphic and video files can now be created and shared through social media applications such as Podomatic, Flikr and YouTube. These files and other data sources can then be recombined to create new meaning and interpretations by using mashup applications such as Intel's Mash Maker and MIT's Piggy Bank. Synchronous technologies such as Skype and Elluminate Live! allow students to communicate and collaborate outside of the classroom. Moreover, virtual world applications such as Second Life provide opportunities for rich synchronous interaction in 3-D immersive worlds to support collaborative and creative project-based work.

A blended learning course or program can be intentionally designed to use Web 2.0 applications to support the progression of inquiry through to resolution and/or application. This educational design consists of four inter-connected phases:

1. Before a synchronous session
2. Synchronous session
3. After a synchronous session
4. Preparation for the next synchronous session

Before a Synchronous Session

The first phase involves the use of communication and information technologies in advance of a synchronous session to 'plant the seeds' for triggering events that will then be more thoroughly defined within the actual synchronous session. Ausubel (1968) refers to these as "advance orga-

nizers" or anchoring events that provide entry points for connecting new information with the recall of prior related learning experiences. There are a variety of learning activities and related online tools that can be used to support this phase. They include the use of web-based readings with an accompanying online survey, quiz or discussion forum. This activity and several other examples are provided in Table 2.

Table 2. Design considerations before a synchronous session

Nature of Inquiry	Learning Activities	Web 2.0 Tools
Learner • Create a *triggering event* • Advanced organizer • Stimulate connections Teacher • Determine learner's prior knowledge or experience with the topic or issue	a) Reading/Writing • Pre-reading assignment or activity on a specified topic or issue • Followed by a self assessment quiz, survey or discussion forum b) Listening/Writing • Auditory/visual presentation of information • Followed by a self assessment quiz, survey or discussion forum activity	i) Communication • Announcement sent to students via a learning management system (e.g., Blackboard) or an RSS feed through a Social Networking Tool (e.g., Facebook) or News Aggregator Application (e.g., Bloglines) ii) Posting or linking to pre-reading assignments • Social Bookmarking Tools (e.g., Del.icio.us, Edtags) iii) Digital learning objects • Podcasts (e.g., Podomatic) • PowerPoints (e.g., Slideshare) • Videos (e.g., YouTube) iv) Self assessment quizzes • Assessment tools (e.g., Moodle) v) Anonymous surveys • Survey Tools (e.g., getfast.ca) vi) Discussion Forum • Pre-class online discussion regarding questions and issue related to the required reading (e.g., Facebook, Ning)

The first priority is to establish online communication with the learners so that they are clear about the rationale and expectations for the pre-session assignments. This communication can be facilitated through a weekly course announcement, which can be transmitted through a course management system (e.g., Blackboard) or via an RSS feed to a social network such as Facebook or a news aggregator application like Bloglines.

Teachers often require students to participate in a reading activity before a synchronous session. Traditionally, this activity involved a reading from the course textbook. Online library resources and social bookmarking systems such as Del.icio.us and Edtags can now be used to provide students with access to relevant and engaging web-based articles and resources. Some instructors also require students to find their own course related articles and then post these resources to a social bookmarking network so that all members of the class can access and comment on these web sites.

In addition, digital audio and video tools can be used to communicate with students before a synchronous event. For example, faculty can use podcasts (e.g., Podomatic), narrated PowerPoint presentations (e.g., Slideshare, Adobe Presenter) or video (e.g., YouTube) to communicate course concepts, scenarios and case studies with students. The advantage of using these type of learning objects are that they allow students to listen and view course-related material at their own pace and as often as required to gain understanding.

Despite the ability to access learning material in a variety of formats there still exists the challenge of getting students to meaningfully engage in these pre-session activities. Novak, Patterson, Gavrin and Christian (1999) have used a survey or quiz tool to create triggering events for students in advance of a synchronous session. They have coined the term Just-in-Time Teaching (JiTT) to describe the process of getting students to read a textbook chapter or web-based article and then respond to an online survey or quiz, shortly before a class. The instructor then reviews the student submissions ‘just in time’ to adjust the synchronous session in

order to address the students' needs, identified by the survey or quiz results. A typical survey or quiz consists of four concept-based questions with the final question asking students: "What did you not understand about the required reading and what would you like me [the instructor] to focus on within the next synchronous session?" An alternative to this activity would be to construct an online discussion forum in a course management system or social networking application like Facebook to allow students to post questions or issues related to the pre-session reading. This can be a powerful learning forum as students are able to read and respond to each other's questions in advance of the synchronous session.

During a Synchronous Session

The second phase of a blended inquiry cycle involves a synchronous session where communication and information technologies can be used to define the triggering event(s), provide opportunities for exploration and create a first step towards the integration phase. These sessions can be facilitated through the use of web-based synchronous communication systems such as Elluminate Live! or Adobe Connect. The focus of these sessions should not be on information transmission such as lecturing, but instead, be used to diagnose student misconceptions, foster critical dialogue, and support peer instruction. Table 3 outlines several synchronous learning activities that can be supported with various online tools. These activities are further described in the subsequent paragraphs.

Table 3. Design considerations during a synchronous session

Nature of Inquiry	Learning Activities	Web 2.0 Tools
• Defining the *triggering events* (key questions) • Beginning to *explore* the questions	a) Talking/Listening • Dialogue with teacher and fellow learners about the specified issue or topic • Mini-lecture and/or tutorial to address the results of the pre-class quiz or survey • Large or small group discussion or activity • Case study • Initiation of an individual or group project	i) Displaying quiz or survey results • In a synchronous communication system (i.e. Elluminate Live! or Adobe Connect) ii) Conducting synchronous quizzes and surveys to promote dialogue and small group work • Survey tool and break-out room features (e.g., Elluminate Live! or Adobe Connect) iii) Displaying digital learning objects and resources • Using social media sharing sites (e.g., Flikr, Slideshare, YouTube) and repositories such as merlot.org iv) Displaying assignments • Course blogs or wikis can be used to post assignment handouts, tutorials, resources and links to examples of previous student work

If a survey, quiz or online discussion forum has been used to support an assigned reading, then the synchronous session will often begin with a debriefing of this activity. Anonymous survey or quiz results can be uploaded to a synchronous communication application such as Elluminate Live! The ensuing debate helps to clearly define the triggering event and allows members of the class to begin sharing and comparing their perspectives and experiences related to the question or issue.

Digital learning objects, such as interactive demand and supply curves for economic principles, can also be accessed and discussed during the synchronous session to help students visualize and understand the relation-

ships between key course concepts. These learning objects can be retrieved from social media sharing applications (e.g., Flikr, Slideshare and YouTube) or from repositories such as MERLOT (Multimedia Educational Repository for Learning Online Teaching). Links to these objects can be made from a course web site, blog or wiki in order to allow students to manipulate and review these learning resources after the synchronous session.

Discussion and debate can be facilitated synchronously online through the use of the quiz and break-out room features in many synchronous communication applications. Crouch and Mazur (2001) describe how synchronous quizzes can be used to support a form of peer instruction. The process begins with the teacher posing a question or problem. The students initially work individually toward a solution and 'vote' on what they believe is the correct answer by selecting the desired response in an online pole The results are then projected for the entire class to view. For a good question, there is usually a broad range of responses. Students are then required to compare and discuss their solutions online in a break out room in order to come to a consensus. Another 'vote' is taken but this time only one response per group can be utilized. In most circumstances, the range of responses decreases and usually centers around the correct answer. An alternative to this process is to have groups of students generate the quiz questions in advance of the synchronous event.

Synchronous sessions also provide a good opportunity to initiate and clarify individual or group projects. To help students understand the expectations for these assignments, previous student work can be displayed and critiqued. Students can then either develop or use a pre-existing assessment rubric to review examples of past coursework. Similar to digital learning objects, these previous assignments can be linked to the course web-site, blog or wiki so that students have access to this material after the synchronous session.

The synchronous session should conclude with a discussion that establishes student responsibilities and action items. This discussion can also be combined with a web-based anonymous exit survey, which asks students to state what they learned during the session and what they are still

unclear about. This closing discussion and survey helps students begin to integrate the new information received during the session with their prior learning experience. The survey data collected also provides valuable feedback for the teacher in terms of planning future synchronous sessions and activities.

Between Synchronous Sessions

The use of communication and information technologies between the synchronous sessions provides opportunities for the students to further explore and reflect on course-related activities. This phase begins with the use of a course web-site, blog or wiki, to post a summary and a list of follow-up items from the synchronous session. An RSS feed can be used to "push" this announcement out to students through a social networking system but it is also recommended that this summary be composed in a word processing document so that it can be copied and pasted as a group email message to the students. Sreebny (2007) states that "Email is still the most widely used collaboration tool in the world" (p.3). An overview of how online learning technologies can be used to support a series of reflective learning activities is provided within Table 4. Each of these activities is then discussed in the accompanying paragraphs.

Table 4. Design considerations after a synchronous session

Nature of Inquiry	Learning Activities	Web 2.0 Tools
• Further *exploration* towards *tentative integration* with the ability to connect theory to practice application	a) Reading/Writing • Anonymous class exit survey • What did you learn from the class session? • What are you still unclear about? • Online discussion with student moderation b) Talking/Listening + Reading/Writing	i) Anonymous surveys • Survey tools (e.g., getfast.ca) ii) Communication • Announcement section of a course web-site, blog or wiki for student "to do" list • Group email for the student "to do" list • Email for individual student questions or clarification (try to put common questions into a Frequently Asked Questions

	• Individual or group project work, case studies **Preparation for next class** a) Reading/Writing • Pre-class reading assignment or activity on a specified topic or issue • Followed by a self assessment quiz, survey or discussion forum	discussion forum) • Online discussion forums in social networking systems (e.g., Facebook) to facilitate student moderated discussions • Synchronous communication tools (e.g., Elluminate Live!, Second Life) for working sessions among student groups iii) Individual and Group Project Work • Study groups within course management systems (e.g., Blackboard) and social networking systems (i.e. MySpace, Ning) • Blogs for reflective journaling (e.g., Blogger) • Wikis for collaborative writing projects (e.g., Wikispaces) • Mashup tools for data analysis and representation of collaborative projects (e.g., Intel's Mash Maker)

In terms of communication, students can email the instructor for individual questions or clarification of assignments but it is recommended that a "Frequently Asked Questions" online discussion forum be created within a learning management system (i.e. Blackboard) or social networking system (i.e. Facebook). Students can then share in the responsibility of answering questions and problem solving course-related issues. Online discussion forums can be used to promote individual reflection and critical dialogue between the synchronous sessions. For example, a series of online discussion forums can be created by the instructor related to the key modules/topics for the course. Groups of students (three to five) then select a module based on course readings, previous experience and/or interest in the topic. Each group is responsible for moderating and summarizing their selected online discussion for a set period of time (often one or two weeks). Garrison, Anderson and Archer's (2001) practical inquiry model can be used to help frame these summaries. For example:

- Triggering event – What were the key questions discussed this week?
- Exploration – What opportunities and challenges (e.g., pros and cons) related to the discussion topic were identified?
- Integration – What were the connections between the discussion and the core concepts/learning outcomes for our course?
- Resolution/Application – What are the "take-aways" from this discussion (e.g., recommendations, application to future practice, lessons learned)?
- Key resources (e.g., web sites, articles, books) that we could use to find further information/ideas about this topic?

An online collaborative writing tool such as a wiki can then be used to make draft notes and a final summary (synthesis and analysis) of the online discussion based on these questions or additional guidelines that are co-created by the students and the teacher.

Online journals such as blogs can be used to support self-reflection and peer review of course assignments allowing students to take a deeper approach to their learning by going "public" with their work (Vaughan, 2008). At the beginning of the semester, the teacher can require each student to create their own blog. Once an assignment has been completed and the student has received assessment feedback they then post responses to questions such as the following on their blogs:

- What did you learn in the process of completing this assignment?
- How will you apply what you learned from this assignment to the next class assignment, other courses and/or your career?

A peer review process can also be supported through the use of blogs. Students can post drafts of course assignments to their blogs and then their peers can review these documents and post comments to the author's blog. Guiding questions for this peer review process could include:

- What did you learn from reviewing this document?
- What were the strengths (e.g., content, writing style, format and structure) of the document?

- What constructive advice and/or recommendations could you provide for improving the quality of this document?

A common complaint from students about group work is the lack of time and the difficulty in arranging meetings between the synchronous sessions. Synchronous communication systems and virtual world applications (e.g., Second Life) can be utilized to overcome this challenge. These tools allow students to participate in 'real-time' online group meetings over the Internet. For example, Elluminate Live! allows students to use a whiteboard to brainstorm ideas; a common web browser to explore and review web sites; and share desktop applications such as word processors, spreadsheets, graphics software to create and revise documents together. Students can also use these applications to synchronously access Mashup tools such as Intel's Mash Maker and MIT's Piggy Bank in order to analyze and visually represent project data. In addition, virtual worlds such as Second Life allow learners to collaborate on project work in rich 3-D immersive environments.

Toward the end of this phase a new, related inquiry based learning assignment can be introduced via the posting of another web-based reading and survey/quiz. This pre-session assignment should be designed to help students synthesize their learning from the current activity and prepare for the subsequent synchronous session.

Next Synchronous Session

In the next synchronous session, communication and information technologies continue to play a key role in helping students 'close the loop' between the asynchronous and synchronous components of a blended learning course. Table 5 describes the type of learning activities that can be used to help students achieve a sense of resolution and/or application to a course related inquiry cycle.

Table 5. Design considerations for the next synchronous session

Nature of Inquiry	Learning Activities	Web 2.0 Tools
• *Resolution/ Application*	a) Talking/Listening/Writing • Review of online discussion activities • Individual or group presentations • Final group thoughts on the topic or issue • Initiation of dialogue on the next topic or issue	i) Display quiz or survey results • In a synchronous communication system (e.g., Elluminate Live! or Horizon Wimba) ii) Display of online discussion forum • Online discussion forums within course management system (e.g., Blackboard) or social networking systems (e.g., Facebook) iii)Display assignments and student work • Links to student blogs and wikis

This process can be facilitated with a class discussion at the beginning of the synchronous session. The inquiry phases of integration and tentative resolution are addressed by first reviewing the results of the anonymous exit survey from the last synchronous session and then discussing any student questions or concerns raised from this survey. If there was an online discussion between the synchronous sessions, the student moderators or the teacher can provide an oral summary or some reflections about the discussion. Students can also be invited to demonstrate assignments 'in-progress'. These types of activities help to clarify assignment expectations and consolidate student learning within the course. The inquiry cycle concludes with a brief 'wrap-up' discussion, including final thoughts or comments, and then moves onto the next related question or topic that in turn triggers the next related inquiry based learning activity.

Future Trends

Predicting the future of blended learning in higher education is difficult as technology and its possible applications continue to evolve at a rapid pace. There does appear to be three identifiable trends that will most likely continue to shape educational practice in the near future. The first and perhaps most significant is the recognition that through the adoption of Web 2.0 technologies blended communities of inquiry can be created and sustained over time and place. This makes possible what Brown and Adler (2008) refer to as "learning 2.0." They state, "… communities are harbingers of the emergence of a new form of technology-enhanced learning – learning 2.0 – which goes beyond providing free access to traditional course materials and educational tools and creates a participatory architecture for supporting communities of learners" (p. 28).

The second trend is the adoption of collaborative approaches to teaching and learning in blended environments. This goes beyond simple interaction and sharing of information. It represents a purposeful partnering to solve relevant problems. It provides an environment to test conceptions and validate personally constructed knowledge. The third blended learning trend is that of a diversity of educational purposes, approaches and audience. While one can identify trends and even principles of practice, the decentralization of the teaching and learning process will inevitably lead to greater diversity and opportunities to learn. This choice of what and how to learn can only be a positive for educators and students.

As opportunities for interaction and collaboration increases in blended learning environments through the proliferation of Web 2.0 tools, more pressure will be placed on educational institutions to adopt collaborative-constructivist approaches that engage learners in communities of inquiry. Collaborative learning goes beyond passively sharing information. For this reason, blended approaches will have a transformative influence in both formal and informal learning environments.

Conclusion

The historical ideal of higher education has been to learn in collaborative communities of inquiry. This article has demonstrated the potential of designing blended learning courses and programs to recapture this vision, even in large, introductory undergraduate courses. The key is to redesign our courses for active and collaborative learning experiences that enable students to take responsibility for their learning and validate their understanding through discourse and debate with their peers.

References

Arabasz, P., Boggs, R. & Baker, M. B. (2003). Highlights of e-learning support practices. *Educause Center for Applied Research Bulletin*, 9.

Ausubel, D.P. (1968). *Educational psychology: A cognitive view*. New York: Holt, Rinehart and Winston.

Bleed, R. (2001). A hybrid campus for a new millennium. *Educause Review*, 36 (1). 16-24.

Brown, J. S. & Adler, R. P. (2008). Minds on fire: Open education, the long tail, and learning 2.0. *EDUCAUSE Review*, 17-32.

Clark, D. (2003). Blend it like Beckham*. Epic Group PLC.* [Online] Available: http://www.epic.co.uk/content/resources/white_papers/blended.htm.

Crouch, C.H. & Mazur, E. (2001). Peer instruction: Ten years of experience and results. *American Journal of Physics*, 69, 970-977.

Dewey, J. (1916). *Democracy and education*. New York: Macmillan.

Garnham, C. & Kaleta, R. (2002). Introduction to hybrid courses. *Teaching with Technology Today,* 8 (6). [Online]. Available: http://www.uwsa.edu/ttt/articles/garnham.htm.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15 (1), 17-23.

Garrison, D. R., & Vaughan, N.D. (2008). *Blended learning in higher education*. San Francisco: Jossey-Bass.

Novak, G.M., Patterson, E.T., Gavrin, A.D. and Christian, W. (1999). *Just-In-Time teaching: Blending active learning with web technology*. New Jersey: Prentice Hall Series in Educational Innovation.

Power, M. (2008). The emergence of a blended online learning environment**.** *MERLOT Journal of Online Learning and Teaching*, 4 (4), 503-514. Available online at: http://jolt.merlot.org/vol4no4/power_1208.pdf.

Sreebny, O. (2007, January 16). Digital rendezvous: Social software in higher education. *EDUCAUSE Centre for Applied Research Bulletin*, Issue 2.

Vaughan, N.D. (2008). The use of wikis and weblogs to support deep approaches to learning. *The University College of Fraser Valley Research Review*, 1(3); 47-60.

Williams, J. (2003). Blending into the background. *E-Learning Age Magazine*, 1.

Williams, C. (2002). Learning on-line: A review of recent literature in a rapidly expanding field. *Journal of Further and Higher Education*, 26(3), 263-272.

A SUCCESSFUL LEARNING COMMUNITY

Challenges and pedagogical solutions

Eila Lindfors

Introduction

In all kinds of societies everyday functions in working life, in education and in private life nowadays require new kinds of competencies including independent knowledge acquisition and application, problem solving and especially skills in working collaboratively and virtually or even in face-to-face collaboration in global groups and teams constituting learning communities. Therefore, one of the basic requirements in the future will be to teach people how to participate in a networked, information society in which the innovative use of knowledge is the most critical resource for social and economic development. Team work and collaboration are preconditions for sharing knowledge and innovating new ideas (Lindfors 2009b; Maznevski & Chudoba 2000).

The use of information and communication technologies (ICT) is commonplace action in most schools and universities in Europe. National projects (e. g. Evälä 2007; Tenhula 2007) as well as international projects (e.g. FISTE 2004-2007) try to promote the computer supported collaborative learning (CSCL). Internet and social media have challenged students and educators to find new ways of learning and teaching. There are many kinds of open and distance learning courses available in every country. However, usually pupils, students and teachers use ICT individually on their own (Anttonen & al. 2006). The work which used to be done with pen and paper individually at school or at home has moved into the Internet. In contrast to this the latest learning research results highlight shared work and collaboration among learners. Thus it is important to consider the use of ICT pedagogically and to try to understand how it is possible to promote collaborative work and learning. Without a learning community collaborative work and learning are not possible.

One idea in the pedagogical use of ICT is to avoid certain problems encountered in conventional teaching like availability of information and

knowledge as well as independence of time and place (Lakkala & Lipponen, 2004). The development of different learning platforms and social media has provided an opportunity to construct and to support collaboration in the web. Formal and informal virtual communities have become more and more popular as the technology has created new types of technical solutions. Social media, virtual platforms and virtual meeting rooms have been seen as places offering opportunities and facilities to share knowledge, ideas and expertise by discussing different issues in new kinds of learning communities likewise to learn new kinds of communication and information processing skills while participants are in virtual connection with each other (Bluemink & Järvelä 2004; Lipponen 2003). Productive collaborative learning situation can result an a more profound understanding and better results than a single learner could achieve individually (Barron 2003; Mäkitalo & al. 2004). Therefore collaborative learning is one of the current approaches in discussion on the quality of learning. Collaborative refers to a learning situation where a group of learners work jointly working towards a shared goal and try to understand and explain certain phenomena together.

The question raised in education in the midst of new technologies is how the use of ICT and especially the shared work of a learning community could promote innovative solutions in order to be able to promote high level collaborative learning. The technology itself will not do this. To further the discussion on the pedagogical use of ICT the learning community is in the focus of this article. The learning community as a concept is presented in the light of earlier research. The challenges and solutions of the successful learning community are discussed on the basis of three case studies (Lindfors 2007a; Lindfors 2007b; Vuopala, Hamalainen & Lindfors 2007). The challenges are considered from a participant's point of view. Solutions, especially pedagogical ones are considered from the perspectives of teachers and tutors.

The learning community

Learning communities can be formed in formal organizations like businesses, schools and universities or individuals may join them voluntarily to be able to achieve some goal or objective of their own. To form learning communities is an everyday action locally, nationally and globally in different sectors of society in this age. One goal is to share ideas and combine expertise in learning activities as well as in work. The earlier research (Nevgi & Tirri, 2003; Pulkkinen, 2007; Barron, 2003; Lipponen, 2003; Salovaara & Järvelä, 2003) has recognized and enumerated the problems of learning communities such as the ability of an individual participant to act as a member of the learning community and the quality of collaborative discussions.

New technology makes it possible for people to join learning communities all around the world regardless of time and place. A learning community is defined here as a group of people in an educational or working context who are trying to achieve some shared goals as a team and are actively engaged in learning with and from each other. Collaboration is seen as a combination of substance knowledge and social knowledge and actions enabling the completion of a common task (Barron 2003; Mäkitalo 2006). This means that a person as a participant of the learning community has to understand how to work together with others and with the substance of learning and also to do this in practice. From the perspectives of learning and teaching it is relevant to ask what the preconditions for the learning community are in order to obtain high level results. Preconditions are understood here as dimensions which are important or essential for achieving and enabling certain things. When a learning community works virtually it constitutes a virtual learning community. Technology itself offers opportunities for CSCL learning but it does not guarantee high level learning results on its own (Vannatta 2007; Winn 2002).

The research has shown that web-based collaboration can create new learning cultures (Barron, 2000) even if the work done is asynchronous and without immediate feedback (Järvelä, & Häkkinen, 2002). More recent research tells us that CSCL can support high level learning by bring-

ing about profound understanding and knowledge construction (Lindfors 2007a). On the basis of the research results web-based learning communities seem to be one way to enhance learning. It has been shown that CSCL exerts an influence on learning, on thinking processes, on collaborative work and on motivation (Lindfors 2007a; Pulkkinen 2007; Salovaara & Järvelä 2003). CSCL can support high level learning by profound understanding and knowledge construction.

Even though CSCL creates new opportunities it entails many challenges. There are new issues to be taken care of: the cultural background, habits of studying and working, understanding the concepts, skills of using new information and communication technology, time resources allocated for the collaboration, etc. (Nevgi & Tirri 2003; Pulkkinen 2007). It has been reported that over a half of the members of a global learning community recognized the scope for collaboration, the aims of collaboration and the awareness of the process of collaboration (Leinonen & al. 2005). Despite these results it is not so self-evident that participants as individuals form a coherent learning community or that by engaging in collaboration the community can achieve high level results. There are problems with the levels and intensity of discussions and the levels of participation (Barron 2003; Lipponen 2003; Salovaara & Järvelä 2003).

It is essential for the learning community to have a common interest in sharing some ideas or a common goal to be achieved. In order to achieve the goals in virtual collaboration participants have to interpret the web-based learning situations and regulate their emotions and volitional processes to help themselves to complete the tasks needed (Leinonen & al. 2005). Reciprocal understanding is needed (Järvelä & Häkkinen 2002). From the participants' point of view there is a need to know the substance of the task, to regulate and to understand the steps that are needed to complete the task as well as to understand how the learning community should work and how the participant by himself/herself can support the community. On the basis of the research students or workers acting together with others need to be skilled in understanding the social context of the learning community while they must take steps to complete the substance task.

The case studies as examples

The first two case studies are presented as examples of learning communities. The focus of these studies was to use the written evaluation texts of the participants and tutors, as research data and to try to identify features which could be seen as preconditions for a successful learning community. These studies were concerned with of the virtual learning communities.

The written evaluation notes were analysed by content analysis (see Krippendorff 2004) The evaluation notes were read several times in order to code them into manageable content categories. The main idea was not to identify any frequencies of different dimensions. Instead the focus was on trying to find some dimensions which the participants as learning community members found it important to comment on. It was assumed that participants and tutors would mention in their written evaluation comments those dimensions they found important in working successfully in a learning community.

The process of coding was basically one of selective reduction and the texts were reduced to category elements. Category elements were first clustered into sub-categories. Sub-categories were abstracted into content categories. The research method can be seen as data based content analysis (Tuomi & Sarjärvi 2003) with inductive elements. By breaking down the contents of the texts into meaningful and pertinent units of information, certain characteristics could be analysed and further interpreted.

The third case study is a part of a larger study on computer supported collaborative learning. The focus of this case study is tutoring.

Case I: student teachers as knowledge creators

In this study (Lindfors 2007a) the learning community was a group of student teachers. There were 19 students in a course entitled Introduction to Textiles, Clothing and Craft Design Studies (3 ECTs). The students attended lectures at a university after which each of them wrote a short abstract based on the craft design studies. Students were guided to down-

load abstracts in the platform and to read some of them to start a discussion in discussion groups. There were three discussion groups in the platform with about six student teachers in each group.

The student teachers started the discussion with ideas gained from the abstracts. They were asked to join the discussion three times a week. After a first discussion message students were asked to continue the discussion by reading others' messages and developing the ideas further. Some of the messages were short and some of them were quite long. Four to five written messages were sent by each student which was one or two more than students were supposed to do. This means that the students were very active in the platform discussion. After the discussion the student teachers wrote up evaluation notes of their participation in the learning community.

Case II: European in-service teachers learning community

In this study (Lindfors 2007b) the learning community was a group of teachers (N=56) who participated voluntarily in an ECSUT-course entitled Educational Challenges and Solutions in Using ICT". The ECSUT aimed to introduce the European teachers to new opportunities and ideas for using ICT pedagogically in teaching, to offer them opportunities to share their experiences and good pedagogical practices and also to encourage them to consider the meaning of collaboration in teaching and learning. This learning community was acting in the frame of a FISTE-project (A Future In-Service Teacher training across Europe) under the aspices of European Socrates Comenius 2.1. projects.

Part of the course was discussion in the platform in which teachers from different European countries participated. The teachers were divided into 5 groups which were tutored by 6 teacher educators from different European countries. There were teachers and tutors from the north, south, west and east of Europe, actually from 10 European countries. The topic was the challenges of using ICT in teachers' everyday work on the basis of their experiences and the new knowledge they had gained. New knowledge for creating new ideas was offered in the project's database which includes research articles about the technological and pedagogical use of

ICT. Participants were supposed to join the discussion over a period of three weeks. The tutors tried to promote multiple interactions among the participants.

After the discussions both the participants and the tutors made evaluation notes and comments regarding the discussion they had taken part in. The participants and the tutors did not know each other and the participants from all over the Europe met only in the platform.

Case III: Tutoring in international course on computer supported collaborative learning

In this study (Vuopala, Hämäläinen & Lindfors 2007) the learning community was a fairly large group (N=100) of higher-education students in the computer-based learning context. The data was collected from an international virtual course international web-based course "CSCL - Computer Supported Collaborative Learning". The students had different kinds of tasks and discussion in the platform. Tutors guided the students during the course. The students were asked to keep a diary during the CSCL course. They had to reflect their learning and studying during the course. They wrote up their diaries after each visit to the platform. The focus in analysing the data was to find out what kind of tutoring is needed in web-courses in order to support and enhance collaborative learning?

The challenges of a learning community

The key element for the successful learning community is collaboration. There must be some target outcomes so that it is worthwhile for the participants to participate. The case studies reported show very clearly that technology offers opportunities for learning communities but does not guarantee successful collaboration. Without collaboration there is no learning community. To be a member of a learning community and to create collaboration it is essential to understand the preconditions of successful collaboration.

From the participant's point of view it is important to consider the real prospects of joining in the work of a learning community (Lindfors 2007b:

2009a). In the virtual learning community technical solutions either enable or prevent participants' participation. In the European data (case II; Lindfors 2007c) the participants could not join the community due to lack of computers, slow or only occasionally working Internet connections or poor usability of other technical solutions.

The interest in joining and the previous experience of participation seem to be absolutely crucial elements in learning communities. In the studies reported the student teachers and practicing teachers were not very experienced in virtual collaboration and / or they had negative earlier experiences. If participants do not know what they are supposed to do they feel insecure and they cannot be creative members of the learning community even if they are interested in the topic of the collaborative work. Positive prior experiences create routines for joining and are also helpful when planning the intensity of the work (Lindfors 2009a).

In face-to-face situations there is a certain time and a place for collaboration. In virtual collaboration the typical features are the availability of information and knowledge as well as the independence of time and place. There is no common timetable for doing things. The idea is that everybody can join the learning community whenever it is convenient. This means that a participant himself has to make a timetable and keep to it to be able to accomplish the required tasks. The intensity and the amount of work the participant is willing and able to contribute seem to be important (case I and II). With the help of good instructions or pedagogical scripts (see below) participants can plan their work intensity and adjust it on given tasks. At the same some participants (case I and II) may not want to use their time for sharing. Some participants only want to get the task done quickly without any interference from others. These participants are not interested in the content of learning. They simply want to finish the tasks and the courses as soon as possible.

In the case studies most participants highlighted collaborative issues. The sharing itself seemed to have special meaning for the participants. Participants reported exchanging ideas and gaining other perspectives. They pointed out the importance of other participants' ideas in sharing and con-

structing new knowledge. The social context of sharing gave new perspectives.

There are no learning communities without participants, without a task, without technology or without collaboration. From participant's point of view there are at least four types on preconditions (Lindfors 2007b) to be fulfilled to make it possible for a participant to join: 1) the technological preconditions, 2) the participation preconditions, 3) the pedagogical preconditions and 4) the collaboration preconditions. The technology itself with all its dimensions and restrictions plays an important role in virtual learning communities. It has to be easy to use, not too difficult or too slow to frustrate participants. Participants must be interested in joining, have time and be willing to invest some effort as a part of the learning community. The pedagogical solution itself seems to promote and inspire the shared work and collaboration. If the preconditions are considered and fulfilled we could assume that the learning community will be quite successful in its work. Therefore the solutions to the challenges have to be considered as a pedagogical question.

Pedagogical solutions to support a learning community

A pedagogical goal in constructing and supporting the learning community is to promote fruitful and multiple interactions among participants (Häkkinen & al. 2000; Mäkitalo 2006; Mäkitalo & al. 2004). If the set goals are to be achieved by a collaborative task it means that collaboration makes it more challenging than it would be as an individual work. If collaboration is not expected to give some new dimensions the task is pointless. It is evident that without support and guidance there will be no collaborative learning community (Salomon & Perkins 1998). Participants seem to have special pedagogical needs to be able to join the collaborative work. It is a real challenge for a teacher to organize and tutor the virtual learning community.

The technical and pedagogical solutions create a basis for collaboration. The pedagogical solution as a whole seems to create opportunities for the participants. Some pedagogical details seem to encourage participants in

their efforts. (Lindfors 2007a; 2007b.) The technology itself is only the way to join a virtual learning community. However the technological solutions create the basic options. Some technical details, like internet connections, may even inhibit the joining the community. Entering and using the platform may be difficult if the usability of a technical solution, e.g. navigation in the platform is poor. Sufficient resources in the form of knowledge and equipment are essential. In the case studies participants commented the technological issues actively even if they did not request help with them.

Tutoring in a technology- based learning environment is a situated, dynamic and fluid process of meaning negotiation (Vuopala, Hämäläinen & Lindfors 2007). In their study Ligorio, Talamo, & Simons (2007) distinguished four different functions of tutoring in virtual space: 1) pedagogical (attempts to sustain the content learning process), 2) social (attempts to support interpersonal and social relationships by considering personal needs, requests, feelings and other expressions), 3) managerial (attempts to keep a certain course/ learning activity in line within the general aims) and 4) technical (interventions related to different technical problems). Tutoring has to be different in different situations.

In all case studies (I, II, III) the tutor's role was considered essential for a successful learning community. The participants needed many kinds of support and encouragement to be able to accomplish tasks and to achieve the goals of co-work. The tutors tried to promote the collaboration by furthering the discussion with their comments but gave no input to the discussion. The support from the participants and tutors in promoting the community work was described as essential for collaboration.

Pedagogical tutoring in order to fulfill the requirements of the collaborative work in the learning community seemed to be important to the participants. Collaboration in learning communities is not easy. Participants are not accustomed working virtually as a coherent team. (Lindfors 2009a.) If the co-work is only a collection of participants' messages and ideas it will not realise the basic idea of sharing experiences and knowledge and taking them further. To be able to succeed in collaboration the participants need to know how to work as members of a community. Thus community work also needs to be supported as social activity. This means that a tutor

has to guide participants to act as members of the learning community. The tutor's role is to guide the collaboration and further reciprocal interaction among participants as well as to diminish their uncertainty about joining the collaboration (Leinonen ym. 2005; Ligorio, Talamo, & Simons 2007).

On the basis of the case studies it seems that the tutor also needs to guide the participants in the personal planning of operative actions during the collaboration. If participants cannot organize their timetables to be able to join they will easily drop out. The tutor has to make the connection between time and workload more visible. This is so-called managerial tutoring.

Tutoring is the responsibility of the teacher/tutor. The participants can ask help and they are usually encouraged to do so. However according to the case studies participants do not do this and despite the possibility to ask they may later complain about lack of help afterwards. This means that the tutor has to follow and to evaluate the collaboration and to offer help even if it is not specifically requested.

There is obviously more need for tutoring if the participants have little experience of learning community work. This can be done by scripts i.e. instructions and comments on how to proceed. The case studies reveal that scripts have at least two purposes. They can act as informative, encouraging and supportive messages from the tutor. At the same scripts and tutoring will teach participants of the learning community a new kind of learning culture. Without tutoring and scripts there is little likelihood that participants will become members of a successful learning community.

Learning community and blended learning

The presented case studies raised questions and taught lessons about face-to-face and virtual learning in building a successful learning community. Blended learning is seen as a mixture of face-to-face and computer supported collaborative learning. The technology systems can support and facilitate the group process and group dynamics of the learning community in ways that are not achievable by face-to-face interaction. Tech-

nology can connect persons worldwide synchronously or asynchronously. It provides opportunities and at the same time requires sharing ideas and building likewise developing a common understanding. It gives space for different personalities to be members of learning communities. In case study I students pointed out that they had enough time to think and reflect. Those participants especially who are not active in face-to-face situations may be very active in virtual work (Oshima & Oshima 2002). Virtual learning community offers the participant a quick way to react and conversely gives time to think and develop ideas of one's own before reacting. It challenges all the participants to join in. Everyone has to provide his own input. If a participant tries to be a silent member in the virtual learning community he simply does not exist. Thus a virtual learning community is equal to all participants.

Face-to-face situations are important for successful virtual work. The participants who do not know each other will easily drop out of virtual work. Face-to-face situations make it easier to work collaboratively and help to create virtual interaction. CSCL has different opportunities than face-to-face learning. It seems very obvious that different kinds of mixtures of face-to-face and CSCL situations support each other. If participants in the learning community know each other they work more intensively. They want to share ideas and learn from each other. The work of the virtual learning community is different from that of a face-to-face learning community. However face-to-face situations are important for the virtual learning community to be successful.

There are no virtual learning communities without participants, without a learning task, without technology or without collaboration. Even if the participants have the interest and opportunity to join the community by having a pedagogically relevant task and a technologically relevant environment the preconditions for collaboration are essential. Without collaboration there is no learning community. The solutions in creating successful learning communities are the pedagogically meaningful use of ICT as well as tutoring, which helps the participants pedagogically, technically, socially and managerially.

Acknowledgements

As a partner and local coordinator in Finland of the FISTE project (A Future In-Service Teacher training across Europe. Socrates - Comenius 2.1) I would like to thank the European Commission for the project funding which made it possible to write this paper.

References

Anttonen, S., Onnela, T. & Terho, H. (2006). *E-learning history. Evaluating European experiences*. Vaasa: Ykkös-Offset Oy.

Barron, B. (2003). When smart groups fail. *The Journal of the Learning Sciences,* 12 (3), 307–359.

Barron, B. (2000). Achieving coordination in collaborative problem-solving groups. *The Journal of the Learning Sciences,* 9 (4), 403–436.

Bluemink, J. & Järvelä, S. (2004). Face to face encounters as contextual support for Web-based discussions in a teacher education course. *Internet and Higher Education,* 7, 199–215.

Evälä, A., Karjalainen, K. & Rytkönen-Suontausta, T. (2007). Laatuaskeleita –kokemuksia verkko-opetuksen laatutyöstä. *Verkko-opetuksen laa-dunhallinta ja laatupalvelu –hankkeen raportti II.* Helsinki: Yliopistopaino.

FISTE 2004-2007. A future in-service teacher training across Europe. *Socrates - Comenius 2.1. project*. Available online at: http://fiste.ssai.valahia.ro/, downloaded on 16. September 2009.

Häkkinen, P., Järvelä, S. & Dillenburg, P. (2000). REFLEX – Group reflection tools for developing virtual distributed expert community. P*roceedings of International conference on Learning Sciences,* June 2000. Michigan, USA.

Hämäläinen, T. & Lindfors, E. (2007). ECSUT course: innovative ideas, practical solutions. In L. M. Gorghiu, G. Gorhiu, A. Glava, C. Glava, S. Kalnina, E. Lindfors, V. Grigore, P. Llavona & G. Thorsteinsson (Eds.), ICT in education: Reflections and

perspectives. *Revista Educatia* 21, 275−282.

Järvelä, S. & Häkkinen, S. (2002). Web-based cases in teaching and learning – the quality of discussions and a stage of perspective taking in asynchronous communication. *Interactive Learning Environments* 10 (1), 1–22.

Krippendorff, K. (2004). *Content Analysis: An Introduction to its methodology*. Thousand Oaks: Sage.

Lakkala, M. & Lipponen, L. (2004). Oppimisen infrastruktuurit verkko-oppimisen tukena. In V. Korhonen (Ed.), *Verkko-opetus ja yliopistopedagogiikka.* Tampere: Tampere University Press, 113-134.

Leinonen, P., Järvelä, S. & Häkkinen, P. (2005). Conceptualizing the awareness of collaboration: A qualitative study of a global virtual team. *Computer Supported Cooperative Work,* 14, 301–322.

Ligorio, J., Talamo, A. & Simons,.R-J.(2007). Synchronous tutoring of a virtual community. Available online at: http://newmedia.colorado.edu/cscl/38.html. Downloaded on 9.October 2009.

Lindfors, E. (2009a). Opitaanko verkossa keskustellen? In T. Joutsenvirta & A. Kukkonen (Eds.), *Sulautuvaa opetusta monilla tavoilla ja menetelmillä*. Helsingin yliopisto. Valtiotieteellinen tiedekunta, 18-33.
http://www.helsinki.fi/valtiotieteellinen/julkaisut/sulautuva_opetus.pdf. Downloaded on 9.October 2009.

Lindfors, E. (2009b). Innovation och användarcentrerad design i pedagogisk kontekst – begreppsliga funderingar. In J. Sjøvoll & K. Skogen (Eds.), *Pedagogisk entreprenørskap. Innovasjon og kreativitet i skoler i Norden.* Trondheim: Tapir Akademisk Forlag.

Lindfors, E. (2007a). Verkkokeskustelu – pakkopullaa vai uudenlainen mahdollisuus? (Discussion in the web – a must or a new challenge?) In J. Lavonen (Ed.), *Tutkimusperustainen opettajan-koulutus ja kestävä kehitys: Ainedidaktiikan symposium 3.2.2006*. University of Helsinki. Researches N:o 285, 273-282.

Lindfors, E. (2007b). A learning community in the web – Challenges on European level. In P. Cunningham & M. Cunningham (Eds.),

Expanding the knowledge economy: issues, applications, case studies. Volume 4. Amsterdam: IOS Press, 1281-1288.

Lindfors, E. (2007c). ICT in teaching – European teachers' views. In L. M. Gorghiu, G. Gorhiu, A. Glava, C. Glava, S. Kalnina, E. Lindfors, V. Grigore, P. Llavona & G. Thorsteinsson (Eds.), ICT in education: Reflections and perspectives. *Revista Educatia* 21, 29−36.

Lipponen, L.(2003). Katsaus yhteisöllisen verkko-oppimisen lupauksiin ja todellisuuteen, *Kasvatus.* 34 (3), 296-302.

Maznevski, M. L. & Chudoba, K. M. (2000). Bridging space over time: Global virtual team dynamics and effectiveness. *Organization Science*, 11 (5), 473 – 492.

Mäkitalo, K. (2006). *Interaction in online learning environments: How to support collaborative activities in higher education setting.* University of Jyväskylä. Institute of Educational Research. Research Reports 18.

Mäkitalo, K., Weinberger, A, Häkkinen, P., Järvelä, S. & Fisher, F. (2004). Epistemic cooperation scripts in online learning environment: Fostering learning by reducing uncertainty in discourse. *Computers in Human Behavior,* 21, 603-622.

Nevgi, A. & Tirri, K. (2003). *In search of good virtual teaching. The advantages and disadvantages to learning in virtual environments – Students' experiences and teachers' evaluations.* Turku: Painosalama.

Oshima, J. & Oshima, R. (2002). Computer-supported collaborative learning in university and vocational education. In T. Koschman, R. Hall & N. Miyake (Eds.), CSCL 2: *carrying forward the conversation*. Mahwah (N.J.): Lawrence Erlbaum Associates.

Pulkkinen, J. (2007). Cultural globalization and Integration of ICT in education. In K. Kumpulainen, (Ed.), *Educational technology: opportunities and challenges*. Faculty of Education, Department of Educational Sciences and Teacher Education, University of Oulu. Acta Universitatis Ouluensis. E 87.

Salovaara, H. & Järvelä, S. (2003). Students' strategic actions in computer-supported collaborative learning. *Learning Environments Research,* 6, 267–285.

Salomon, G.& Perkins, D. (1998). Individual and social aspects of learning. *Review of Research*, Volume 23. Availble online at: http://construct.haifa.ac.il/~gsalomon/indsoc.htm. Downloaded on 9.October 2009.

Tenhula, T. (2007). *Effective nation-wide training. An analysis of the effectiveness of the nation-wide TieVie Virtual University project*. Publications of the Finnish Virtual University. No 2. Helsinki: Multiprint Oy.

Tuomi, J. & Sarjärvi, A. (2003). *Laadullinen tutkimus ja sisällönanalyysi*. Jyväskylä: Gummeruksen kirjapaino.

Vannatta, R. (2007). The Intrepid Explorer: A model of effective technology use for all educators. In K. Kumpulainen (Ed.), *Educational technology: opportunities and challenges*. Faculty of Education, Department of Educational Sciences and Teacher Education, University of Oulu. Acta Universitatis Ouluensis. E 87.

Winn, W. (2002). Current trends in educational technology research: The study of learning environments. *Educational Psychology Review,* 14 (3), 331-351.

Vuopala, E. Hamalainen, T. & Lindfors, E.(2007). How to support collaborative learning in web-based learning environment? In L. M. Gorghiu, G. Gorhiu, A. Glava, C. Glava, S. Kalnina, E. Lindfors, V. Grigore, P. Llavona & G. Thorsteinsson (Eds.), ICT in education: Reflections and perspectives. *Revista Educatia* 21, 141−147.

PROMOTING COGNITIVE AND INTERACTION SKILLS

BLENDED LEARNING - A STUDENT-CENTRED VIEW OF TEACHING RESEARCH METHODS

Teaching and Counselling Practices in the Open University of Jyväskylä

Päivikki Jääskelä & Marja Leena Böök

One of the central aims of academic studies is to learn scientific thinking. This process should be supported from the outset of a student's studies. Participating in short-term research processes and practising research methods (e.g. gathering data by interview or survey methods and analyzing data) are visible and concrete ways of learning scientific thinking.
In this article, we describe the research teaching methods and the counselling practices used in the Open University of Jyväskylä in Finland. The focus is on the continuum of practising research skills as part of basic and subject-level studies. Participating in the research process and practising research methods is possible for students at different stages of their studies and on different courses. From a curricula perspective, this means proceeding from the critical reading of research reports and acquiring knowledge of the basic concepts of the research process to practising and understanding a range of research methods. Finally, the student demonstrates his/her research skills in the proseminar paper required for the Bachelor's degree.
Teaching research skills is one of the most challenging tasks in academic education. The courses given by universities in research methods are often experienced as difficult and uninteresting by many social and behavioural science students (Murtonen, Olkinuora, Tynjälä, & Lehtinen 2008; Leech & al. 2007; Murtonen & Lehtinen 2005, 2004; Ylönen & Väisänen 2003). Many reasons have been found for these learning problems: students may experience motivational problems, negative emotions or fears in relation to studying research methods, have mythic conceptions of research or themselves as learners, suffer from cognitive overload in teaching or find it difficult to internalize knowledge or to apply research skills in working life. Murtonen & al. (2008) state that teachers should be encouraged to think of ways of getting students to adapt a more positive attitude

towards research. We suggest that a learning environment which, on the one hand, enables active social interaction, collaboration and shared feelings during the student's studies, and on the other hand, focuses on exploratory learning, in which a personal relationship both to the subject of learning and to one's own learning is taken, could be the way to promote learning outcomes. To create such a learning environment requires flexible ways of implementing studies for students.

Blended learning in the context of the Open University in Finland

In Finland the Open University specializes in the methodology of adult learning at tertiary level. It follows the general guidelines laid down by the Ministry of Education. It offers everyone regardless of gender, age or educational background an equal opportunity to participate in university-level studies. The Open University has the same degree requirements as the regular university faculties, and Open University students may subsequently apply for regular university admission. Open University studies are organized by 18 Finnish universities. The Open University of Jyväskylä is an independent unit of the University of Jyväskylä. It is one of the biggest (ca. 14 000 students) open universities in Finland, organizing university studies nationwide (also abroad) jointly with other institutes of education. Pedagogy has been strongly developed at the Open University of Jyväskylä in recent decades. Along with the technological revolution of the 1980s and 1990s, it became possible actively to adapt teaching methods to students' particular different life circumstances. A central outcome of this developmental work was the integration of classroom face to face teaching, distance education and self-study in the Open University. At the same time the thinking of teachers and educational developers became more student-centred with an emphasis on the active role, responsibility and autonomy of students with respect to their learning. This has led to the different applications of integrative approach (described above) in several subjects. (Elinikäistä oppimista edistävä yliopistopedagogiikka 2005, 14-19)

However, the further development of flexible study arrangements utilizing the latest technologies is urgently needed. This applies to all university pedagogy. The integration of different teaching methods and technological means is known as blended learning (Levonen, Joutsenvirta & Parikka 2005). According to Bullet & Alltree (2006, 4), blended learning is an "educational provision where high quality e-learning opportunities and excellent campus-based learning are combined or blended in coherent, reflective and innovative ways so that learning is enhanced and choice is increased". Garrison and Kanuka (2004, 96) crystallized blended learning as "the thoughtful integration of classroom face to face learning experiences with online learning experiences". In Finland, there has been active debate on the meaning of the concept of "blended learning" (e.g. in an annual seminar on the theme of blended learning). Is the focus of blended learning on teaching or learning or both? What aims do teachers have when organizing different learning experiences? What views of learning is blended learning based on? In this article we consider 'blended learning' as defined by Jääskelä (2009, 2008), that is, as a student-centred view of teaching and supporting students in their studies. Thus blended learning concerns teaching and counselling practices which promote active knowledge construction and the self-directedness and the responsibility of students for their own learning. To achieve these aims, interactive methods of teaching and counselling are required along with flexible means of study and carefully planned guidance services (e.g. study materials, subject web-sites and guidance services by the academic staff).

In the Open University of Jyväskylä a set of pedagogical principles has been laid down: First, Open University studies must be of the same quality and follow the same requirements as their counterparts in the faculties, and must be accessible to students from all backgrounds. Second, the starting points of Open University studies are student-centeredness and lifelong learning. Third, Open University teaching methods should support students as active members of society. For this reason, students must be given practice in the skills of problem-solving and information searching,

and in critical reading. Moreover, teaching methods should also make use of the latest technology.

Theoretical grounds for the student-centred view of teaching

The primary roots of the student-centred view of teaching lie in the humanistic approach. According to Rogers (1983, 283-290) the aim of education is “a fully functioning person” and self-direction is a one feature of a fully functioning person. Knowles (1985, 18) highlights the importance of the learner’s initiative, responsibility and engagement in learning, the learner’s self-conception as an independent and self-directed person, and the learner’s ability at self-assessment. Knowles also emphasizes the importance of reciprocal action and the teacher’s role as a supporter.
The construction of knowledge by the students supported by the learning environment constitutes the core of the student-centred view of teaching. The conception of knowledge construction is based on the constructivist and pragmatist approaches. These approaches, which are supported by many scholars in the field of learning, represent the relativistic view of knowledge, emphasizing both individual and social processes in knowledge construction, as well as the meaning of individual interpretation and the context of use of knowledge. From the thinking underlying constructivism and pragmatism, Jääskelä (2005, 2009) extracted the following four theses on a student-centred view of teaching:

Learning is the active construction of knowledge.
Learning is based on the individual’s previous knowledge and experiences and is active in nature. This is the basic assumption of constructivism. Earlier, Piaget (1988) highlighted the role of cognitive processes in learning. According to Piaget, knowledge construction takes place when the learner adjusts his/her own knowledge structure to the current context. This knowledge construction occurs through accommodation or assimilation. Subsequently, several researchers (e.g. Vosniadou 1994, Rauste von Wright 1994; Tynjälä 1999; Hakkarainen, Lonka, & Lipponen 2004, 84-99) have emphasized the process of conceptual change in learning. In

the same way, the pragmatic philosophy stresses the dynamic nature of knowledge and having a personal relationship to knowledge as starting points for a deeper understanding (Kelly 1986). In academic studies, theoretical and conceptual learning, as well as the active production of knowledge, are important. Instead of merely repeating knowledge, it is understanding, applying, comparing, analyzing, synthesizing and abstracting knowledge that leads to active learning. University teachers need to pay attention both to students' possibilities for handling knowledge and to the strengths of adult students as knowledge constructors. The learning of adult students is based on their existing practical knowledge and experiences. They want to understand and conceptualize practical phenomena. In addition, they often have a readiness to enter into a relativistic relationship to knowledge.

Knowledge is constructed in social interaction, in which a shared understanding prevails.

In learning the importance of group and social interaction has been widely emphasized (e.g. Vygotsky 1978; Palinscar 1998; Dillenbourg 1999; Littleton & Häkkinen 1999; Cockrell & al. 2000; Mercer 2000; Marttunen & Laurinen 2004; Hassanien 2007; Mäkitalo & Siegl 2008). According to both the socio-cultural approach and the pragmatist philosophy, social interaction is seen as a necessary part of an individual's deep learning (Vygotsky) and of becoming existent and understood in a human community (Mead 1934). In university pedagogy, many computer supported learning designs have been used to connect students and to promote learning together. Many group designs have also been used face to face. However, studying with groups does not automatically enhance one's learning. More important is to construct the space (climate, common language) for sharing different conceptions and experiences of phenomena and a dialogue aiming at shared understanding.

Knowledge construction is directed by action, goals and context.

Functional psychology and pragmatism, both of which have impacted on constructivism, emphasize the importance of the individuals' goal-oriented

action and their active relationship with the environment. (Mead 1934; Rauste von Wright 1994, 116.) Our actions are understandable when we understand our aims. On the other hand, action and experiences lead us to revising and even to changing our aims. In line with this view, Aaltola (1998, 45-46) states that knowledge construction is also directed by the individual's goals and context of action. Learning has to be seen as an individual process due to the diverse experiences, and learning contexts and aims of students. Some researchers have pointed to the importance of the learning situation or the context of learning (e.g. Lave 1991; Collin & Tynjälä 2003). Others have found a connection between the learning environment and study orientation or motivation (e.g. Järvelä & al. 2008; Helle & al. 2007). In university pedagogy, the key question is how can we as teachers support students in achieving their individual study aims and in constructing meaningful paths towards academic expertise?

A research orientation and reflection are the central ways to attain a deeper understanding the world.

Both constructivism and pragmatism emphasize the hypothetical, experimental and dynamic nature of knowledge. Knowledge is constructed by the constitution and testing hypotheses and is a result of individual action. (Dewey 1933, 107-115; James 1913, 31-57). Learning can be seen as a problem-solving process starting from individual questioning and experiences. Many adult learning theorists (Kolb, Knowles, Revans, Schön etc.) have modeled and conceptualized the nature and the sources of adult learning. Malinen (2000, 134-138) states, after having analyzed these theories, that learning is a process of re-construction in personal experiential knowing; learning starts when the familiar is disrupted for the individual. Dewey (1951, 26-30) stressed the role of active thinking, explanation of and reflection on one's own conceptions and action as a necessary part of learning. This view has been supported by several later researchers (e.g. Mezirov 1990; Ploetzner & al. 1999). According to them, a student's prior experiences and knowledge are the basic elements of learning. In addition, students should be activated to formulate individual questions that motivate them to gather knowledge, to explain and to ar-

gue, and to reflect on their own thinking and learning. Inquiry learning, developed by Hakkarainen, Lonka & Lipponen (2004, 295-316), is one approach in which teaching practices have shifted towards creating a knowledge construction-oriented, explorative and innovative community.

From the four theses to teaching and counselling practices

Students' learning and thinking processes are the focus of research methods teaching. Our view as research methods teachers is that students always have some kind of pre-understanding of the research process or of the nature of knowledge acquired by research. For example, students might have personal experiences of participating in research as informants, or they might have read research results written in popularized form in magazines. Such pre-understanding builds the starting point for learning research skills.

Our aims in teaching are twofold. First, the aim is to bring the students' pre-understanding into dialogue with principles of scientific knowledge production. Second, as teachers we must be interested in what really happens in students' minds during this dialogue and how it is possible for this dialogue to happen. Figure 1 illustrates this dialogue also showing that learning research skills and understanding research is a gradual, cumulative process. This learning process entails a personal relationship to the subject matter. In our course on research methods we usually ask students, as their first task, to commit to paper their thoughts about their relationship to research and to themselves as researchers. Our view as teachers is that it is impossible to force a person to learn. However, it is important for the students to set personal aims for their learning. It is also important for teacher to be aware, to some extent, of students' individual starting points, needs and aims. During their studies students need individual support and feedback to become aware of and self-assess their learning processes.

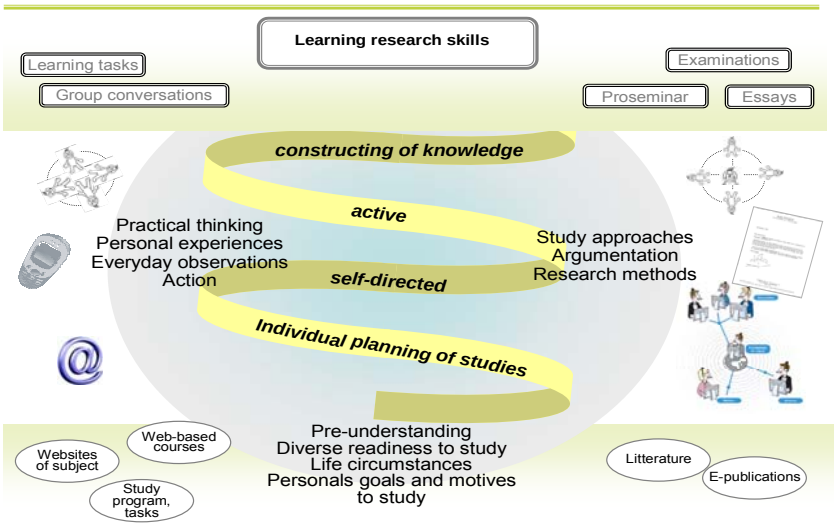


Figure 1. Teaching and Counselling Practices during Learning of Research Methods

Open University students are adults of varying ages (18-60). They have different levels of readiness to study and their individual life circumstances vary. One student might have no experience of tertiary level studies, while another might have a university degree. Another student might have a family and work while studying. Due to the students' different starting points and study possibilities, we cannot teach everyone in the same way, time and place. If the aim of teaching is improved motivation to study and greater competencies and achievements, we must as teachers both pay attention to the student's possibilities to study (accessibility) and concentrate on supporting the learning process (sense of different study possibilities), thereby enhancing the dialogue between the student's pre-understanding and further acquisition of scientific knowledge. The question is thus, what kind of learning experiences best enhance one's learning?

The options for receiving teaching and counselling are many: these include traditional lectures, seminars, group tutoring, individual counselling sessions and individual verbal feedback on students' written assignments.

All these options are implemented face-to-face or via the Web. E-mail counselling and counselling by phone are also common. In addition, students are supported in a web-based course on research methods that takes place in a closed learning environment in Optima Discendum. This web-based course is user-friendly so that anyone who is able to use the Internet is also able participate. The course enables students to receive up-to-date information and learning materials, and to talk with teachers or other students as individuals or as a group.

Research skills in Basic Studies

Studying research skills begins with Educational Research I (5 ECTS credit), which forms part of Basic Studies in Education and Adult Education. “The course gives an introduction to scientific work, the stages of the research process, and the principles of quantitative and qualitative research” (Education and Adult Education Curriculum 2005-2007). Students are assumed to be able to understand, interpret and evaluate educational and adult educational research reports after passing this course.
Over 500 students annually have commenced Basic Studies in Education and Adult Education in the Open University of Jyväskylä. The students study from their different places of residence via educational institutes which co-operate with the Open University of Jyväskylä. The basic mode of teaching in these studies is in the form of e-lectures, which enable real time participation in the lecture. The lecture Educational Research I (4 h) is also available on the Web. This voluntary e-lecture introduces students to the course contents. In practice, the teacher lectures face-to-face to students in Jyväskylä. At the same, the lecture is available to students elsewhere (at home or in educational institutes) by e-connection. During the lecture the teacher both gives information and activates the students to recognize their personal preconceptions and experiences. The teacher also activates the students to conduct research via small exercises in groups. Chat is used to give feedback on the exercises done by students studying at a distance. Chat as a feedback tool also gives students the chance to ask questions and comment on each other’s work. The e-

lecture has also been videotaped, so that the students are able to access it whenever they so wish.

After the introductory lecture the students in the voluntary tutoring groups work on course-related topics. A written assignment (written alone or in groups), a Web-based task or an exam has been alternative modes of assessment. The student always, except after the exam, gets written feedback from the teacher on his/her work.

In the tutorial groups in Basic Studies in Education and Adult Education, students have the opportunity to deepen their conceptual knowledge and find answers to the questions asked in the lecture. They have also a chance to check their own understanding. The expertise of the tutor is important from two viewpoints: on the one hand expertise (the tutor) is needed for the construction of a culture of communication that enables and encourages critical thinking. On the other, the tutor is an important role model in the early stage of studies as the student's main counsellor. (Jääskelä 2005, 162-163; ks. Ylijoki 1998.)

Subject Studies: practising research

In Basic and Subject Studies in Education and Adult education, the development of research skills can be described as a continuum: after passing the Basic Studies component the student is able to 'read' and understand research reports. This phase can be seen as the phase of searching for appropriate models to do educational research. In Subject Studies the student deepens his/her research skills and also takes an active and individual role as a researcher (Figure 2).

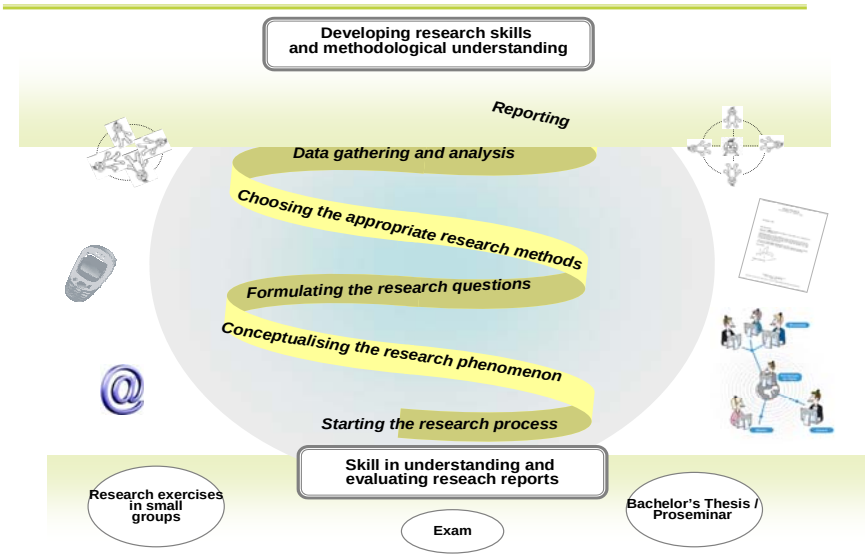


Figure 2. Studying research methods in Subject Studies in Education and Adult Education

In Subject Studies research skills are practised both in the courses Research Methods in Education II and Proseminar leading to the Bachelor's Thesis. In the former, scientific reasoning and argumentation, the basics of educational research, are studied. The student acquires the basic abilities to plan, carry out and evaluate qualitative or quantitative educational research. In the course Research Methods in Education II both quantitative and qualitative research methods are learnt and gathering and analyzing data in particular are practised. In brief, the aim of the course is to serve as methodological preparation for the Bachelor's Thesis and to provide the students with the basic knowledge and skills required in educational research. (Education and Adult Education Curriculum 2005-2007, Education and Adult Education Curriculum 2007-2009).

The course Research Methods in Education II consists of lectures and exercises (total 56 hours). The students in the Jyväskylä region participate in face-to-face lectures and the students in educational institutes participate in the same lectures by e-connection in real time. The e-lectures in the Subject Studies are carried out in the same way as in Basic Studies.

Exercises are integrated with the lectures: the students do small research projects, where the research process (from the naming of research phenomenon to setting the research questions and to reporting the research) is done in small groups. During the lecture the teacher asks questions, gives tasks and maintains interaction face-to-face or by chat. In Jyväskylä the exercises have been carried out face-to-face and in the educational institutes by conference call.

The application of knowledge and active participation by the student in the research project increase during the courses on research methods. The student becomes acquainted with the research process in stages, from the first exercise to, finally, the Bachelor's Thesis (proseminar paper). The students learn to argue about the solutions concerning research methods with teachers as well as with their fellow students. The students receive peer feedback from each other and support each other in preparing their own research papers.

When necessary, group tutoring has been organized during Research Methods in Education II. In the tutorial groups, the students have (with the help of the tutor) clarified the contents and the main concepts presented in the research method literature and in the lecture. This is one way to prepare for the exam. To pass the course, the exam and the assignments must be approved.

Research Methods in Education II has to be completed before the Proseminar leading to the Bachelor's Thesis. For their Bachelor's Thesis the students carry out an empirical research project and summarize this research process in a report (proseminar paper). The research process and the reporting can be done alone or jointly with a fellow student. The Proseminar course lasts one semester and includes independent study and seminars in which each research paper is discussed. In addition, both general and individual counselling are given. (Education and Adult Education Curriculum 2005-2007, Education and Adult Education Curriculum 2007-2009).

The aims of the Proseminar are to develop both the skills of scientific thinking and problem solving, and the skills to evaluate and to find the relevant literature for the research topic. In addition, it is important that

students learn how to construct a scientific research report and follow the rules of academic communication. (Eskola & Hämäläinen 1991.)
During the academic year 2007-2008, the course Proseminar consisted of a face-to-face seminar (30 h) and two time-limited Web-based study periods. During the latter, students practice writing bibliographies and acting as an opponent. The students also receive feedback on their work from their fellow students. The teacher counsels the students in their Web-based learning, giving them feedback on their assignments.
Because they are mostly doing their Bachelor's Thesis for the first time, students need counselling. Students' counselling needs vary qualitatively and quantitatively, according to their life circumstances and their readiness to study. For these reasons, academic progress will vary individually. The basic mode of counselling in the course leading to the Bachelor's Thesis is discussion in the seminar. The teacher also counsels students individually by e-mail, by telephone or on the Web. The Open University pedagogy emphasizes student-centred counselling: students receive individual counselling at different stages of their studies. It is important for the teachers to think about their role as a counselor in the learning process. Teachers must be available for their students in a way that supports the independent decision making and individual thinking of the latter.

Concluding remarks

Research skills develop gradually and in stages. However, studying in the Open University is based on passing individual courses at different levels. This situation presents the teacher with a challenge. First, the teacher has to maintain the learning process as a continuum and to make this continuum visible to the students. Second, the blended learning model has been developed for the purpose of enhancing individual learning – not for the purpose of furnishing students with the easiest way to carry out their studies. This means that the teacher has to explain the blended learning model to the students. The teacher has to explain the variety and, especially, the ways in which studies can be done and the reasoning behind

them e.g. the role of lecturing, tutoring and counselling and that of writing, reading, acting and academic debate.

Utilizing the blended learning model in teaching research methods, as described above, challenges the student to construct and to produce knowledge, to share learning experiences and to reflect on his/her own personal relationship to research. On the basis of our own teaching experiences we consider that there is a need to incorporate narrative methods into the blended learning model with the aim of further fostering individual learning. In addition, there is a need to devise measures that enable students to belong and feel that they belong to academic community.

References

Bullen, P. & Alltree J. (2006). Editorial. *Journal for the Enhancement of Learning and Teaching*, 3, 2, 4 – 6.

Cockrell, K.S., Hughes Caplow, J. A. Donaldson, J.F. (2000). A context for learning: Collaborative groups in problem based learning environment. *Review of Higher Education,* 23 (4), 347-363.

Collin, K. & Tynjälä, P. (2003). Integrating theory and practice? Employees' and students' experiences of learning at work. *Journal of Workplace Learning*, 15 (7/8), 338 – 344.

Dewey, J. (1933). *How we think. A restatement of relation of reflective thinking to the educative process*. Boston: D.C. Heath and Company.

Dewey, J. (1951). *Experience and education*. (Primary text 1938.) New York: Macmillan.

Dillenbourg, P. (1999). Introduction: What do you mean by "collaborative learning"? In P.Dillenbourg (Ed.), *Collaborative learning. cognitive and computational approaches*. Amsterdam, Pergamon, 1-19.

Garrison, G. R. & Kanuka, H.(2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education,* 7, 95 -105.

Hakkarainen, K., Lonka, K. & Lipponen, L. (2004). *Tutkiva oppiminen.*

Järki, tunteet ja kulttuuri oppimisen sytyttäjänä. [Inquiry learning. Sense, emotions and culture as activators of learning] (6.-7. pianos). Porvoo: WSOY.

Hassanien, A. (2007). A Qualitative student evaluation of group learning in higher education. *Higher Education,* 32 (2/3), 135 – 150.

Helle, L., Tynjälä, P., Olkinuora, E. & Lonka, K. (2007). Ain't nothing like the real thing. Motivation and study processes on a work-based project course in information system design. *British Journal of Educational Psychology*, 77 (2), 397 – 411.

James, W. (1913). *Pragmatismi: uusi nimitys eräille vanhoille ajatteluta-voille*. Suom. K. W. Silfverberg [*Pragmatism: A new name for some old ways of thinking*. Transl. K.W. Silfverberg] Helsinki: Otava.

Järvelä, S., Järvenoja, H. & Veermaas, M. (2008). Understanding the dynamics of motivation in socially shared learning. *International Journal of Educational Research,* 47 (2), 122 – 135.

Jääskelä, P. (2009). Oppimisen laatu ja opiskelun joustavuus: Ohjauksellisen pedagogiikan ydin. [The quality of learning and the flexibility of studies: The core of a student-centered pedagogy.] *Aikuiskasvatus*, 29 (3), 223 – 228.

Jääskelä, P. (2008). Avoimen yliopiston arvoille pohjautuva ohjauksellinen pedagogiikka. Teoksessa P. Jääskelä (toim.) *Monimuoto-opetuksesta kohti ohjauksellista yliopistopedagogiikkaa. [Student-centered pedagogy based on the values of the open university.* In P. Jääskelä (Ed.) From the multi-approach to teaching to student-centered pedagogy.] Jyväskylän yliopiston avoimen yliopiston pedagoginen strategia, Osa II. Jyväskylän yliopiston avoimen yliopiston tutkimuksia ja selvityksiä, 11, 12-19.

Jääskelä, P. (2005). *Tuutorointi avoimen yliopiston opetuksessa. Tuutoroinnin kehittämistä koskeva toimintatutkimus. [Developing tutoring in open university teaching. An action research study].* Jyväskylän yliopisto. Chydenius-instituutin tutkimuksia 1.

Kelly, A. V. (1986). *Knowledge and curriculum planning*. London: Harper & Row.

Knowles, M. (1985). *Self-directed learning: a guide for learners and teachers*. New York: Accociation Press.

Lave, J. & Wenger, E. (1991). *Situated learning*. Cambridge: Cambridge University Press.

Leech, N. L., Onwuegbuzie, A. J., Murtonen, M., Mikkilä-Erdmann, M. & Tähtinen, J. (2007). Researcher workshop for student teachers – an example of a mixed methods learning environment. In M. Murtonen, J. Rautopuro & P. Väisänen (Eds.) *Learning and teaching of research methods at university.* Kasvatusalan tutkimuksia – Research in Educational Sciences 30. Suomen Kasvatustieteellinen Seura, 205 – 226.

Levonen, J., Joutsenvirta, T. & Parikka, R. (2005). Blended learning – Katsaus sulautuvaan yliopistoon. [Blended learning - a look at blended learning at university] *Piirtoheitin, Verkko-opetuksen verkkolehti,* 2(3). Available online at: http://www.valt.helsinki.fi/piirtoheitin/sulautus1.htm. Luettu 28.5.2007.

Littleton, K. & Häkkinen, P. (1999). Learning together: Understanding the processes of computer-based collaborative learning. In P. Dillenbourg (Ed.) *Collaborative learning: cognitive computational approaches*. Amsterdam: Pergamon, 20-30.

Malinen, A. (2000). *Towards the essence of adult experiential learning. A reading of the theories of Knowles, Kolb, Revans and Schön.* Jyväskylä: SpPhi.

Marttunen, M. & Laurinen, L. (2004). Lukiolaisten argumentointitaidot – perusta yhteisölliselle oppimiselle. [Argumentation Skills of Secondary School Students – a Basis for Collaborative Learning] *Kasvatus*, 35 (2), 159 – 173.

Mead, G. H. (1934). *Mind, self and society: from the standpoint of a social behaviorist*. London: Routledge.

Mercer, N. (2000). *Word & minds*. *How we use language to think together*. London: Routledge.

Mezirov, J. (1990). How critical reflection triggers transformative learning. In J. Mezirov & al. (Eds.) *Fostering the critical reflection in adulthood. A guide to transformative and emancipatory learning.* San Francisco: Jossey-Bass, 1-20.

Murtonen, M., Olkinuora, E., Tynjälä, P. & Lehtinen, E. (2008). ”Do I need research skills in working life?” University students’ motivation and difficulties in a quantitative methods course. *Higher Education,* (56) 5, 599-612.

Murtonen, M. & Lehtinen, E. (2003). Difficulties experienced by education and sociology students in quantitative methods courses. *Studies in Higher education,* (28) 2, 171-15.

Murtonen, M & Lehtinen E. (2005). University students’ research orientations: Do negative attitudes exist towards quantitative methods? *Scandinavian Journal of Educational Research,* (49) 3, 263-280.

Mäkitalo-Siegl, K. (2008). From multiple perspectives to shared understanding: a small group in an online learning environment. *Scandinavian Journal of Educational Research*, 52 (1), 77 – 95.

Palinscar, A. S. (1998). Social constructivist perspectives on teaching and learning. *Annual Review of Psychology,* 49, 345-375.

Piaget, J. (1998). *Lapsi maailmansa rakentajana: kuusi esseetä lapsen kehityksestä. Suom. S. Palmgren. [Six études de psychologie, problèmes de psychologie génétique, psychologie et épistémologie. Transl. S. Palmgren.]* Porvoo: WSOY.

Ploetzner, R. Dillenbourg, P. Preier, M. & Traum, D. (1999). Learning by explaining to oneself and to others. In P. Dillenbourg (Ed.), *Collaborative learning. Cognitive and computional approaches. Advances in learning and instruction Series*. New York: Elsevier Science, 103-121.

Rauste-von Wright, M. & von Wright, J. (1994). *Oppiminen ja koulutus [Learning and education]*. Juva: WSOY.

Rogers, C. R. (1983). *Freedom to learn for the 80’s*. Columbus: A bell & Howell.

Tynjälä, P. (1999). *Oppiminen tiedonrakentamisena. Konstruktivistisen*

oppimiskäsityksen perusteita [Learning as knowledge construction. The basic conceptions of constructivism]. Helsinki: Kirjayhtymä.

Ylönen, S. & Väisänen, P. (2004). Tilastolliset menetelmät opettajankoulutuksessa – oppimisen x, y, z. Teoksessa J. Enkenberg, E. Savolainen & P. Väisänen (toim.), *Tutkiva opettajankoulutus – taitava opettaja*. [Statistical research methods in teacher education – the x, y, z of learning. In J. Enkenberg, E. Savolainen & P. Väisänen (Eds.), *Inquiry teacher education – A skillful teacher].* Joensuu: Savonlinnan opettajankoulutuslaitos, 46–58.

Valleala, U.M. (2005). (Ed.) *Elinikäistä oppimista edistävä yliopistopedagogiikka Jyväskylän yliopiston avoimessa yliopistossa – teorian ja käytännön dialogia. [Lifelong learning pedagogy in the open Uuiversity of Jyväskylä*] Jyväskylän yliopiston avoimen yliopiston tutkimuksia ja selvityksiä 56.

Vosniadou, S. (1994). Capturing and modeling the process of conceptual change. *Learning and Instruction*, 4 (1), 45 – 69.

Vygotsky, L. (1978). Mind in society: The development of higher psychological processes. Cambridge Mass.: Harvard University Press.

UNDERSTANDING FOREST SECTOR ETHICS AND CORPORATE SUSTAINABILITY THROUGH BLENDED LEARNING

Description of the course 'Ethics and responsibility in the forest sector'

Kirsi Kettula-Konttas & Liisa Myyry

This article describes the development of a blended learning course in professional ethics, 'Ethics and responsibility in the forest sector', that was held in the Faculty of Agriculture and Forestry at the University of Helsinki in the spring semester 2009. The course is an obligatory study unit for second-year students of forest ecology and forest economics and marketing, and it aims to enhance students' ability to identify and resolve ethical problems and develop an understanding of their professional role.

The course consisted of different elements of face-to-face and online learning, as well of independent studies. There were six traditional classroom lectures given during the course: three general lectures dealt with ethical theory and practical matters, and three lectures were presented by visiting professionals in ecological or corporate sustainability. The students also participated in one drama workshop concerning corporate sustainability in the forest sector. The independent studies consisted of writing three learning journals and reading scientific articles for weekly online exams. The web-based studies including group work and online exams took place in a virtual learning environment, Blackboard. The students also submitted their learning journals through Blackboard.

Altogether 54 students participated in the course. The students worked in 14 different groups; each group consisted of four to five students.

Reasons for choosing blended learning

The course in professional ethics was arranged as a compulsory study unit for the first time in 2005. Originally the course was taught as a normal lecture course, but quite soon the teachers realised that it was rather a

challenging task to try to fit such an intensive course in two different departments' study programmes and over 50 students' schedules. It is very common for the forestry students to work part-time during the semesters, and therefore very often there were several students absent from the lectures. These schedule irregularities presented problems for the teachers, because the adopted teaching approach, Team-Based Learning (see Michaelsen et al. 2004), relies on active team discussions and interactive group work; thus attendance at lectures is essential.

In order to better facilitate flexibility, the teachers started to offer a separate online course parallel to the lecture course. However, this online course turned out to be unsatisfactory. First, the quality of the group work created online did not meet the teachers' expectations. It was also rather burdensome to teach simultaneously two parallel courses (lecture and online). Furthermore, the students were also dissatisfied, because they felt that they had received too little support and guidance from the teachers.

In 2008, the lecture and online courses were finally unified, and blended learning was chosen as the teaching solution. The idea was to take advantage of the best features of both face-to-face and online learning: the active group discussions of the face-to-face lectures as well as the flexibility (time schedules and physical attendance) of the online course. As this first pilot of blended learning gave quite encouraging results, we chose to continue with blended learning this year, as well.

However, based on the feedback from the pilot blended learning course, we reduced the number of group work assignments and online exams, each by one. At the same time we increased the number of in-class lectures. The student groups had felt that they needed more face-to-face support in order to be able to work independently online.

Combining face-to-face learning and online learning

Both face-to-face learning and online learning supported students' learning on the course. First of all, face-to-face learning enabled the students to get to know each other, especially in the drama workshop. Because

students have to work intensively in groups during the course, it was assumed that the co-operation would be better if the students were acquainted with each other. In the drama workshop, the student groups formed 'executive boards' for different paper or pulp mills, with each student playing a role as a member of the board. The boards were given different ethical approaches (eg., virtue ethics, utilitarianism) to follow in their decision making. The structural idea for the workshop was borrowed from Allan Owens's process drama pre-text 'The Four Sectors' (Owens & Barber, 2001). Like The Four Sectors, our drama workshop also ended with a tough negotiation between the small groups for deciding which mill should be shut down or sold. Typically, in the final negotiation the groups were fighting as one for (the survival of) their 'own' mill, which in turn purportedly improves the levels of cohesion in the groups. According to Deeter-Schmelz et al. (2002), cohesion plays a critical role in effective teamwork. Hence, besides providing experiences of ethical decision making in a group context, our drama workshop also acted as a versatile exercise to build team cohesion and thus helped the future group work.

Secondly, during lectures, professional ethics concepts learned from materials could be clarified for the students if there were some misunderstandings. Also in the class session between the first and second group work and online exam, feedback was given about the students' performance. According to Biggs (1996), the assessment criteria used in a course guide students' learning, i.e., if the aim of the course is to enhance understanding of concepts the assessment criteria should be in line with this aim. Biggs calls the union of instructional design of courses and assessment of students' performance constructive alignment. In the last lecture the aims of the course and instructions for the learning journal were reviewed and feedback was collected in group discussions.

The lectures presented by visiting professionals in ecological or corporate sustainability were important in-class learning. To perceive how professionals from their own field deal with ethical issues, how professional ethics is taken into account in organisations and how it affects organisations' functioning, helps the students to construct their own ethical professional identity. The professional role is considered to be a crucial aspect of moral

motivation, the willingness to behave morally and to prefer moral values to other values (Rest, 1986). Moral motivation also refers to a commitment to taking a moral course of action and taking personal responsibility for moral outcomes (Rest et al., 1999). Hence, professionals of ecological or corporate sustainability – as members of ingroups – can serve as significant role models for students. In addition, professionals can present conflicting viewpoints to the students in their presentations. These kinds of socio-cognitive conflicts – i.e., situations where different viewpoints are represented by different people in a way that makes it difficult to just comply with other's opinions (Doise & Mugny, 1984) – might prompt more complex forms of thinking (e.g., Myyry & Helkama, 2007) and thus enhance students' moral reasoning skills.

The face-to-face learning formed an integral part of the ethics course due to its role in clarifying the aims, learning tasks and assessment criteria of the course. Based on previous years' experiences, it was concluded that students need more support and contact with teachers than a solely online course can offer. Thus, the face-to-face teaching constituted the skeleton of the course whereas the online learning was the flesh. Furthermore, as the students were only in their second year of studies, they may have needed more support than students at the end of their studies. Based on Vygotsky's (1978) concept of Zone of Proximal Development (ZPD), it is assumed that at the beginning of their studies the students need more scaffolds to support their learning, but gradually they will require less assistance from teachers. The Zone of Proximal Development means that people are able to acquire knowledge together with others that they could not learn alone.

The idea of ZPD was also applied in the three group projects carried out during the course. Students could perform them online, e.g., in chat, but most of the groups preferred to meet face-to-face or to complete the task using email. Whatever the form of the group work, the purpose was to discuss the task at hand together and reach a common view about it. The tasks were for instance choosing a consulting firm for an organisation or to consider the role of responsibility in ethical conduct. Consequently, the group discussions served also as situations of socio-cognitive conflict

(Doise & Mugny, 1984) for the students since they had to take the roles of others and try to understand others' viewpoints. The groups were heterogeneous in the sense that there were both forest ecology and forest economy students in each group. In the domain of moral research considerable evidence exists that ethics programs which last longer than a few weeks and emphasise dilemma discussions are effective in promoting students' moral reasoning skills (Rest, 1986; Bebeau, 2002).

The group work was submitted through Blackboard and besides the grade every group received written feedback on their performance in order to take it into account in the next group work. Thus, the principle of constructive alignment (Biggs, 1996) was followed here as well.

Online learning consisted of the three online exams which were based on scientific articles about ethical issues of forest sector and had same topics as the group work. Thus, both the online exams and group work were based on the same material. The purpose of the online exams was to make the students familiar with the topics and concepts introduced in the articles and prepare them for the group work. Students could read the articles at their own pace and then test their understanding through the online exam. Accordingly, it was assumed that both types of learning would support the understanding of the contents of the course. The online exams formed together with the learning journals the independent study of the course.

Blended learning as a tool for skill-development

Among other issues, the aims of the course also included improving students' argumentation skills as well as enhancing their ability to identify and resolve ethical problems in working-life contexts. Of all the different online and face-to-face learning elements, it was mostly some face-to-face learning situations that were used to reach these targets. The group meetings, discussions and possible debates supported the development of argumentation skills. However, this type of skill-development requires the genuine motivation of the students themselves, as well.

The group meetings and the drama workshop served also as a medium to improve the students' ability to apply the theories of professional ethics to working-life problems and to develop their skills in ethical decision-making.

Assessment of student performance

The assessment of students' performance was split to several elements: preliminary and online exams, group work and learning journals. The preliminary and online exams formed 30% of the total grade (7.5 % each). They were all multiple choice tests with five questions and four choices for each question (see Table 1). The online exams were scored automatically by Blackboard.

Table 1. Elements of the total grade

Element	**Proportion from the total grade**
Preliminary and online exams	30 %
Group work	30 %
Learning journals from workshop and visiting lectures	10 %
Final learning journal	30 %
Total	100 %

Group work formed 30% of the total grade (10% of each) as well. Every member of the group received the same score if they had taken part in completing the task. Altogether the students had to write three learning journals during the course: one on the drama workshop (5% of the total grade), one on the visiting lectures (5%) and one final learning journal. The final learning journal formed 30% of the total grade and it was a reflection on learning and an evaluation of the course. Thus, students' performance on the Web was not assessed per se, only their outcomes of online studies. Because the primary aim of the course was to enhance students' understanding of ethical concepts, the assessment criteria were adjusted to this target. In the final learning journal the students were

asked to reflect on their basic assumptions and schemas about ethical issues and to evaluate what they had learned from the course, if anything.

What did change with blended learning?

Considering all the different aspects of blended learning, we can see that improved flexibility – both in timetables and physical attendance – can be seen as one of the greatest benefits of this course. The students appreciated the opportunity to take the weekly online exams whenever they could fit them in their schedules. To have three smaller exams instead of one larger literature exam was also seen as a benefit. From the teacher's point of view, the online learning unit made it possible to have weekly tests for over 50 students, because the online exams were scored automatically by Blackboard. The main challenge of the online exams was, however, to find the right degree of difficulty for the multiple-choice questions. The questions should be difficult enough to encourage thorough reading of the literature, but easy enough to reward the students for their efforts. On this course the students claimed that some of the questions were too difficult. This feedback should be taken into account in the following years.

According to the feedback, many students also appreciated the diversity of the face-to-face and online elements of the course. These students felt that mixing different learning methods was invigorating and motivating. On the other hand, some students thought that the course structure was too fragmented; they felt it was difficult to piece together a general view of the subject.

When comparing the earlier in-class courses and the current blended learning course, we noticed that the quality of the group work became more varied. Among the 14 groups, there were both some very strong and some weaker groups. Some of the groups did extremely good work and they had evidently spent much more time on the assignments than what we had scheduled for the work in the earlier in-class courses. On the other hand, some of the groups had apparently taken the easy way out and had put very little time and effort into the work. In their feedback, a few students mentioned that some group member's indolence had dis-

turbed the group work; therefore, these students would have preferred doing group work in class. In those groups that had been functioning well there had been lively discussions between the group members, and the students had clearly realised new points of view by listening to the argumentations of their peers.

One further challenge seems to have been to find a common time for the group meetings. We did not provide class time as such for group meetings, but we had pointed out and suggested certain hours in the weekly timetable for the groups to meet. Besides face-to-face meetings, the groups could also meet online in chat; yet, some groups had found it extremely hard to find time for group work, and thus some groups had ended up doing their work by using email. However, none of the groups failed to submit the group work assignments in time. Here, we should most likely be obliged to Blackboard and its 'strict' deadlines. When the students know that the system does not accept submissions after certain deadlines, they seem to be more timely in completing their tasks. However, in the future, it will be worthwhile to try to find different ways to support the groups either online or in-class.

One possible way to enhance the blendedness of the course is to make the students complete the group work – or at least some of them – online. If the students are forced to write their comments in Blackboard, they may be more inclined to participate and it would be easier to control students' activity. Writing down the arguments might also improve their quality: research in the domain of cognitive skills has revealed that usually more complex thinking is used after some thinking and with little or no time constraint whereas strict time-limits and responses produced with little prior thought lower the complexity (Baker-Brown et al., 1992). Doing group work in the Web would also improve the integration of different types of learning: teamwork and web-based learning. It would also increase flexibility since students don't have to arrange face-to-face meetings.

As a conclusion, blended learning has proved to be a workable method to teach forest sector ethics and corporate sustainability. However, as in teaching in general, there is always room for improvement. In the future,

our main challenge will be to find new ways to facilitate group work – either face-to-face or online. “Blending” is a continuous activity.

References

Baker-Brown, G., Ballard, E.J., Bluck, S., deVries, B., Suedfeld, P. & Tetlock, P.E. (1992). The conceptual/integrative complexity scoring manual. In: C.P. Smith (Ed.) *Motivation and personality: Handbook of thematic content analysis*. New York: Cambridge University Press, 401-418.

Bebeau, M.J. (2002). The Defining Issues Test and the Four Component Model: Contributions to professional education. *Journal of Moral Education*, 31, 271-295.

Biggs, J. (1996). Enhancing teaching through constructive alignment. *Higher Education*, 32, 347-364.

Deeter-Schmelz, D.R., Kennedy, K.R. & Ramsey, R.P. (2002). Enriching our understanding of student team effectiveness. *Journal of Marketing Education*, 24, 114-124.

Doise, W. & Mugny, G. (1984). *The social development of the intellect*. Oxford: Pergamon.

Michaelsen, L., Bauman Knight, A. & Fink, L. D. (2004). *Team-based learning: A transformative use of small groups.* Stylus Publishing.

Myyry, L. & Helkama, K. (2007). Socio-cognitive conflict, emotions and complexity of thought in real-life morality. *Scandinavian Journal of Psychology*, 48, 247-259.

Owens, A. & Barber, K. (2001). *Mapping drama*. Carlisle, England: Carel Press.

Rest, J.R. (1986). *Moral development. Advances in research and theory*. New York: Praeger.

Rest, J.R., Narvaéz, D., Bebeau, M. & Thoma, S.J. (1999). *Post-conventional moral thinking: A neoKohlbergian approach*. Mahwah, NJ: Lawrence Erlbaum Associates.

Vygotsky, L.S. (1978). *Mind in society: the development of higher psychological processes.* Cambridge, Mass: Harvard University Press.

A BLENDED BUT SIMPLE INTRODUCTION TO MEDIA EDUCATION

Timo Portimojärvi & Leena Rantala

Introduction

This article describes and evaluates the implementation of the course *Introduction to Media Education.* We aimed to develop a blended but simple course with respect to the study culture in higher education that is becoming more and more penetrated by the ubiquitous technologies. In practice, the course was a traditional mass lecture course expanded with the Moodle platform, online lectures and weblogging. In this article we evaluate the course implementation in the light of the feedback collected from the students (142 respondents).

The idea of the course was to implement blended learning in terms of integrating the subject matter, educational technology and new study practices in a meaningful way. Accordingly, blended learning in this case refers to an aim to build a learning environment that consists of a variety of elements and appropriately integrates different studying and learning practices and processes as well as technologies, tools and knowledge (cf. Levonen, Joutsenvirta & Parikka 2005).

Our evaluation of the course suggests that developing new study environments in higher education could be easy and simple in practice, but blended in terms of studying and learning. We will propose that in order to create such learning environments three elements should be considered and developed in parallel: 1) course content, 2) study practices and 3) learning tools.

The Implementation of the Course

The course *Introduction to Media Education* was organized in the University of Tampere in the autumn of 2008. The aim of the course was to pro-

vide an introduction to the main perspectives, theories, concepts, and pedagogy in media education. In addition, after they had learnt the basics of the field the students were expected to be able to recognise them in practice and to continue their studies on media education. The course (5 ECTC credits) is a part of the basic studies (25 credits) in media education.

The main challenge of the course was to organise a flexible learning environment for a great number of students with various backgrounds, locations and time schedules. The basic studies in media education are open for all university students and targeted in particular to students in teacher education, early childhood education, journalism and information studies. A group of distance-learners from the University of Vaasa also attended the course.

The course was built within the structure of a traditional university course: it involved 10 lectures, small assignments between the lectures, the electronic course literature and the final exam. As a solution for the challenge of student variety we needed several options for the basic structure.

Media education as a subject matter challenged us to connect the knowledge substance of the course with the students' own media usage, which is known to be a key factor in implementing media education in practice, in particular in schools (e.g. Kotilainen 2001; Flores-Koulish 2005; see also Luukka et al. 2008).

In order to achieve such aims we organised a learning environment that included a Moodle course platform, online lectures with Adobe Connect Pro, and weblogging. The Moodle is widely used in various courses in the University of Tampere, and thereby most of the students were already familiar with it. The primary function of the Moodle was to integrate everything into a solid course structure. This included typical elements such as course information, timetables and course materials. The small assignments between the lectures were also documented and returned in the Moodle. In addition, online lectures, recordings and weblog feeds were combined into the platform for the students to watch, read and comment. All the students logged into the Moodle and used it throughout the course.

The lectures for 142 students caused challenges for timetable and location. To solve this we used the Adobe Connect Professional conferencing software to stream and record the lectures. The software is designed for conferencing, but it was taken into lecturing use because of the easiness and flexibility it provided. The lectures used only one-way audio and video and sharing the presentations, and a chat was used as a return channel (Figure 1). The lectures were also recorded. The students were able to participate in the lectures in a lecture hall, as real-time online lectures or as recorded sessions in their homes or practically anywhere. The students used and were also encouraged to try all these options. They also mixed them in various ways, such as reviewing the recorded lectures after being in the lecture hall, or participating in the lectures with their laptops. Both the online sessions and the recording were linked from the Moodle.

Figure 1. Screen capture of a recorded lecture, delivered via the Adobe Connect Pro.

Individual weblogging was an optional way - instead of the final exam - to accomplish the course by commenting on the lectures, by small assignments and the literature. The blogging option was introduced to the students as a challenge of doing the studies in a new way. 78 students se-

lected the blogging option. Most of them understood what blogging is but had not been blogging before. In conjunction with the nature of the course content, the blogs were open and public, and the students were allowed to create the blog anywhere, such as blogger.com or wordpress.com. For keeping all the blogs in control, a small hack was needed. The RSS-feeds from all the blogs were first collected to the teachers' RSS-reader (Google Reader), which aggregated them into a single blogroll with post titles and source information. This blogroll was then inserted into the front page of the Moodle platform (Figure 2). The result from this was a constantly updating list of the students' blog titles, which also made the Moodle alive and interesting to the students.

Figure 2. Screen capture: The Moodle platform of the course, enriched with a constantly updating blogroll.

The options described above allowed various paths for the students. The number of different combinations is uncountable, but we illustrate the differences with three case type descriptions of "Online learner", "Flexible individual" and "Self-challenger".

> *The online learner lives in another city or has other reasons to stay off-campus. A possibility to attend online-lectures is a great solution for her. Otherwise she couldn't take the course. She is familiar with the Moodle, and goes on happily with the assignments in it.. She can take the course fully at home, except the exam. She comes to the exam later on the department's common exam day.*
>
> *The flexible individual has an irregular time schedule and is engaged in various courses and projects. He can manage it all if he can stretch or reorganise the timetable. He selects the most individual options: follows the lectures mainly as recordings, and writes a blog. When possible, he comes to the lecture hall. He knows that following the recorded lectures is much harder than the real-time lectures, and that writing a blog may be much heavier than taking an exam. However this is the only option for him because managing within the given time limits wouldn't otherwise be possible.*
>
> *The self-challenger is a traditional student, used to lectures and exams. She uses the Moodle if she has to, but understands that it does not help her to learn any better. However, she understands that as a media educator she should know the digital environment well. She has never been blogging before, but now that blogging is offered as a challenge, she decides to try it. She does not become a blogger outside the course, but is happy to have a personal experience on blogging.*

All this flexibility requires proper planning before the course. The workload is much bigger if compared with a course with only lectures, literature and an exam. The course was implemented in collaboration of two teachers, which was one aspect in creating an interactive and open atmosphere for the course. The course was evaluated with a standard university scale (1-5), which was clearly contrasted with the open, student-centered approach.

The Students' Feedback

The feedback from the students was collected via the Moodle with a questionnaire. The students gave us information for the registration of the course results in the same questionnaire, and therefore their responses were not anonymous. A total of 142 students filled in the questionnaire, and 137 of them gave us permission to use the answers as research material. The questionnaire included 16 closed questions related to the students´ general evaluations regarding mainly the appropriateness of the studying practices and technologies used in the course. In addition, with four open questions we aimed to find out more comprehensively about the students´ experiences from their learning and suggestions for developing the course. In what follows, we will focus on the answers to the open questions.

The students´ responses to a question about what was the most important thing they had learnt from the course included aspects related to 1) developing personal media literacy, 2) enhancing consciousness of and enthusiasm about media education and 3) learning to know the concepts and the field of media education. First, the students described how their media literacies developed during the course in terms of learning to use and understand the functions of new technologies. In particular writing the weblog was important in gaining media literacies. For example, a student described that she was breaking her own personal limits by getting familiar with weblogging. Second, the students replied that they had become inspired by media education and had started to apply a media education perspective to their own professional field. For instance, a student wrote that after the course she would consider her future career as a teacher from the perspective of a media educator as well. Third, the students replied more generally that they had learnt concepts and perspectives related to the field of media education.

In the questionnaire the students were asked to answer a question about what had particularly improved their learning in the course. The following three elements were the most important: 1) weblogs, 2) small assignments between the lectures and 3) discussions both in the discussion

board of the Moodle and in the lecture hall. Writing the weblog enhanced learning in a variety of ways. Particularly "one's own thinking", process-oriented learning and reflecting on the subject matter from the lectures and the literature were highlighted in their responses. A student, as an illustration, described that in order to write a weblog entry you had to "continually think over media education" during the course and "reflect on the subject matter from your own perspective and apply it to your personal experiences". In that way, the students felt that they were not reading the course literature only for the final exam but for developing their own thinking and doing in media education.

Not only writing the weblog enhanced learning. The students who did not choose the option to write the weblog but instead decided to accomplish the final exam said that reading the weblogs of other students enhanced their learning. So, reading other students' weblogs was a way of getting inside other people's thoughts and reflecting on these different perspectives was important to the students according to their answers. A student, for instance, replied that "although I did not have the courage to meet the challenge (to write the weblog) it was interesting to examine other students' weblogs, and I definitely think that it enhanced my learning a lot".

Besides weblogging, the small assignments we gave to the students between the lectures were reported to have improved learning. These assignments were related to the students' personal media usage, media literacies and media environment. They were, for instance, asked to keep a media usage diary, evaluate their own internet-related media literacies and observe the visuality of the city environment. The students replied that these assignments were a good way to prepare for the lectures. Moreover, according to the students the assignments supported their reflecting on the subject matter. For example, a student wrote that "the assignments connected the theoretical knowledge from the lectures to practice, and by observing my own actions I learnt new things related to my personal media usage".

The common interactive nature of the lectures and particularly the discussions in the discussion forum of the Moodle also enhanced learning according to the students. The discussions in the Moodle forum dealt mainly

with the small assignments: the students who did not write a weblog were instructed to discuss the tasks in the Moodle. However, we were surprised that these Moodle discussions appeared to be so important for the students because we only took part in designing these discussions by formulating the assignments and giving the space. Students pointed out that "the discussions in the Moodle were important: I got things to think about and I was able to see other students' opinions and different views of a variety of topics". An important aspect was the multidisciplinary background of the students: ”although I personally was not so active in the discussions, it was really interesting to read comments from other students from different fields".

In the questionnaire, the students also answered a question about what were the most important strengths of the course. The answers included three aspects related to 1) the multifaceted nature of the course, 2) the appropriate use of the technologies and appropriate studying practices, and 3) flexibility in terms of participation in the course and modes of study. According to the students, a key reason behind these strengths was the opportunity to carry out distant studies, which was made possible by distributing the lectures via the net and recording them for later watching. By the multifaceted nature the students referred to the design of the course in which media education was taught with and trough media. As a student wrote: "media was used authentically in teaching media education". The students had also noticed the appropriateness of the design of the course with respect the subject matter: ”later I realised how recorded video lectures, writing weblogs, the literature in the form of an e-book etc. were appropriate precisely for this course". The flexibility in the modes of study and participating in the course were, however, the most important strengths from students' perspective. According to the students, flexibility was realised in the study schedules and the individual ways of studying and learning. The students emphasised that these kinds of teaching practices are uncommon in university education in general.

In this article we do not give any detailed report on the answers to the closed questions. They include a richness of data which supports the aspects presented in the open questions, and gives us important back-

ground data for planning the next course. The success of the blogging option was quite clear. In the cross-tabulated results some remarkable distinctions occurred between the bloggers and the non-bloggers (exam passers). The bloggers valued the course more highly than the non-bloggers. Especially when asked whether the practices were suitable for the subject, the difference was clear (Figure 3). Likewise the bloggers were more satisfied with the technological solutions that were used during the course.

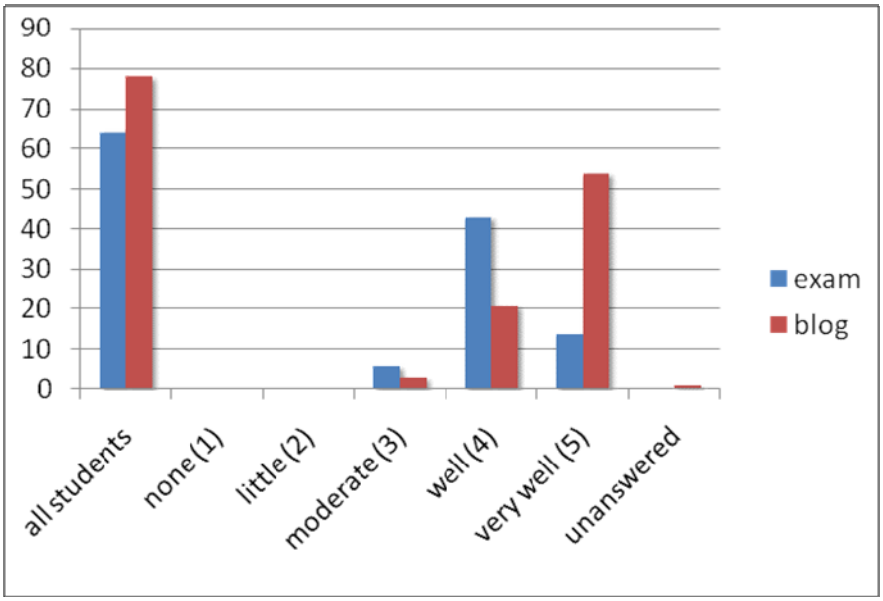


Figure 3. The bloggers' and exam passers' opinions regarding whether the practices were well-suited to the subject

In addition the highly positive feedback, the students suggested a variety of ways of developing the course. Several suggestions were related to the weblogging. According to the students the weblog as an option to accomplishing the course should have been better supervised, for instance, the evaluating criteria of the weblogs could have been more explicit (the weblogs were evaluated with the numeric scale 1-5, as the final exams). More supervising would also have been needed in the commenting on the weblogs. Students felt that they did not get a sufficient amount of written comments from other students or teachers on their weblog entries. More-

over, the teachers should have used weblog comments more as interactive discussion materials during the lectures.
Besides suggestions related to weblogging, the students would have wanted better organising and supervising of the discussions in the Moodle platform. An important aspect for the future development of the course was the need to pay more attention to the whole variety of audiences during the lectures. Particularly the distant learners who were watching the lectures online felt that they should have been taken into account more carefully, and more interaction between the audiences should have been created. The interaction was successful only in the last lecture when we used wireless microphones in the lecture hall so that the distant participants could hear not only the teacher's voice but the discussion from the lecture hall as well.

Discussion

The organisation and implementation of the course *Introduction to Media Education* was not too complicated for us teachers, and this evaluation indicates that the course was blended studying and learning for the students. Accordingly, developing new study environments in higher education could be easy and simple in practice but blended in terms of studying and learning.
We suggest that in order to create blended learning environments in higher education three interrelated elements should be considered: 1) knowledge (the subject matter, media education in this case), 2) new study practices (ways of participating in lectures, collaborative learning practices, personal ways of learning) and 3) tools (devices, software and other equipment needed). In this case these aspects were blended, for example, in terms of developing the students' media literacies: this aim which was related to the subject matter of media education was promoted by designing a mode of study that involved weblogging, and enhanced by designing small assignments during the course. Within a course of media education the integration of these elements is quite natural and easy. With

this success story we want to encourage other teachers to involve new media and new practices in their courses.

References

Flores-Koulish, S. (2005). *Teacher education for critical consumption of mass media and popular culture*. New York: Routledge.

Kotilainen, S. (2001). *Mediakulttuuri opettajankoulutuksen haasteena*. Tampereen yliopisto. Acta Universitatis Tamperensis 807.

Levonen, J., Joutsenvirta, T. & Parikka, R. (2005). Blended learning – Katsaus sulautuvaan yliopisto-opetukseen. *Piirtoheitin*, 2/2005.

Luukka, M-R., Pöyhönen, S., Huhta, A., Taalas, P., Tarnanen, M. & Keränen, A. (2008). *Maailma muuttuu – mitä tekee koulu? Äidinkielen ja vieraiden kielten tekstikäytänteet koulussa ja vapaa-ajalla.* Jyväskylän yliopisto: Soveltavan kielentutkimuksen keskus.

HEALTH PROMOTION AND MANAGEMENT

Connecting the viewpoints by means of blended learning

Ari Haaranen

The purpose of this article is to describe the design and implementation of the study module Health Promotion Management and to examine the significance of interaction in blended learning. The study module was entirely new and combined two extensive content areas, health promotion and management into one functional entity. The first chapter shortly describes the starting points and objectives of the study module. In the second chapter, the implementation and assessment of the study module are introduced. Finally, the significance of interaction in blended learning as prerequisite for success of the study module is examined. The description of the study module can be found in http://terjo.wikispaces.com.

Collaboration and society's needs as starting points

Health promotion management is a study module with four ECTS-credits. It was designed and implemented in collaboration with the Department of Nursing Science of the University of Kuopio and Schools of Public Health and Clinical Nutrition. Purpose of the collaboration was to increase cooperation between these two departments and to combine both departments' strong competency of health promotion, management and web-based teaching. Kuopio University's Council for Evaluation and Development of Education granted a development appropriation for the purpose of designing the study module in year 2008. With this appropriation, a designer was appointed for one month to coordinate collaboration between departments, design the study module and implement a web-based teaching period. A work group consisting of three experts from both departments of either health promotion, management or both domains was formed to support the design and implementation of the study module. The work group met three times in the course of six months.

Study modules discussing both health promotion and management together have not previously been available in the University of Kuopio. Both departments had received messages from the working life emphasizing the significance of teaching health promotion and management today and especially in the future. The focus of the national educational, social and health policy over the last few years supported the strengthening of health promotion and management competency in education. In 2004, a committee on the education and training for social and health care management of the Ministry of Education suggested that management training of social and health care should offer students management skills by means of which the implementation of national social and public health policy objectives could be ensured and populations' well-being and health promoted (Ministry of Education 2004, 44). Similarly, documents of the Ministry of Social Affairs and Health (e.g. Quality Recommendation for Health Promotion 2006, 23-24; National Development Plan for Social and Health Care Services. Kaste Programme 2008–2011, 38-39) and the Finnish governments' policy programme for health promotion (Health Promotion. Government Policy Programme 2007, 5) emphasized the strengthening of competency of health promotion management.

The purpose of this new study module was to offer future health scientists management skills and competency 1) in acknowledging and implementing welfare and health objectives in social decision-making, 2) in coordinating the functions of health promotion and 3) monitoring and assessing welfare and health strategies. In addition, there was a need to strengthen the acknowledging of ethical viewpoints connected to management.

Contents of the study module were:

- The basis of health promotion management
- Management practices in health promotion
- International and national strategies and programmes as basis of decision-making and management
- Management tools in health promotion: welfare reports and indicators, health impact assessment (HIA), international and

national welfare programmes and strategies, quality recommendations for health promotion
- Ethics in management

As learning objectives the students will:

- Create a general view of health promotion management and related factors
- Recognize the significance of multidisciplinary, cross-administrative, multiprofessional and international collaboration and networks in health promotion management
- Use national and international welfare strategies and programmes in health promotion management
- Construct new viewpoints to the evaluation of alternatives in health promotion management by using future dialogue
- Predict the challenges of health promotion management in the future
- Recognize and reflect one's own values and ethical aspects in health promotion management

Teaching and learning methods

The study module was first realized in the fall 2008. Altogether 71 students participated in the study module. They were mature students mainly coming from three different fields of health science: preventive nursing, nursing leadership and management and public health. Most of the participants studied in addition to working and did not live in the town they studied in. The study module was a part of Master's level studies, which meant that all students already had previous studies in management, health promotion or both.

The implementation of the study module included four stages: orientation, web-based learning, expert panel and future dialogue. The aim of the orientation was to give a general idea of the study module and subject area, form small groups, create blogs for the groups and give instructions for future web-based learning period. During the web-based learning pe-

riod students got acquainted with the topic from different perspectives, formed their own opinion about health promotion management and reflected on other students' views. The aim of the expert panel was to introduce different practical views concerning the topic with the help of outside experts, and together discuss the future challenges of health promotion management. By means of future dialogue, a new view of health promotion management was formed, things learned during the web-based learning period and panel were applied to practical examples and a positive future was anticipated. In the end of the future dialogue, a debriefing was arranged, where students' own learning and the realization of the study module were evaluated. Different stages and methods applied in them formulated a clear learning process, in which students' learning gradually deepened. The following chapter introduces these stages and their implementation more closely.

Orientation: what to do and expect?

The study module was commenced with a three hour orientation lecture, in which the teachers presented themselves and introduced the study module from the perspectives of health promotion, management and social media. During the lecture students familiarized themselves with the starting points, goals, implementation and assessment of the study module and were introduced to the use of social media in the studies. After the lecture students formed small groups and with the help of teacher created a blog for the group and prepared their first learning task, in which they presented their own group and shared their expectations concerning the study module. Students were allowed to write the blogs anonymously. Most groups created a group name for them and wrote the blog under this name. Nevertheless, each group had to inform the tutor which students belonged to their group. Altogether 21 small groups were formed. Students' expectations concerning the study module could be divided into two separate sections: content-related expectations and competency-related expectations. In expectations connected to content, the students hoped to get a broader general view about health promotion and management. Especially practicality, acquiring of new practical tools for man-

agement and applying these tools were expected. Some groups also wanted to better understand the significance and role of manager in health promotion and the societal relevance of health promotion and management. Expectations related to competency were connected to social media and especially to the desire to learn how to use blogs. Students wanted to have competency to use the blogs and participate in public conversation.

Understanding the topic and finding a viewpoint

After the orientation lecture students started to work independently in small groups in the Internet, by using the given study material and learning tasks as well as blogs created by students. Study module's own wiki site had been created into wikispaces.com environment. It is a free and practical wiki service with useful features for didactic use (Kalliala & Toikkanen 2009, 149). It contains all information connected to the study module and its implementation, as well as links to students' blogs. The site functioned only as web page of this study module. Only study module teachers were able to use its wiki features, such as jointly written text and revising while creating and revising the site. Nevertheless, the study module was realized in this environment, because teachers wanted to test it while creating the module. In the future, also students can utilize its wiki features in their tasks. In this occasion it was agreed that creating blogs, making entries to these blogs and reading other students' blogs were sufficient skills to students, who did not have any previous experience about tools of social media.

Duration of the web-based working period was eight weeks. During the web-based working students familiarized themselves with the given material and in small groups completed six learning tasks in their group blog. In the first task students had to present their own group and explain their goals and expectations regarding the study module. In the next four tasks students had to prepare a commentary summary of the given topic. Finally, students made an entry to the blog where they evaluated their own learning. In addition to these tasks, they had to comment on other groups' blogs. Because of the abundance of small groups, commenting on other

peoples' blogs was clarified by forming separate blog groups out of the small groups' blogs, within which the commenting took place. This way each small group had to comment on 4-5 blogs and reply to the comments received in their own blog. Totally one week was reserved for both creating a blog entry and commenting on the blogs.

The learning tasks were comprehensive on purpose. Each small group had an opportunity to choose their emphasis and viewpoint in regards to the given task. Therefore each task was different and emphasized different views, so unnecessary repetition was avoided. The blog entries were written in the form of commentary summary i.e. critical summary. This is a type of text in which the relevant points of author's text are explained to the reader so that the content and emphasis of the original text transfer to the reader. However, commentary summary enables author's own considerations and comments on the original text. Own comments and opinions are justified by scientific argumentation (Helenius et al. 2006). This way commentary summary enabled the summarizing of the topic, students' own comments and justifying of these comments.

Plenty of literature had been assigned to each learning task. Students were not expected to familiarize themselves with all literature prior to the learning task, but they were allowed to choose and share the material themselves. The aim was to gather a study material that would offer as comprehensive view of the topic as possible and would be as easily available to the students as possible. Therefore, the study module utilized free and available net publications whenever it was possible.

Directions concerning small group work were not given to students in beforehand, but students formed the groups themselves and determined their own practice patterns. On the whole, group work functioned quite well and the practice patterns used were versatile. In the debriefing students brought forward the different ways of working. For example, one group had gathered together and agreed on how to divide work. After this they arranged regular Skype-negotiations concerning the proceeding of the work. Respectively, some groups had divided tasks between members and exchanged information by email. In many groups the summary had been created together, after which one member added the text to the

blog. In some other groups however, the blog was written together, so that each member got acquainted with the material and wrote a comment, which other group members then complemented. Not all students were content with the group work. Reasons for this were for example the abundance of group work during studies, strong group members and so called “free passengers", who did not make enough effort to help the group and participated poorly in the group tasks. (see Repo-Kaarento & Levander 2003, 154-155).

The role of tutor in the web-based learning was to give technical support, follow blogs and occasionally comment on them. The use of blogs in the studies was new to all students. The goal was to ease the use of this new technical tool for example by dividing students into small groups, so that the groups’ collective knowledge and blog-using skills lowered students’ threshold to use this new study tool. Students were free to contact the tutor whenever there was a technical problem. Only few groups contacted the tutor for this reason and in these cases the main reason was a blog-server-related problem. In addition, the tutor actively followed students’ work online and every other week also commented on different blog groups’ entries after other students had commented on them. The students were satisfied with the tutors’ role; they stayed in the background but were also present at times as supervisors and commentators.

Expanding the topic and producing new information

After web-based learning an expert panel was arranged, to which experts and managers from the working life had been invited to give short introductory speeches about health promotion and management from the viewpoints of their own work. These viewpoints included for example strategic management, competency management, occupational well-being, cooperation and networking as well as concrete practical examples of health promotion and management. Each panellist had ten minutes to give their introductory speech, after which experts and students discussed about the presented viewpoints and considered the future challenges together. The expert panel continued for three hours. After the panel teachers prepared a short summary and instructed students to work in

groups and prepare for the future dialogue to be arranged the next day. The groups were deliberately bigger and different than groups in the web-based learning period. Three hours was reserved for the group work. The study module culminated to the future dialogue, in which student groups reminisced about good future within given cases and roles. With the help of tutors, they explained what kind of progress had occurred in discussed themes in year 2015. The themes included for example realization of national strategies and guidelines of health promotion in management, considering the health perspective and equality of health in decision-making and utilizing health promotion management tools in the municipality. Each group had their own theme, which students were allowed to clarify during group work for example to concern a particular area of communal activities. In addition, each theme included roles that students could also define in accordance with their theme. Students' roles varied within the groups, but at least following set of people were included: managers or people involved in decision-making, customers, residents of the municipality and employees of social and health care or health promotion. The future dialogue was implemented one theme and group at a time. There were altogether five groups. In all 30 minutes was reserved for each group after which all students had 15 minutes, or slightly more in needed, to comment on or suggest further ideas for the presented themes. Tutors posed questions for each group, to which the students of that group answered from the point of view of their own role. Table 1 presents examples of these questions. Next, students replied according to their own roles and themes. If needed, tutors asked additional questions and made sure that each group member had the opportunity to speak. The aim was to create conversation in which all members were able to present their viewpoint and find good practices and solutions together.

Table 1. Examples of teachers' questions in the future dialogue (by adapting Arnkil 2006)

Examples of questions posed by teachers
• Situation has proceeded optimistically, what particularly makes you happy?
• What actions have you taken to promote positive development?
• Which cooperation partners assisted you?
• Did you have concerns before, what were they?
• How these concerns have been resolved?
• What do you think has been decisive in the proceeding of things?

In the end of future dialogue tutors prepared a summary concerning the realized dialogue. The future dialogue clearly raised thoughts among students about things discussed in the panel by experts and other dialogue groups. In addition, thoughts raised during web-based learning were brought forward when students introduced the realized solutions as concrete actions in the presented cases. This way they proved that they can apply previous knowledge into presented cases. After the future dialogue also a debriefing was arranged, in which one's own learning and implementation of the study module were evaluated.

Feedback from students

The study module was evaluated by scale passed – fail. In order to get a passed grade the group was required to complete all tasks in their blog, comment on other groups' entries and discuss their own learning. In addition, each student had to actively participate in the expert panel and future dialogue.

Feedback was gathered in several different ways: with the learning task, debriefing and electronic feedback questionnaire since this was the first time this study module was realized. In the final web-based learning task, student groups wrote an evaluation of their own learning into their blogs

and discussed how the study module supported their learning. Students' comments were also valuable in order to develop the study module. A debriefing was arranged in the end of the future dialogue, in which teachers gave students feedback of their learning. Totally 51 percent of students returned the electronic feedback questionnaire two weeks after the study module. This questionnaire evaluated the used work forms as well as students' work load and time spent on the module.

Based on the feedback received, the study module was considered as demanding and hard but rewarding. According to students' feedback, the work load was however in accordance with the ECTS-credits. A study plan had been prepared for the study module, which described the time needed for learning. For example 43 hours i.e. 6 – 10 hours per learning task was reserved for familiarizing oneself with the material. This timetable frame was on display in the study modules' site.

According to students' opinion, the study climate was inspiring and supported critical thinking. The content of the study module corresponded well with the given goals. They were especially content with the abundance and availability of reference material and use of new methods. Although students hoped for even more guidance in regards to the use of blogs and more clarity to practical arrangements. Finally, one month after completion of the study module, the teacher gave students a written answer concerning the given feedback.

Interaction and supporting it – how did it succeed?

To connect two expansive content areas, health promotion and management, methods were needed by means of which students could deepen their learning together, find new solutions to combine contents and understand the interfaces of these subject areas. Promoting the students' learning by means of interactive methods was chosen as starting point of the study module, because it has been discovered that interaction increases students' learning and formation of knowledge (Repo-Kaarento & Levander 2003, 145; Dumbrajs 2007, 187).

Interaction can be supported both in contact and web-based teaching. Combining these two forms of teaching in the same study module is called blended learning. According to Garrison and Vaughan (2008, 5), the experiences of both contact teaching and web-based teaching are profoundly combined in blended learning. By reflecting on literature, the following chapters examine how interaction was promoted in the above presented study module.

In interactive and dialogue teaching the central goals are learning from conversation, learning independent thinking, combining different viewpoints, together identifying the matter being learned and producing new understanding (Sarja 2000, 10; Repo-Kaarento & Levander 2003, 142). All these goals are included in the structure of the learning module, which idea was to use the stages of dialogue exam that was utilized in the teaching of nursing: 1) understanding the matter and finding a perspective, 2) producing distinctive views, 3) scientific conversation, 4) producing new knowledge and 5) creating synthesis (see Pietilä et al 2008, 18). The first stage was included in the web-based learning and was actually its goal. Students got acquainted with the given material together and prepared a commentary summary. The next stage, producing of distinctive views was divided into three phases of the study module. This stage was clearly included already in the web-based learning as groups commented on each others' tasks, but particularly in the expert panel, where experts introduced views on practical management and health promotion. Producing of distinctive views was further continued in the future dialogue, where students placed in different roles brought varied viewpoints to the themes. Scientific conversation was practised both during web-based learning and in collective conversation of the expert panel. Producing of new knowledge and creating synthesis were included in the future dialogue. Together students formed new views concerning management and health promotion by means of supervised dialogue. Finally, the tutors gathered the new views together.

The selection of methods supporting interaction and dialogicality of the study module both in contact and web-based teaching was successful. Work group established to design the study module was eager to try both

social media (blog) and new dialogical methods (expert panel, future dialogue). For example, the basic idea of social media includes interaction, cooperation and jointly produced information, in which openness, interaction and fusion of communication forms are essential (Laitinen & Rissanen 2007, 11). According to Kalliala and Toikkanen (2009, 18), social media is also a process, in which individuals and groups build common meanings by means of contents, communities and network technologies. This way the selection of social media supported the starting point of the study module i.e. interactive learning.

Blog, a social media tool was selected as students' network tool. Blog is a practical and free web page service designed for publishing and maintaining text and multimedia. It enables the sharing of thoughts, comments and descriptions and interaction with other people, and allows them to add sound, pictures or videos into the texts (Kalliala & Toikkanen 2009, 41; Downes 2004, 16).

Purpose of the blog was to create interaction and increase searching, sharing and evaluating of common knowledge. Another important goal was to learn how to use new, modern publication methods. In this study module the purpose of the blog was to act as publishing platform of students' tasks and discussions and as discussion board for the students. The idea to use blogs as forums of students' commentary summaries functioned quite well. Even though it was stated in the orientation lecture that blog entries are usually quite short, unofficial and personal (see Downes 2004, 18), the students' texts were still relatively long. In addition, some texts lacked students' own discussion and comments. Long texts lowered other students' interest in reading the blogs. Reasons for these long texts were expansive assignments, difficulties in defining the topic and students' study behaviour. Students were accustomed to prepare expansive writing tasks in their previous studies. In the future, the study module will be developed so that the dividing of work between groups is altered. One group in turn within each blog group prepares a commentary summary, which others comment on based to the material they have read. Assignments will also be focused.

Based on feedback received from students the use of blogs was quite easy. It was a new and stimulating experience for many. Emphasizing the communalism in information sharing and training to comment on texts with help of source material were considered as the benefits of using blogs. According to students, while writing the blog they had to think about the text more than usual. Students wanted the text to be well prepared before it was published openly. While preparing blogs and comments students had to consider things from several different perspectives. The opinion was that working with blogs in groups developed skills of critical evaluation, writing, argumentation and acting in group.

The dialogic methods of contact meetings were expert panel, future dialogue and working in small groups while preparing to the dialogue. Dialogue is defined as discussion between people, in which they think and search for answers together, listen to each other, are interested in each others' views and respect each other (Arnkil 2006, 1; Isaacs 2001, 40). The purpose of dialogue is to raise new insights and in that way attain new understanding, which guides us to listen and see entities from various aspects. Dialogue inspires us to learn together and from each other (Isaacs 2001; 30, 40).

In the expert panel it was gratifying to see how well students participated in the discussion after the introductory speeches. The experts' partly conflicting introductory speeches raised thoughts about health promotion and management and combining these two. Previous familiarization with the topic in the web-based learning period gave students skills to comment on what they had heard and justify their opinions, rather than just rely on the "I feel that " – knowledge. This way the panel became richer in meaning and more versatile than it otherwise would have been. Clear differences in the students' activity were detected due to differences in educational backgrounds. Students who had used dialogic methods actively in their previous studies were more initiative and had courage to bring forward their own views better than others. On the other hand, the space and group size limited interaction. A lecture room designed for 200 students was reserved for the panel and it was too large for about 50 study module participants. Students were scattered all over the room in order to enable

active interaction, and the large number of students also silenced the shy and quiet students to some extent.

Future dialogue was a new method for both teachers and students. However, teachers of the study module had previous experiences of some other dialogic methods. Future dialogue has usually been used in workshops and conferences consisting of several different actors, and dealing with problems demanding cooperation or being versatile in nature. Each participant imagines the future and significant progress that has occurred in the discussed topic. Future dialogue is a future-oriented, polyphonic and problem-solution-oriented method in which good future is reminisced. (Arnkil 2006, 2-9.) For the purpose of this study module, teachers revised the method so it would be better suited for the learning situation and would better promote learning.

According to Arnkil (2006), dialogicality brings along amusement and surprise to the situation. During dialogue it was discovered that the atmosphere in the lecture room became relaxed and playful. Students took their roles seriously and brought surprising elements to them, so other members of the group had to react from the perspective of their own character and handle new challenges. Especially in these situations student's competency on the topic was clearly visible. According to one example, technical manager of the municipality had decided to increase the gritting of sidewalks during wintertime in order to avoid serious fallings and hip fractures. In the same group, an elderly member of the district was not content with this, because gritting would limit the exercise possibilities, when it would no longer be possible to use a kick sled in the sidewalk. Both parties examined the matter from the perspective of health promotion, but conflict was still unavoidable. As the discussion proceeded, the parties agreed on a partial gritting of the sidewalk, then half of the sidewalk would be gritted and the other side would be left as it was.

The aim of the dialogical methods of web-based teaching and contact meetings was to create dialogue and listening between students, between students and teachers, students and experts, and possibly also between students and rest of the society. Of these goals first three were realized. The last objective was already from the very beginning only a possibility

that the use of blogs enabled. Although people outside the study module did not comment on students' blogs and they therefore lacked active interaction, also outsiders did read the blogs. Many students had mentioned the study module and its implementation in open network environment in their work places in social and health care. Some students had even presented the study module and material related to it. Based on the download statistics of blogs and wiki-environment, the study module had been followed actively also by outsiders. This way the final objective was realized, although passively from the students' point of view. On the other hand, this supports the definition of Downes (2004, 24) about blogging, which is first defined as reading, coming to know the blogger's areas of interest. Secondly, it is commitment to contents and to the writer, what has been read: reflecting, criticising, questioning and reacting. Only by last definition blogging is writing and replying to writings (Downes 2004, 24).

The weakest area of the study module was assessment. It was not designed well enough from the viewpoints of interaction and group activity. For example evaluation of group work was only scantily included in the debriefing and it was not discussed in any other assessment method. In the future, common activities will be evaluated in different stages of the study module. An assessment section evaluating the groups' learning will be added to the web-based learning task evaluating one's own learning and group activity assessment will remain as part of debriefing. Students' own evaluation and teachers' assessments were persevered in all stages of learning. Students were not completely aware of the content assessment criteria used by teachers in the web-based learning. In the future, own assessment criteria for web-based learning will be prepared, which will concern both contents and group work, and are visible and acknowledged by students throughout the whole study module.

The use of interactive methods succeeded both in contact and web-based learning. Methods supporting both teaching forms were discovered. They deepened students' content-related learning, but also learning of group activity and interaction. The amount and diversity of interaction in different situations increased phase by phase and was concluded in common dia-

logue, in which new solutions were found to different situations by working together. Initial experience of the implementation of the study module was encouraging. It supported and gave new perspectives to realizing the next study module. The weakest points of the study module (assessment and arrangements) were identified and by developing them, a better study module than before can be realized. By means of blended learning it is possible to develop students' interaction skills and group activity gradually by using the most suitable tools.

References

Arnkil, R. (2006). Tulevaisuusdialogi ja dialogin tulevaisuus. *Aikuiskasvatus,* 2/2006, 1-11.

Downes, S. (2004). Educational blogging. *EDUCAUSE Review*, 39 (5), 14-26.

Dumbrajs, S. (2007). *A learning community. Teachers and students engaged in developing their own learning and understanding*. University of Joensuu, Publications in Education. N:o 123. Joensuu University Press.

Garrison, D.R. & Vaughan N.D. (2008). *Blended learning in higher education. Framework, principles, and guidelines*. Jossey-Bass. U.S.A: John Wiley & Sons, Inc.

Health promotion. Government policy programme 2007. Finnish Government. Downloaded on 2.7.2009 from: http://www.vn.fi/toiminta/politiikkaohjelmat/terveys/ohjelman-sisaeltoe/fi.pdf.

Helenius, J., Kaakkolammi, K., Laihanen, E., Lampinen, A., Nurmi, T. & Suoniemi-Taipale, I. (2006). *Kirjoittajan ABC-kortti –Web page*. Downloaded on 3.8.2009 from: http://webcgi.oulu.fi/oykk/abc/.

Isaacs, W. (2001). Dialogi ja yhdessä ajattelemisen taito. Helsinki: Kauppakaari.

Kalliala, E. & Toikkanen, T. (2009). *Sosiaalinen media opetuksessa*. Helskinki: Oy Finn Lectura Ab

Laitinen, K. & Rissanen, M. (Eds.) (2007). *Virtuaalisia yhteisöjä, ajatuksia*

ja avoimuutta –sosiaalinen media opetuksen ja oppimisen tukena. Sosiaalinen media opetuksen ja oppimisen tukena (SMOOT) hankkeen selvitys. University of Kuopio. Learning Centre. Kuopio: Kopijyvä.

Ministry of Education (2004). *Report of a committee on the education and training for social and health care management*. Reports of the Ministry of Education, Finland 2004:30. Helsinki.

Ministry of Social Affairs and Health (2006). *Quality recommendation for health promotion*. Publications of the Ministry of Social Affairs and Health, Finland 2006:19. Helsinki. (in Finnish)

Ministry of Social Affairs and Health (2008). *National development plan for social and health care services*. *Kaste Programme 2008–2011.* Publications of the Ministry of Social Affairs and Health, Finland 2008:6. Helsinki. (in Finnish)

Pietilä, A-M., Karvinen, I., Matveinen, M. & Röynä, T. (2008). Dialogi – mahdollisuus tieteellisen argumentoinnin oppimiseen. *Pro terveys* 5/2008, 16-19.

Repo-Kaarento, S. & Levander, L. (2003). Oppimista edistävä vuorovaikutus. In S. Lindblom-Ylänne & A. Nevgi (Eds.), *Yliopisto- ja korkeakouluopettajan käsikirja*. Helsinki: WSOY, 140-170.

Sarja, A. (2000). *Dialogioppiminen pienryhmässä. Opettajaksi opiskelevien harjoitteluprosessi terveydenhuollon opettajankoulutuksessa.* University of Jyväskylä. Jyväskylä studies in education, psychology and social research 160. Jyväskylä.

SUPPORTIVE VIRTUAL LEARNING ENVIRONMENTS

BLENDED LEARNING: TEACHING PRIMARY HEALTH CARE WITH VIRTUAL PATIENTS

Lena Sjöberg-Tuominen & Kalle Romanov

In the medical curriculum, various teaching methods are commonly combined to train students to adopt clinical skills, perform diagnostic reasoning and select the correct treatment of the patients. The teaching has traditionally involved various modalities such as lectures, clinical rounds, and small group sessions. Unfortunately, these campus-oriented modalities are often insufficient in mediating the basic skills students need to enable them to manage the clinical process in the care of primary care patients. Additionally, the symptoms and complaints encountered in primary health care are rarely seen in the setting of a university hospital inpatient or outpatient clinic. On the other hand, neither the students nor their teachers have regarded paper-based patient cases as a dynamic and stimulating learning method.

To improve teaching methods, educators have developed interactive computerized sessions that would enhance student activity and provide them the opportunity to practice their skills. Such methods could effectively train students to master the knowledge and skills needed to run a successful primary care practice. The use of virtual patients in medical teaching has increasingly been adopted in medical schools (Huang 2007).

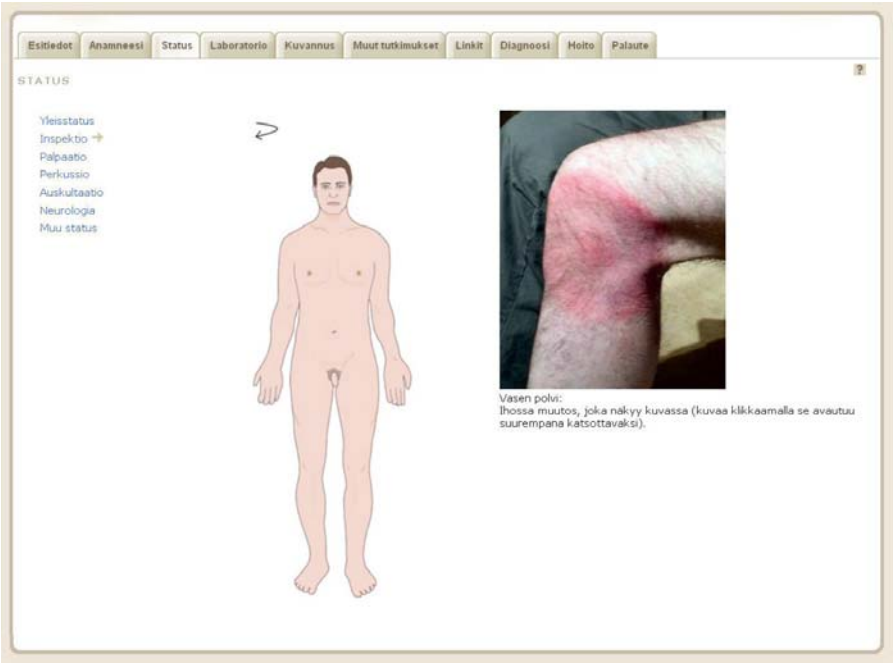
The web-based virtual patient pool, *VPP*, was developed in the medical faculty of the University of Helsinki during the VPP project in 2004-2006. The goal was to develop web-based software to simulate the natural process of clinical examination of adult patients, and VPP was designed to allow students to perform extensive clinical examinations and investigations on virtual patients.

Each virtual patient is associated with up to four stages or activity types, denoted by the terms *history*, *examination*, *investigation,* and *management*. History is the activity directed at asking the patient questions. Examination is the physical examination of the patient. Investigation

represents the use of available laboratory, radiological and other services provided. The VPP enables students to record a complete medical history of the patient, perform a clinical examination, including auscultation of the heart and lungs, to take all necessary laboratory tests, examine the patient with medical imaging methods, and examine the patient with diagnostic procedures. For each patient, the student may choose from none to many items within each stage, although most patients will tend to follow a sequential pattern of history, examination, and investigation. There is no requirement to undertake any of these, and they can be undertaken in any order.

Lastly, the management of the patient (i.e., diagnostics and treatment) covers those issues that are the central outcomes of the whole process. Diagnostics covers the student's attempt to identify precisely the nature of the patient's health problem. The treatment aims to modify the outcome for the patient, for example through treatment with medication or perhaps physical therapies. The criteria for a completed virtual patient may include just the diagnostic process or students may also be required to formulate a treatment plan for the patient.

As an example of the process, the student might begin by asking the patient, “What brings you here today?” Further questioning would also be directed at assessing how the underlying condition had been managed to date and whether some other process might be affecting the current health status of the patient. Once the patient’s history has been ascertained, the student begins the physical examination with an initial evaluation of the patient’s vital signs, including pulse and blood pressure. The student might then inspect the general status of the patients. The clinical examination is directed at identifying objective indications of illness. Having completed a relevant physical examination, the student would order laboratory and other investigations in order to confirm (or exclude) the anticipated diagnosis and to assess the consequences of the underlying condition.



Picture 1. The virtual patient is examined: by clicking on his body, inserted photographs of genuine findings appear.

At any point, the student has the opportunity to return to another stage, such as the recording of the patient's history, verifying whether items have been overlooked or an unexpected finding was found in the examination, or as the result of investigations.

The teacher can design the properties of a VPP virtual patient in order to emphasize certain student activities and actions assigned relevant to the diagnosis or management of the patient. This same relevance can also be assigned to selected laboratory investigations and medical imaging.

After finishing the whole process with a virtual patient, the student can compare immediate feedback on his/her performance against a golden standard defined by the teacher. This feedback contains a list of relevant issues to be covered in recording the patient's history, physical examination, ordering investigations, and choosing a management.

For the teacher, the VPP will produce detailed information on how each individual student is performing with a virtual patient. In addition, summarizing statistics displaying the average performance of all students are available for the teacher.

In earlier studies, we have investigated how students utilize voluntary VPs and discovered that the use was associated with better outcomes in a semi-annual progress test. VPs are more often voluntarily utilized by students who already perform better in clinical topics (Kuusi and Romanov 2008). Therefore, this type of teaching should be integrated into clinical studies in order to reach those students who need it more.

Blending the virtual patient pool into teaching general practice

Medical students are taught to become general practitioners, after which they can focus on different fields of medicine. The course in primary health care medicine, however, lasts only about four weeks. One week is included in the third study year, and three weeks in the fifth study year. Of these three weeks during the fifth year, the first week focuses on theory, which prepares students for a two-week period of practical studies in a health centre.

During the first four study years, medical studies are very disease- and hospital-oriented. One of the main goals of the course in general practice and primary health care is to help the students to adopt a perspective which focuses on the patient as both a person and a member of his or her family and society. In the hospital world, different patients come and go, but they all have similar problems within one field of medicine (e.g. eye diseases, delivery), whereas in primary health care, the same persons come and go, but potentially present a new problem for each appointment. The symptoms can be diffuse and their severity can vary considerably. This change of perspective is pointed out to the students and is also included in a less candid manner throughout the entire course.

During the only week of theoretical studies in general practice, we use virtual patients in the classroom. The students are asked to log into the VPP and to choose one of the cases; all students use the same case simultaneously. The two teachers (one professor, one clinical teacher) are present in the classroom. By walking around in the classroom, the teach-

ers observe how the students work in the VPP system. After all students have solved the case, the case is discussed in the group.

The short duration of the course enables us to focus on one major symptom: fatigue. All the virtual patients presented during the study week have come to see the doctor because they feel tired. There are five virtual patients to use during the course and they all have a different underlying condition which causes the fatigue. Each disease is discussed in the group from the perspective of practical primary care.

The general practice study week also consists of traditional lecturing, but in small groups. About one fourth of the week consists of VPP group sessions. The symptoms and underlying conditions discussed during the VPP sessions are also discussed during a part of the lectures, and the clinical management of tired patients is evaluated in the examination, which takes place two to three weeks after the week of theoretical studies.

According to the principle of constructive alignment (Biggs and Tang 2007, 50-63), the teaching and evaluation methods should be aligned with both the learning activities and the objectives of the course. By using virtual patients during the course in general practice and primary health care, we simulate the clinical situations present in primary care.

If none of the students makes any grave mistakes and if none of them opposes, the summarizing statistics are shown to the group when all have solved the case. This enables self-evaluation on a larger scale than the simple system feedback, where the diagnosis is either right or wrong in a very black-and-white sort of way. The students can see how fast or slow they were, how much money they have used on diagnostics and how great a proportion of the questions they asked where relevant – all in comparison to their peers.

Perustiedot | Palaute | Anamneesi | Status | Laboratorio | Kuvannus | Muut tutkimukset | Keskeiset tiedot | Suoritustilastot

Yhteenveto | Suoritukset | Anamneesi | Status | Laboratorio | Kuvannus | Muut tutkimukset

YHTEENVETO

Nimi	Vk	Diag	Oik	Ratkaistu	Kesto	Anm	Anm%	Sta	Sta%	Lab	Lab%	Rtg%	Muut	Kust	Pal	Link
[redacted]	Ku	B02	1	22.04. 11:50	24 min	30	100 %	46	67 %	4	---	---	0	64,20 €	1	0
[redacted]	L5	GS4.0	0	24.04. 12:27	9 min	6	0 %	8	17 %	3	---	---	0	38,00 €	1	0
[redacted]	L5	M79	0	17.04. 18:32	18 min	28	100 %	74	33 %	5	---	---	2	251,70 €	1	0
[redacted]	L5	M54	0	22.04. 17:03	54 min	46	100 %	61	17 %	5	---	---	0	132,40 €	1	1
	---	---		---	---	---	---	---	---	---			---	---	---	---
[redacted]	L3	M75.8	0	22.04. 21:04	46 min	43	100 %	63	33 %	32	---	---	1	489,60 €	1	1
[redacted]	L4	M79.1	0	15.04. 13:34	10 min	28	100 %	37	17 %	4	---	---	1	166,60 €	1	1
[redacted]	L3	I48	0	16.04. 21:40	23 min	26	100 %	49	0 %	2	---	---	2	395,60 €	1	1
[redacted]	L4	B17	0	15.04. 22:07	21 min	17	100 %	36	50 %	20	---	---	2	884,10 €	1	0
[redacted]	L5	B02	1	22.04. 12:53	6 min	9	100 %	6	17 %	2	---	---	0	8,20 €	1	0
Keskimäärin:		25/109 = 23 %			29 min	35,3	87 %	49,8	28 %	12,0	---	---	1,0	290,09 €	100 %	45 %

Picture 2. The summarizing statistics. In the column “Oik”, 1 stands for a correct and 0 for an incorrect diagnosis. “Kesto” is the time spent with the patient. The number of questions asked is listed in “Anm”, the number of clinical investigation procedures in “Sta”, and the number of laboratory investigations in “Lab”. “Kust” shows the money spent on diagnostic procedures. The teacher has defined which questions and investigations are relevant for the case; the proportion of relevant procedures conducted by each student appear as a percentage (Anm%, Sta%). (This particular case did not include absolutely relevant laboratory or radiologic (Rtg) investigations.)

We found that the group discussion is more active immediately after the students have solved the virtual patient case than when the students are assigned a virtual patient case on their own and discuss it afterwards in the classroom.

According to Chickering and Gamson (1987), good practice in undergraduate education

1. encourages contact between students and faculty,
2. develops reciprocity and cooperation among students,
3. encourages active learning,
4. provides prompt feedback,
5. emphasizes time spent on an assigned task,
6. communicates high expectations, and
7. respects diverse talents and styles of learning.

These *Seven Principles for Good Practice in Undergraduate Education*, which in our opinion represent ”common sense” at its best, are emphasized in teaching general practice. In primary health care, teamwork is essential, and communication with colleagues should be encouraged during the studies. In our opinion, the virtual patient cases have stimulated to discussion to a greater extent than have traditional lectures. The virtual patient system actually measures up to the standards of all the above mentioned principles of good practice in undergraduate education.

According to the principle of constructive alignment, the evaluation methods should be in line with both the objectives and the teaching methods of the course. The course examination in general practice includes patient cases, the management and treatment of which the students are expected to write about. Thus far, we have used only paper-based cases in the examination, but are planning to include a virtual patient case in future examinations. This has been done elsewhere, e.g., in Germany (Waldmann et al. 2008). In this German study, however, the correlation between the level of performance in the virtual patient examination and the traditional examination was only moderate. The students preferred the virtual patient examination, because it enabled them to apply their knowledge and skills.

Both the Finnish universities in general and our own university in particular have defined quality criteria for web-based education. According to these, the use of virtual patients in our course fulfils the criteria of good quality: the learning objectives, teaching methods and assessment are set, the course consists of versatile learning situations and methods, and individual feedback is a natural part of the learning process.

For many years, virtual patients have served in medical education in other universities in several countries. To our knowledge, our course is the only one in Finland where virtual patients are used in a blended learning situation. The general feedback from the students has been very positive. When asked specifically which they prefer, virtual patient cases or paper-based cases, all have unanimously preferred virtual cases.

We have implemented the use of virtual patients in a blended learning situation in groups consisting of 8 to 14 students. A small group size is

essential to enable sufficient teacher supervision during the virtual session and to ensure a relevant group discussion after each case.

Creating new patient cases is time-consuming, which other medical teachers have also noted (Huang et al 2007, Voelker 2003). In previous studies, students have acquired even better diagnostic and communication skills with virtual patients than with so called standardized patients (which usually means professional actors) (Deladisma et al 2007, Stevens et al 2006, Triola et al 2006). In these studies, however, the virtual patient system was technically more advanced than our VPP system.

We cannot teach communication and interaction in the doctor-patient relationship – a very important skill, which often is discussed in society in general - by using virtual patients in the classroom. On the other hand, a blended learning situation provides teachers an opportunity to emphasize this component of real patient encounters. We also trust that the way teachers act in the classroom when providing feedback to students serves as a model to the students when they meet and interact with patients, nurses and colleagues in primary health care.

References

Biggs, J. & Tang, C. (2007). *Teaching for quality learning at university (Third edition)*. Maidenhead: Open University Press/McGraw Hill.

Chickering A, Gamson Z. (1987). Seven principles of good practice in undergraduate education. *The American Association for Higher Education Bulletin*, March 1987.

Deladisma, A.M., Cohen, M., Stevens, A., Wagner, P., Lok, B., Bernard, T., Oxendine, C., Schumacher, L., Johnsen, K., Dickerson, R., Raij, A,. Wells, R., Duerson, M., Harper, J.G. & Lind, D.S. (2007). Association for surgical education. Do medical students respond empathetically to a virtual patient? *American Journal of Surgery, 193(6):756-760.*

Huang, G., Reynolds, R. & Candler, C. (2007). Virtual patient simulation at US and Canadian medical schools. *Academic Medicine, 82(5):446-451.*

Kuusi, T., Romanov, K (2008). The use of virtual patients and students' clinical knowledge. *The Association for Medical Education in Europe 2008*, abstracts 4X/P12.

Nevgi, A., Löfström, E. & Evälä, A. (2007) (Eds.) *Laadukkaasti verkossa. Yliopistollisen verkko-opetuksen ulottuvuudet.* Kasvatustieteen laitoksen julkaisuja. Helsinki: Yliopistopaino.

The Teaching Evaluation Matrix, University of Helsinki. Available online at: http://www.helsinki.fi/julkaisut/aineisto/hallinnon_julkaisuja_44_2007.pdf .

Stevens, A., Hernandez, J., Johnsen, K., Dickerson, R., Raij, A., Harrison, C., DiPietro, M., Allen, B., Ferdig, R., Foti, S., Jackson, J., Shin, M., Cendan, J., Watson, R., Duerson, M., Lok, B., Cohen, M., Wagner, P. & Lind, D.S. (2006). The use of virtual patients to teach medical students history taking and communication skills. *American Journal of Surgery,* 191(6):806-11.

Triola, M., Feldman, H., Kalet, A.L., Zabar, S., Kachur, E.K., Gillespie, C. Anderson, M., Griesser, C. & Lipkin, M. A. (2006). Randomized trial of teaching clinical skills using virtual and live standardized patients. *Journal of General Internal Medicine ,21(5):424-429.*

Verkko-opetuksen laatukäsikirja, VOPLA (2005). Available online at: http://www.vopla.fi/laatukasikirja/ .

Voelker R. (2003). Virtual patients help medical students link basic science with clinical care. *JAMA,* 290(213): 1700-1701.

BLENDED LEARNING IN BIODIVERSITY TEACHING

Viivi Virtanen & Jouko Rikkinen

Introduction

Some skills in species identification are required from all people that work with biodiversity. For example, the current global biodiversity crisis with greatly accelerated species extinction rates is generally recognized and conservation efforts have been initiated around the world to preserve at least part of Earth's biodiversity (Agenda 21, 1992). Skills in species identification are a prerequisite for the collection of basic data for environment protection and the preservation of all types of biodiversity, including species of medicinal or other economic importance.

Variation in students' motivation and prior knowledge will greatly influence the learning outcomes of any student group (Biggs & Tan 2007; Hailikari & Nevgi 2009). In many cases traditional teaching methods have not resulted in desired or satisfactory learning outcomes. Teaching species identification has traditionally relied on teacher intensive methods and much face-to-face contact. If confronted with poor learning outcomes the teachers have often claimed: 'I did my best and gave all the necessary information, but the students still didn't learn'. In this statement the focus of teaching is clearly on what the teacher has done and not on what the students did (Biggs 1999, 62-63). However, practical experience had shown and research has confirmed that deep learning requires students own activity and engagement in learning (Biggs & Tan 2007; Vermunt & Vermetten 2004). In other words, the focus of teaching in higher education should be on what the students do. In the context of biodiversity courses, we need to carefully consider whether all of our traditional teaching methods have really supported student activities that can lead to deep learning of species identification skills.

Plants are diverse and the local flora of even a small study area will typically include more species that can be examined together during face-to-

face sessions, particularly if the students are given adequate opportunity to actively participate in recognition processes. Figure 1 shows a generalized species importance curve typical of very many natural environments in productive ecosystems. The importance value refers to some index that typically combines a measurement of local frequency and abundance of given species. At the left side of the diagram there are the dominant species that are both common and abundant. For many practical purposes, these are the 'must species' that every local biologist should know, and thus they are typically included in the obligatory requirements of elementary university courses. At the other end of the scale there are other species of special interest, e.g. threatened species or species that have very restricted habitat requirements and can thus be used as biological indicators etc. Because of their theoretical and/or practical uses, such species are often taught and learnt during advanced courses.

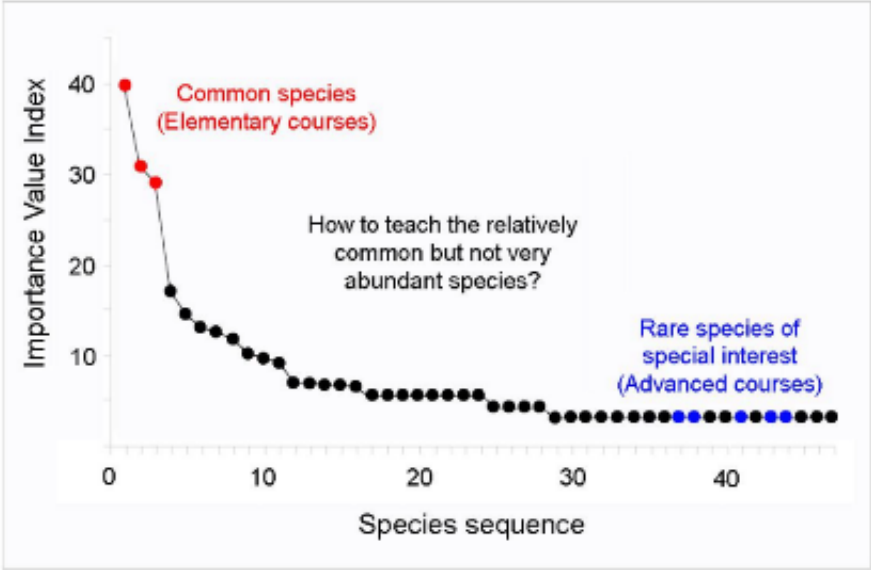


Figure 1

The above pattern underlines one general difficulty in teaching biodiversity and especially species recognition. A student may soon acquire the skills necessary for identifying most of the common and abundant species, and even a number of rare and difficult ones, but to really master the later

group – which is typically required from academic professionals, and thus also among the desired learning outcomes of higher education – one should also acquire a good general understanding of practically everything else that might be around. This level of expertise can hardly be achieved by any other means but through the full engagement and considerable personal activity of a highly motivated student.
While trying to support our students in their task, we have become convinced that blended learning is the most effective presently available model for us to use in redesigning our basic and advanced university courses in plant identification and other learning assignments.

What and why do we blend?

Graham (2006, 4-5) defined blended learning as the combination of face-to-face instruction and computer-mediated instructor. In blended courses the two traditionally separate learning systems are combined, and the role of computer-based technologies is emphasized. Vaughan (2007, 81-83) noted that blended learning in higher education mostly referred to hybrid courses, in which a significant portion of the learning activities take place online, and classroom time is reduced. Optimally, an increased emphasis on online activities also changes the nature of face-to-face sessions, with a shift from lectures to interactive discussions (Meyer 2003). Thus, the end result of blended learning may often be more than just the net sum of bringing the two different learning environments together (Vaughan 2007, 81-83). In practice, the shift from separate lectures and computer exercises to the use of blended learning systems can usually only be achieved by redesigning the whole course.
In our new courses we use learning assignments that require student activity in more than one learning environment (field, botanical garden, classroom, home study, web recourses) and these activities are blended. Typically, several different teaching and learning methods, such as independent studying, collaborative learning, and short lectures, are integrated into each course. In all cases, some learning activities require the use of online study materials, and students are actively encouraged to take on

extra take-home assignments to further explore the subject on their own before the next course gathering. These practices enhance student activity also during lectures, often leading to situations where knowledge is constructed together with the students. Also online study materials are produced together with the students – sometimes to be used later during the same course – but often also for the benefit of forthcoming student groups. The ultimate goal is to build an open-access web-resource that could support lifelong learning in practice, and give the students the opportunity to come back to their own study material and continue to construct their knowledge indefinitely.

The quality of learning, flexibility, and cost-effectiveness are some reasons why people are said to choose blended learning (Dalsgaard & Godsk 2007; Graham 2006; Vaughan 2007). Also in our case, the main reason for incorporating blended learning strategies has been a hope to alter the learning process of students for better learning outcomes. Research suggests that student activity and engagement in learning are among the key features that promote high quality learning (Biggs & Tan 2007; Vermunt & Vermetten 2004). As previously described, we have identified these same features to be crucial for reaching the desired learning outcome in our biodiversity courses. Well in tune with Meyer (2003), we have also experienced that engaging students in well-planned online learning activities tends to change the nature of the in-class learning situations: in many cases teacher-intensive lectures have been partly replaced by interactive discussions, in which the students and teachers share and construct knowledge.

Learning environment and students

Together with three other faculties of the University of Helsinki on the Viikki Campus, the Faculty of Biosciences forms the largest cluster of bioscience research and education in Finland. Graduates of the faculty are trained to become experts in different fields of biology, biochemistry, and aquatic and environmental sciences, and most of them will pursue

their working careers in basic or applied research, education and administration, but also in business and industry.

Instruction within the biology major includes lectures, practical laboratory work, field courses, seminars, and web-based teaching. Living collections, the student herbarium, and the resources of three biological stations are all traditional and important components in the learning environment of students during biodiversity studies. Basic concepts of biodiversity and examples of species diversity in different groups of organisms are given during first-year introductory courses as these are an important prerequisite for more advanced studies. Although only common or otherwise important species are typically introduced, the cumulative number of species tends to rise into the hundreds.

The basic challenge for the teachers is: How to help students understand the complex interrelations between the various facts and concepts presented in the different courses, and how to motivate the construction of deep-level understanding of biodiversity, when even memorizing the relevant scientific names may pose a significant task for students that often have had hardly any prior experience in recognizing species?

Students' prior experiences, knowledge, conceptions, and reasons for taking specific courses are all important background variables that can greatly influence the quality of learning in university studies (Biggs & Tan 2007; Vermunt & Vermetten 2004). Accordingly, we have started to collect data on the prior knowledge and motivation of first-year-students in our faculty. We have given all participating students a questionnaire at the beginning of the first introductory course on plant identification and so far (during 2008 and 2009) collected information from a total of 160 students. The preliminary results indicate that the students' prior knowledge and primary goals are quite variable. However, a great majority of students regard the subject matter interesting and are quite motivated in improving their skills in plant identification. This agrees well with the experience of many teachers: the lack of student enthusiasm is generally not among the greatest challenges in teaching biodiversity courses.

Web-based learning environment Pinkka

Many plants and fungi are difficult to identify, for example because they are small, highly variable, or quite often both. In many groups of organisms, the lack of modern literature in Finnish poses an additional obstacle for learning, especially for first-year students. For teaching biodiversity and especially to support the independent study efforts of biology students we have constructed 'Pinkka', an open-access web-based biodiversity resource.

Pinkka has a large database with species descriptions, photographs, and other relevant information that help in the identification of plant and fungal species. It is not a standard web flora nor textbook, but rather consists of pre-organized study material to support student learning activities during biodiversity courses, but also at other times. In the web-based learning environment numerous photographic images are easily provided. Students are also encouraged to compile their own digital herbaria. At present, students can test their knowledge on any species group by hiding the names, and they can test their knowledge on scientific names by taking computer generated and evaluated web tests. In future, the program will allow much more student interaction.

Blended learning in practice

As pointed out by Graham (2006, 10-12), blended learning can occur at different levels, such as the student activity level, course level, program level, and institutional level. Students at different levels of their university studies need a teacher to support their learning activities, but in all levels the teacher should soon draw back and emphasize student's self-regulation in learning.

In this paper, we describe three practical examples of how we have used blended learning strategies in different learning situations.

- The first example describes how we have used blended learning strategies while introducing novice undergraduate students to

some basic concepts of biodiversity, taxonomy and biogeography, and to the practical task of identifying vascular plant species.

- The second example describes how we have used blended learning strategies in supporting graduate student learning activities before and during a field course on plant identification, and how some student projects have been later incorporated into the data base of the web resource itself.
- The third example describes how we have activated students to recognize their own skills and to excel in producing high quality web-based learning materials to be used by other students.

Finally, we discuss some general experiences in blended learning accumulated during botany courses in recent years.

Constructing knowledge

At the introductory level we give considerable emphasis to teacher-guided knowledge construction. The concept of biodiversity comes up during several different courses, including the basic course in plant identification, which is obligatory for most biology majors. Currently about 80 students take this course each year, most of them first-year students.

The desired learning outcome of the course is to learn to identify 300 common plant and lichens species in Finland. After taking the course the students should be able to correctly identify, name and, to a certain degree, classify the species and also recognize them in the field. The main study material has traditionally comprised herbarium sheets at the student herbarium, and only during recent years the students have been offered supporting online material. The students are offered teacher-led demonstrations of all species, but student attendance to the demonstrations is not obligatory. At the end of the course, the students must pass a strictly evaluated exam, where they are required to correctly identify 30 random plants.

Supporting online study material at the Pinkka website includes photographic images and descriptions on all species pre-organized in systemat-

ic groups such as vascular plants, ferns, and bryophytes. The variation displayed by the plants in size, colors, leaf-shapes, and other structures is clearly displayed in the online material. After completing the course the students are encouraged to use the now familiar open-access biodiversity web resource also during their other studies.

Several first-year courses in biology focus on fundamental concepts of evolution and ecological theory. In order to succeed in their studies, students should learn to understand the many interrelationships between such concepts and other facts presented during the different introductory courses. During the plant identification course the supporting online material encourages students to link their practical and often somewhat overwhelming first experience in biodiversity to key concepts in evolution, ecology, and biogeography. This supports deep learning in plant taxonomy.

The teacher stands back

During the past few years we have started to integrate blended learning into several graduate courses in botany. These have included both advanced courses in species identification and courses dealing with different aspects of biogeography and vegetation science. One example is a field course in Arctic plants and vegetation. The course is held partly in Helsinki (introductory lecture, instructions and Pinkka assignments) during the spring semester, and partly at the Kilpisjärvi biological station in NW Lapland (five days of field excursions, species demonstrations, and data collecting) during the summer semester. The course is wrapped up in Helsinki during a one day seminar in the fall, where the students present the results of their study projects.

The introductory lecture gives the theory and basic background on the subject matter. After this the students are given relatively free hands to realize their own learning goals – however, some learning activities must involve the active use of Pinkka and/or other online study materials. Here

the use of blended learning supports inquiry-based learning – inquiry implies involvement which can lead to understanding.
During the field excursions the students carry out personal study projects on a subject that links to their previous study efforts in the web. After returning to Helsinki the students are strongly encouraged to continue their work in a way that some of the results can later be incorporated into the data base of the web resource. Student reports, digital herbaria, and other similar material can then be used as a basis and starting point of forthcoming student projects in following years.
During the course in 2008 one student wished to focus on collecting a scientific collection of classical herbarium specimens of arctic plants. The student acquired a good overall understanding of the local flora before the field trip through independent studies at the student herbarium.
During the field excursions an excellent herbarium was collected which was later photographed and incorporated into the Pinkka data base. There the collection functions as a source of reference and also as an encouraging example for other students.

The Pinkka contest

One of our primary goals has been to give students opportunities to actively participate in the construction of their own online learning environment. As seen in the previous example, this aim can easily be incorporated into the practices of individual courses or course assignments. However, to tap into the true creativity of highly motivated students, some assignments should be open and give individuals or groups the possibility to pursue multidisciplinary learning goals not specifically stated in the curricula of standard courses.
The annual Pinkka contest gives highly motivated students “free hands” to design and execute demanding student projects that result in high quality learning material or other web content for other students. The assignment can either be totally free or directed towards some general goal, like into producing web materials that help foreign students in their biodiversity studies, etc.

The winner of the 2008 Pinkka contest designed and produced a web resource on human pathogenic species of the fungal genus *Aspergillus*. The project was very demanding, as it involved not only research into the scientific literature of the field, but also culturing and photographically documenting filamentous fungi, and producing a general introduction to the filamentous genus and detailed descriptions of all species.

Discussion

Our experiences in blended learning in botany during 2005–2009 have convinced us that a web-based learning environment offers many real enhancements to university courses and teaching. Also research has shown that learning outcomes can be improved if the blended learning model is well designed (Skinner & Hobach 2003; Ginns & Ellis 2007). There are several models of how to realize blended learning (e.g., Bradley, Stutz & Towill 2009; Bromham & Oprandi 2006; Marbach-Ad, Rotbain & Stavy 2008; Pereira et al. 2007; Perry 2006; Toth, Morrow & Ludvico 2009), and some practical examples were also given in this paper. Blended learning can provide outcomes that are not necessarily delivered through traditional lectures or practical exercise courses. By redesigning courses and using blended learning strategies we have tried to keep our focus on what the students do, give students a possibility to better participate in their learning processes, to explore many topics on their own, and to connect new concepts to prior knowledge.

As pointed out by Vaughan (2007, 84-85) a reduction in the classroom time, a flexible possibility to study, and a flexible possibility for repetition are real enhancements that help to develop learner activity and interaction. Undergraduate students typically represent a diverse group with different levels of prior knowledge and needs for personal instruction. The possibility to freely practice in a virtual learning environment before classes can help students that may have problems in keeping up with the pace of introductory courses. This also allows the students to be more active in the classroom: students with some background knowledge are naturally more prepared to participate in discussion, to ask and to interact

(Hailikari & Nevgi 2009). Also in field courses, the use of prior web learning helps students to connect their own observations to a theoretical background and to what has already been learnt during lectures. After lectures and courses, the students can actively support and enhance their evolving skills by practicing at the website. Blended learning in combination with an open-access web-resource offers possibilities for unlimited repetition and can be used to support lifelong learning.

Naturally, the lack of student self regulation skills will always hinder the success of some students and represent a major challenge to the teacher. Vaughan (2007, 85-86) identified four key challenges that students encounter with blended learning: (1) the expectation that fewer classes meant less work, (2) inadequate time management skills, (3) problems with accepting responsibility for own learning, and (4) difficulty with sophisticated technologies. We have experienced the same problems, but also feel that the fourth challenge may often more seriously affect teachers than the new student generation.

In any blended learning situation the teacher needs to have a realistic picture of how students perceive the online learning environment (Ginns & Ellis 2007, 62-63). It is also important to discuss the intended learning outcomes with the students and to describe in some detail how the web assignments and exercises actually help in reaching these goals. We agree with Pereira et al. (2007, 194) that the implementation of blended learning is extremely demanding for teachers. Designing, processing, and updating digital learning materials tends to consume a lot of time and resources. To overcome these often practical problems, the support from the faculty and colleagues is crucially important.

In the future, we intend to survey students' experiences of blended learning during our biodiversity courses. The results are likely to guide us in further improving our blended learning design in teaching. Future studies should also show whether blended learning has actually improved the practical species identification skills of our graduate students.

References

Agenda 21. (1992). *The Rio Declaration on environment and development, and the statement of principles for the sustainable management of forests.* United Nations Department of Economic and Social Affairs. Available online at: http://www.un.org/esa/dsd/agenda21/

Bradley, L. K., Stutz, J. C. & Towill, L. R. (2009). Plant biology: From the classroom to the internet. *Journal of Natural Resources and Life Sciences Education,* 38, 82–86.

Biggs, J. (1999). What the student does: teaching for enhance learning. *Higher Education Research & Development*, 18, 1, 57–75.

Biggs, J. & Tang, C. (2007). *Teaching for quality learning at university (Third Edition)*. Buckingham: Society for Research into Higher Education and Open University Press.

Bromham, L. & Oprandi, P. (2009). Evolution online: using a virtual learning environment to develop active learning in undergraduates. *Journal of Biological Education*, 41, 1, 21–25.

Dalsgaard, C. & Godsk, M. (2007). Transforming traditional lectures into problem-based blended learning: challenges and experiences. *Open Learning,* 22, 29–42.

Ginns, P. & Ellis, R. (2007). Quality in blended learning: Exploring the relationships between on-line and face-to-face teaching and learning. *The Internet and Higher Education*, 10, 53–64.

Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *The handbook of blended learning: global perspectives, local designs*. Pfeiffer & Company, 3–21.

Hailikari, T. & Nevgi, A. (in press). How to diagnose at-risk students in chemistry: The case of prior knowledge assessment. *International Journal of Science Education*.

Marbach-Ad, G., Rotbain, Y. & Stavy, R. (2008). Using computer animation and illustration activities to improve high school students' achievement in molecular genetics. *Journal of Research in Science Teaching*, 45, 3, 273–292.

Meyer, K. A. (2003). Face-to-face versus threaded discussions: The role of time and higher-order thinking. *Journal of Asynchronous Learning Networks*, 7, 55–65.

Pereira, J. A., Pleguezuelos, E., Meri, A., Molina-Ros, A., Molina-Tomas, M. C. & Masdeu, C. (2007). Effectiveness of using blended learning strategies for teaching and learning human anatomy. *Medical Education*, 41, 189–195.

Perry, B. (2006). Using photographic images as an interactive online teaching strategy. *The Internet and Higher Education*, 9, 220–240.

Skinner, K. M. & Hoback, W.W. (2003). Web-based, active learning experiences for biology students. *Bioscene*, 29, 23–29.

Toth, E. E., Morrow, B. L. & Ludvico, L. R. (2009). Designing blended inquiry learning in a laboratory context: A study of incorporating hands-on and virtual laboratories. *Innovations in Higher Education*, 33, 5, 333–344

Vaughan, N. (2007). Perspectives on blended learning in higher education. *International Journal on E-learning*, 6, 1, 81–94.

Vermunt, J. D. & Vermetten, Y. J. (2004). Patterns in student learning: Relationships between learning strategies, conceptions of learning, and learning orientations. *Educational Psychology Review*, 16, 359–384.

NEW TECHNICAL SOLUTIONS AND THEIR PROBLEMS IN BLENDED LEARNING

TACKLING THE CHALLENGES OF A LARGE COURSE WITH BLENDED LEARNING

Tapio Auvinen, Lasse Hakulinen, and Ari Korhonen

Introduction

On large courses, it is often impossible to give individual guidance for each student because of limited resources. On the other hand, students cannot be expected to learn everything independently by reading a book or listening to the lectures. Complicated concepts such as mathematics or programming are extremely difficult to be memorized if they are not actively practiced in form of exercises. In addition, students should receive sufficient feedback from the exercises to be able to learn from mistakes. However, on a course with hundreds of students and multiple exercises per student, it would be problematic to check all the exercises manually.

Fortunately, many software systems have been developed to aid marking of exercises and promote learning by means of better feedback. Consequently, the current trend seems to be towards using more and more automatic assessment. See, for example, the survey by Carter et al. (2003).

Blended learning can be defined as a method where contact teaching and the use of distributed learning systems are combined (Graham, 2005). In this article, we discuss how automatically assessed exercises have been combined with contact teaching on the Data Structures and Algorithms (DSA) course at the Helsinki University of Technology. DSA is a basic computer science (CS) course with an enrollment of about 500 students. Lectures and lab sessions are arranged in traditional contact teaching at the campus, while an interactive learning environment called TRAKLA2 is used for automatically assessing algorithm simulation exercises online.

The course, teaching methods, and tools are described in greater detail in Chapter 2. In Chapter 3, we discuss how the tools have worked on the course, and how students see the usefulness of different learning me-

thods. Finally, in Chapter 4, we draw conclusions on how contact and online teaching should, in our opinion, be balanced and how to improve it in the future.

Course description

The Data Structures and Algorithms course is a basic computer science course that deals with the many ways to efficiently organize data in computer's memory and to solve some typical computing problems like sorting of data. The course is compulsory for all computer science students, and thus it is very large with about 100 major and 400 minor students.

The course is lectured at the campus once a week for a whole semester. It also uses a printed text book for studying further details that are needed to complete the exercises. An important part of the course is the TRAKLA2 learning environment (Malmi et al., 2004) where the actual working of the algorithms is practiced. Students are given the description of an algorithm alongside with a graphical representation of a data structure. They must then simulate the working of the algorithm by manipulating the data structure with the mouse. The system gives immediate feedback about the correctness of the solutions and allows students to examine model solutions by means of algorithm animations.

The main purpose of the TRAKLA2 exercises is to force the students to study the data structures and algorithms in great enough detail. Intricacies of the algorithms are easily missed when skimming trough a text book, but to actually simulate the algorithms requires the students fully to understand them. The exercises cover practically all topics lectured in the course. At least 50% of the exercises must be completed before the final examination. This way, we can make sure that students have studied at least the basic topics before attending the exam.

Many automatically assessed exercises are quite mechanical in their nature. Thus, also more traditional lab exercises are arranged for computer science major students. This allows for more abstract exercises, such as open-ended essay questions or programming exercises, which are more difficult to assess automatically. Students complete the exercises at

home or at the lab and check the results with a teaching assistant. This gives the students an opportunity to ask questions and receive guidance from a human instructor.

The number of minor students is so high that it is impossible to arrange lab sessions for them. Instead, a larger project work is completed in small groups. In the project, students must design the overall architecture of a real world application in terms of data structures and algorithms. The project is returned in several phases, and each time, the groups receive guidance from a teaching assistant by email. An online tool called Rubyric (Auvinen, 2009) has been developed for supporting the assessment process.

The course has been developed actively during the years. The idea is to adopt and test different approaches and keep the best practices. In spring 2009, a collaborative learning tool called PeerWise (Denny, Luxton-Reilly & Hamer, 2008) was experimented on the course. The system allows students to author multiple-choice questions and answer other students' questions.

Trakla2

Before 1990, algorithms were practiced on the DSA course with pen and paper by writing down the intermediate states of the data structures by means of desk checking algorithms. The correctness of this manual simulation process were later checked at the lab sessions. As computers evolved, it became clear that such mechanical exercises could be marked automatically. First implementation was introduced as early as 1991. Students submitted manually typed records of the intermediate states by email to a marking robot. Nowadays, the current technology allows students to manipulate graphical representations of the data structures interactively by drag-and-dropping items on the screen. In addition, the exercises are now checked in real time. A screen shot of a typical exercise is shown in Figure 1.

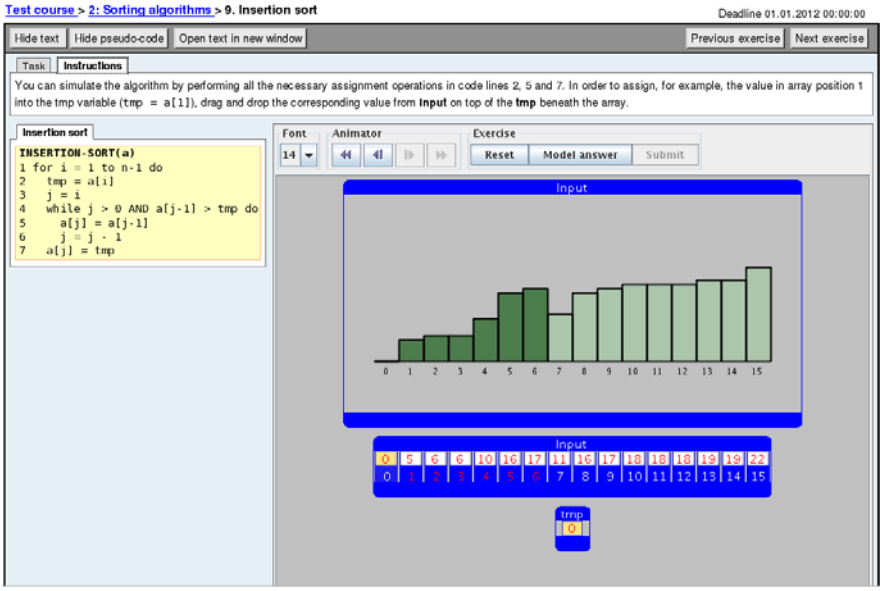


Figure 1. Insertion sort algorithm exercise in TRAKLA2

An important feature of the TRAKLA2 exercises is that the input data used for populating the data structures is randomized. This makes it possible to allow the students to examine the model solution after an unsuccessful attempt to solve the exercise, and still let them try the same exercise again. As the input data is different on each attempt, the algorithm will follow a different sequence of steps, making it impossible to just copy the model answer. As a bonus, this makes it impossible to copy the answers from other students.

Currently, students are allowed to attempt any exercise as many times as they want. During the course's history, we have compared results with limited and unlimited resubmissions. It seems that when the students are allowed to try exercises as many times as they want, they are actually motivated to keep trying until they succeed (Malmi & Korhonen, 2004). With limited number of attempts, the students have no choice but to give up after all the allowed resubmissions are used. A down side with unlimited resubmissions is that it allows a trial-and-error problem solving method. The data collected from the system shows that some students can use hours of work to submit the same exercise dozens of times, when it would be more fruitful to spend the same time studying the algorithm from

a book to find out what goes wrong. Fortunately, the number of such students is low. The problem could perhaps be corrected if the system could automatically tell the students what they have understood wrong instead of just showing which step in the answer sequence was incorrect. Currently, the study of automatically recognizing such misconceptions is an ongoing project.

TRAKLA2 exercises work very well within its limited scope, but only for exercises in which the students are supposed to simulate how an algorithm works. There is also a need for different kind of exercises, for example, for more open ended questions that are beyond the scope of the current systems capable of automatic assessment. Exercise sessions are arranged in small groups of about 20 students, which makes the environment also suitable for open discussion. These exercises involve implementation of algorithms by programming, as well as essay-like exercises. Students are encouraged to solve these exercises in pairs. They can also ask a teaching assistant for advice in lab sessions on campus. Currently, major students do TRAKLA2 exercises alone on the web, and lab exercises as pair work on alternating weeks.

PeerWise

PeerWise, developed at the University of Auckland (New Zealand), is an online system where students create multiple-choice questions by themselves, and answer the questions created by peers. We experimented with the system for the first time in the 2009 course by replacing one lab session with a task in PeerWise. The CS majors were asked to create 2 questions about any topic covered on the course, and answer at least 10 questions. To ensure that students put enough effort into developing good questions, we reduced exercise points for students whose questions were substandard. In addition, some bonus points were granted for exceptionally high activity or excellent questions. The deadline for the task was set two weeks prior to the exam, but the system remained open until the end of the course to allow students to use it for practicing for the exam. This arrangement ensured that there were enough questions in the system for

it to be useful for practicing. Two weeks before the exam, PeerWise was also opened for the CS minor students for voluntary practicing.

The main concern with student contributed material is of course the quality of the questions. Because of this, PeerWise has multiple built-in mechanisms for monitoring the quality of each question. First, students can rate a question after answering. Inferior questions can easily be spotted as their ratings drops below the average. Another mechanism raises a warning flag if the majority of students select a different answer than what the author has marked as the correct one. Course staff can spot these questions and attach comments to the question to make sure that no incorrect information is delivered through the system.

Rubyric

Instead of lab exercises, the CS minor students complete a large design project that is done in groups of 3-4 people. The project is returned in three iterations which are about one month apart. Each time, the design document is read by a teaching assistant who gives written feedback about where the group has succeeded and which aspects they have overlooked.

There are typically about 100 student groups, which means a large amount of returned documents and feedback emails. In addition, the relatively large number of teaching assistants (typically 6) raises the question about the consistency of the feedback. First, more experienced teaching assistant are able to give better feedback than newcomers, which puts students in an unequal position. Second, when the exercise is graded, some assistants may be more critical than the others. To address these challenges, an assessment tool called Rubyric was developed.

The system allows the lecturer to create a scoring guide which consists of evaluation criteria and reusable feedback phrases. Because many groups make similar mistakes, large parts of the feedback mails can be constructed using a limited number or prewritten phrases. Of course, additional comments can be freely added and the phrases can be freely edited by the teaching assistants to personalize the feedback for each group.

The grading view, where the feedback is constructed, is shown in Figure 2.

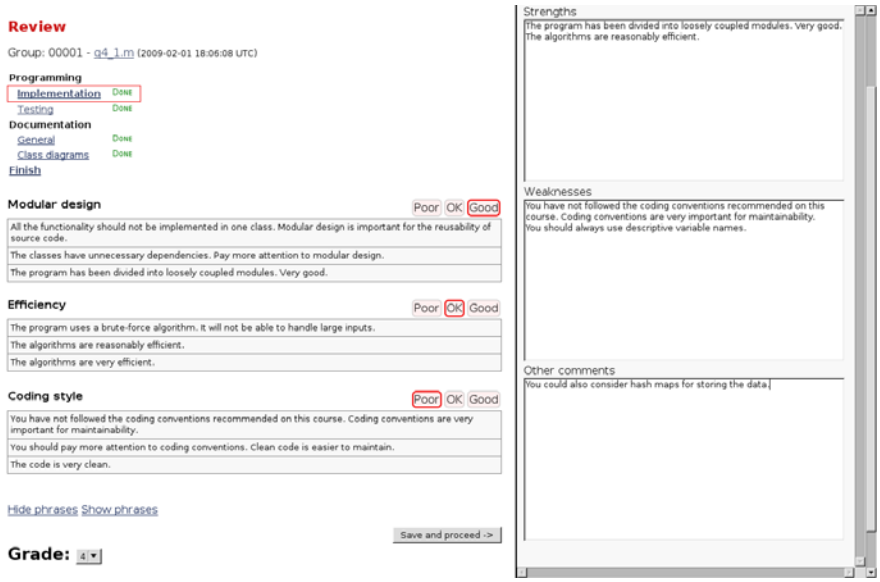


Figure 2. The grading view of Rubyric

The use of prewritten phrases speeds up the construction of feedback but also helps to ensure consistency. First, when all teaching assistants are required go through the same evaluation criteria, they are bound to look for the same qualities in the answers. Second, the quality and amount of feedback is more consistent when using common building blocks compared to fully manually written feedback.

The system also helps to keep the submitted documents and generated feedback mails organized. Students submit their documents on the web. The documents can easily be distributed to the teaching assistants who can do their markings and write feedback online. These feedback mails are automatically sent to all group members and stored in the system where the lecturer can later access them if asked for rectification.

Results

Trakla2

Interactive exercises can improve feedback compared to the old fashioned manual process. A long time ago, the course had algorithm simulation exercises that students did with pen and paper as homework. The exercises were later checked in class. It was up to each student to make sure that they understood each algorithm correctly, and study more if they had misconceptions. But, since this extra homework did not bring any more points, the motivation to do so was very low.

Nowadays, students get feedback from the computer immediately after submitting the exercise. If the answer is wrong, the student is given a new problem with slightly different input. Maximum points are not awarded before the exercise is correct, which motivates the students to keep studying until they understand the algorithm correctly. In fact, the statistics show that the majority of students complete 100% of the exercises event though 90% would be enough for the maximum course grade.

Plagiarism is not a significant issue because each student is given a slightly different input data which leads to a different answer. It is true that it is possible to ask a friend to help with the exercises. However, there is evidence that doing interactive exercises with a peer actually contributes to learning. Collaboration with other students is thought to promote learning because it supports joint critical thinking and helps students to become aware of their own thinking processes (Arvaja, Häkkinen, Eteläpelto, & Rasku-Puttonen, 2003). This is why we actually encourage group work. Finally, we have a final examination at the end of course to make sure that also individual learning takes place.

PeerWise

The total number of questions created in PeerWise by the students was 87. All the questions were created before the deadline when points were awarded for it. When the system was open for voluntary practicing for the exam, students were only interested in answering the questions. Also, the CS minor students, for whom the activity was completely voluntary, did

not create any questions at all. This indicates that students were not interested in contributing material if it was not mandatory.

The quality of the student contributed multiple choice questions varied a lot. It was clearly seen that some students were motivated to create good questions with carefully planned distractors and explanations while others wanted to finish the task with the minimum amount of work. Also, the effort put in when commenting other student's questions varied considerably between students.

A total of 3792 answers were recorded. Interestingly, 70% of the answers came after the deadline, even though no extra points were awarded for voluntary practicing. 66% (67) of the CS major students and 26% (103) of the CS minor students used PeerWise during the course. 34% (1358) of the answers came from majors and 66% (2641) from minors. An average user answered 24 questions, meaning that those students who used PeerWise, used it a lot, considering that only 10 questions needed to be answered. The result can be interpreted so that some students consider this learning activity useful for them.

Feedback from the learning methods

After the final examination, feedback was gathered from the students about the learning methods used on the course. Students rated the different methods based on the usefulness of the method to their learning process. The methods were rated on a scale from 0 (not useful) to 3 (very useful).

The results show that the students considered both contact teaching and online teaching useful for their learning. CS major students gave the best average rating (2,54) to TRAKLA2 and the electronic course book, and the second best rating (2,43) to the weekly lab exercises. CS minors, in turn, gave the best rating (2,41) to TRAKLA2 and the second best (2,09) to the printed handouts.

TRAKLA2 got the best average rating from both the CS major and the CS minor students. CS major students gave very similar rating to contact teaching and online teaching. The CS minors, who had no lab sessions

but only lectures and email guidance, gave better rating to online tools than contact teaching methods. This could indicate that lab sessions in small groups are desirable.

Conclusions

When selecting teaching methods, our goal has always been to activate students. In our experience, it is essential that students practice the algorithms 'hands on' instead of just listening or reading their descriptions. It has been shown in multiple studies that complex details are better remembered if students are actively engaged in the task (Prince, 2004).

Online learning environments provide good platforms for active learning as the computer can check at least some of the exercises automatically. This way, a large number of topics can be covered by the exercises.

Both contact and online teaching can be either activating or passivating depending on how they are used. It is important to choose the right medium for each exercise. Automatic assessment allows us to give feedback from a very large number of mechanical exercises, whereas contact teaching is suitable for a smaller amount of exercises that require more abstract thinking.

One problem with automatic assessment is that it typically requires tools specifically developed for a certain course. This kind of development is highly expensive even when done by the teachers themselves. Fortunately, some interactive generic tools exist such as PeerWise and Rubyric that are suitable for a variety of courses.

Collaborative learning and student contributed learning material is an interesting concept that can help to reduce staff's workload on large courses. Our latest experiment was with PeerWise. PeerWise was introduced to students fairly late during the course, which might be one of the reasons why some of the students did not use the system at all. For future courses, we are planning to introduce PeerWise in the beginning of the course and have more than one deadline during the course. However, the total number of questions to be created by one student should probably

be kept small, so that students would focus on the quality rather than the amount of questions.

Using multiple computer systems on a course can also cause new problems. Students will be frustrated if they have to spend considerable amount of time just for learning the systems. As it cannot be expected that one monolithic system could fulfill all the requirements of different courses, there is a need for technology that allows separate systems to be bundled into one. This way, the most suitable tools from different sources could be selected for each course. One step towards this kind of distributed learning environment is the single sign-on technology used by the Haka alliance of Finnish universities. It enables students to log into different web environments using just one password even if the systems are located in different universities. In addition, once logged in, the student does not have to re-enter the password when moving between different systems. It is obvious that universities could benefit from tools developed at other universities.

References

Arvaja, M., Häkkinen, P., Eteläpelto, A., & Rasku-Puttonen, H. (2003). 3. Social processes and knowledge building in project-based face-to-face and networked interactions. In J. Bopry & A. Eteläpelto (Eds.), C*ollaboration and learning in virtual environments.* University of Jyväskylä, 48–61.

Auvinen, T. (2009). *Rubyric - A rubrics-based online assessment tool for effortless authoring of personalized feedback*. Helsinki, University of Technology.

Carter, J., Ala-Mutka, K., Fuller, U., Dick, M., English, J., Fone, W., et al. (2003). How shall we assess this? *Annual joint conference integrating technology into computer science education* (pp. 107–123).

Denny, P., Luxton-Reilly, A., & Hamer, J. (2008). The PeerWise system of student contributed assessment questions. *Proceedings of the tenth conference on Australasian computing education - volume 78*

(pp. 69–74).

Graham, C. (2005). *Blended learning systems: Definition, current trends, and future directions*. Pfeiffer Publishing.

Malmi, L., Karavirta, V., Korhonen, A., Nikander, J., Seppälä, O., & Silvasti, P. (2004). Visual algorithm simulation exercise system with automatic assessment: TRAKLA2. *Informatics in Education*, 3(2), 267–288.

Malmi, L., & Korhonen, A. (2004). Automatic feedback and resubmissions as learning aid. *IEEE international conference on advanced learning technologies, 2004*, proceedings, 186–190.

Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education*, 93, 223–232.

COLLABORATIVE CONCEPTUAL MAPPING IN TEACHING QUALITATIVE METHODS

Kari Kosonen, Liisa Ilomäki & Minna Lakkala

Introduction

Strong pressure is currently being faced from applied researchers in the field of social and behavioural sciences to train "research experts" who are able to incorporate both qualitative and quantitative methods and approaches in their projects (Toshakkori & Teddle, 2003). This causes pressure to increase training in qualitative research methods for psychologists and other practitioners (e.g., in the UK, see Forrester & Koutsopoulou, 2008), and a growing interest in the best way of teaching them in higher education (Hansen & Rapley, 2008, Navarro, 2004). Research methods are often taught in higher education through lecturing complemented by small-scale practical exercises, but such general methodological courses do not usually match with students' needs in their own research assignments (Benson, & Blackman, 2003; Edwards & Thatcher, 2004).

The aim of the seminar on qualitative methods in the Department of Psychology, University of Helsinki, investigated in the present study, is connected to these common trends. The aim was to offer students a practice-related seminar which combined students' own research work concerning their thesis and the research practices of a professional research community in general. The participants were at the same time in the role of a student learning research methods, and novice researchers conducting their own study. Throughout the seminar, students conceptualized their assumptions about various research methods by creating concept maps collaboratively. In addition, the students' own research for master's or doctoral thesis was employed to provide a "real-world" context and motivation for applying qualitative research methods. The aim is to support long-term work with the methods and also cross-fertilize study practices with professional research practices from outside the seminar.

In this paper, we examine the use of collaborative conceptual modelling as a sustained knowledge practice in conjunction with other practices in the two iterations of qualitative research methods seminar. We will also evaluate the use of technology, because for both iterations, new technology was used for supporting the pedagogical setting. Through the new technology, we sought to offer a more collaborative way of working, which also supported the blended learning approach which was used during both iterations.

Context and aims of the study

The present study was conducted within the Knowledge Practices Laboratory project (KP-Lab, www.kp-lab.org), a research and development project supported by European Union (KP-LAB, 2008). The aim of KP-Lab is to investigate and develop pedagogical practices and technology that support students' and professionals' sustained collaboration on the development of various shared knowledge objects for real use; for instance, papers, reports, knowledge models and design products.

The research and development activities of the KP-Lab project particularly emphasise collaborative knowledge practices, such as: the integration of individual and group work; the shift of responsibility from educators to learners for creating shared knowledge objects; the sustained character of knowledge creation; the externalisation and transformation of declarative, procedural and tacit knowledge; cross-fertilization between knowledge practices of educational institutions and authentic professional working settings, in addition to flexible technical support of these processes (Paavola & Hakkarainen, 2009).

Consequently, in the present study we focused on investigating how collaborative conceptual modelling in conjunction with other knowledge practices in a higher education course can be used to promote interaction between students' individual and joint knowledge creation activities, strengthen students' own responsibility for these activities, facilitate transformations between various forms of knowledge, and cross-fertilization between knowledge practices of higher education and a community of

professional researchers. Finally, the study aimed to explore how networked technology can be implemented for mediating and promoting the above processes.

Research questions addressed in the study were the following:

1) How did collaborative conceptual mapping support understanding of qualitative methods?
2) How did the technology used during the two iterations of the seminar support the pedagogical setting?

Method

Setting: Qualitative methods seminar

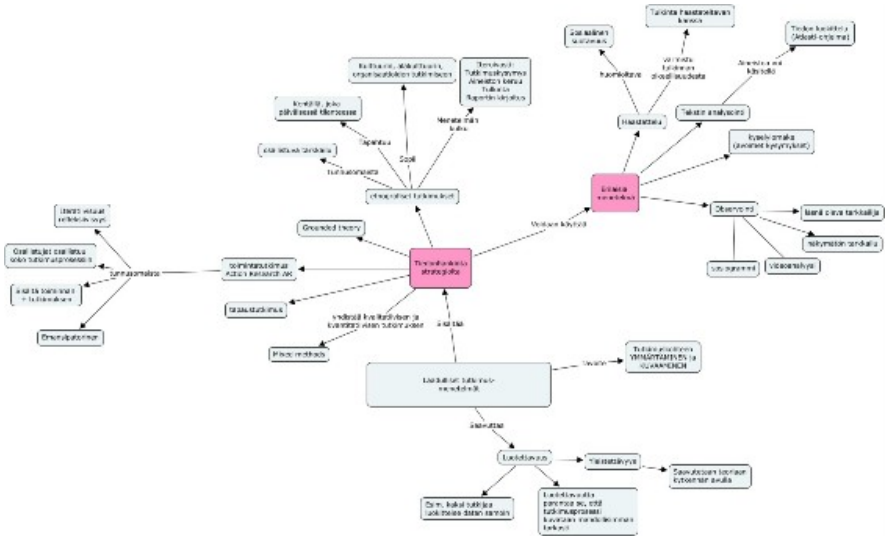
The study was conducted over two successive pedagogical cases because of the need to evaluate two different types of applied technology. Both cases were iterations of a voluntary seminar-like course about qualitative research methods for students at the Department of Psychology in the University of Helsinki. The seminar acquaints students with qualitative research methods and provides them with support for the advancement of their master's or doctoral thesis. The course is a combination of face-to-face meetings, students' presentations and discussions, work in pairs for constructing digital concept maps, and independent individual work or work with a partner between the face-to-face meetings. The schedule and content for each course is launched on the basis of an initial discussion about the research interests and methodological problems of the participating students.

During the seminar, participants are required to give a presentation on their own theme related to qualitative research methods. Each seminar meeting is organized around one issue so that those students who are interested in the same theme have either a joint presentation or they discuss the theme from different points of view during the same meeting. Concept maps are created in the first seminar meeting in pairs, and they are then re-organized and re-written after meetings using an electronic conceptual mapping tool on the basis of the new information encountered by the participants, in addition to that shared through the virtual environ-

ment used in the course. Between the meetings, the participants are expected to keep track of the communication in the virtual environment and also to submit their own comments and supplementary materials related to the methodological themes. During the last seminar meeting, the students' concept maps and the status of their own research work are discussed. Finally, the general results of the course activities are evaluated. The seminar lasts six weeks, one face-to-face meeting each week. A total number of 14 hours are allocated for the group meetings with the teacher and the students; 66 hours are allocated for the students' individual work.

Technology used in the investigated courses

In Course 1, a virtual collaboration tool, 'Future Learning Environment' (FLE3, see http://fle3.uiah.fi), was used. The participants constructed and revised a conceptual map on their own laptops using the CMap-Tools software, (see http://cmap.ihmc.us/ and Picture 1). The laptops were brought to the seminar room for every session, which required one assistant to work with the installation.



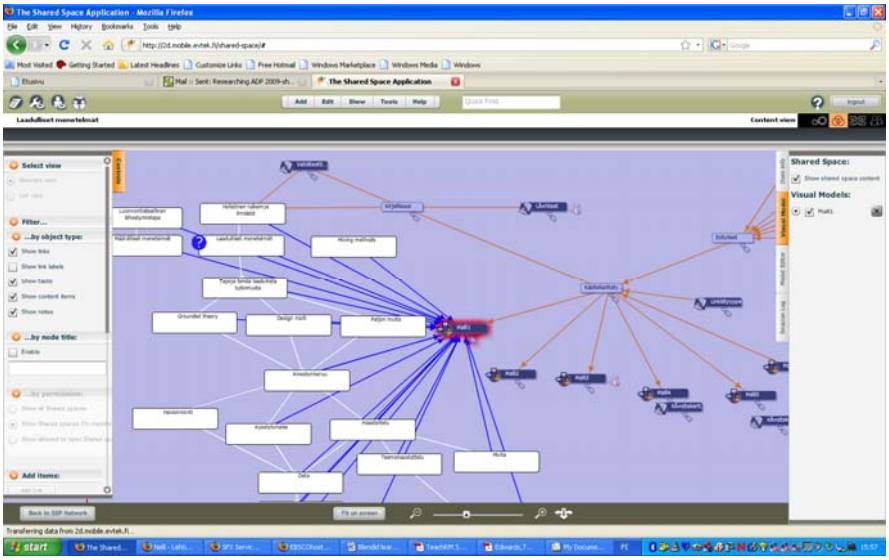
Picture 1. A concept map created with CMap-Tools

In Course 2, the Knowledge Practices Environment (KPE), developed in the KP-Lab project (www.kp-lab.org), served as the virtual environment of the course. KPE is a web-based collaborative working and learning envi-

ronment offering various facilities for creating and interacting with knowledge artefacts and knowledge process models as well as for collaborating with other users. Among other integrated tools and functionalities for working with the shared knowledge objects, it includes shared working spaces, a note editor, commenting and linking. The environment provides users with a flexible means to create, annotate, work on, and modify shared artefacts, as well as the possibility to examine them through multiple views or organize them spatially.

Besides the basic functionalities of KPE, the students in Course 2 used the Visual Model Editor tool (VME) in creating and editing conceptual maps (Picture 2) instead of CMap-Tools as used in Course 1. VME provides an extension to the basic functionalities of KPE and allows users to create, share, use, and update visual models as well as the underlying visual modelling languages themselves as another type of shared artefact.

-



Picture 2: A concept map created with VME in the KPE environment.

The students were guided to use the Concept Map modelling language in creating conceptual maps. This language consists of a single “node element” (Concept/Phenomenon) and several named link-elements (for instance “part of”, “type of”, “activity related to”).

Data collection

The data collected from the investigated course consisted of the following: the teacher's written scenario of the course design; students' written self-reflections after the course; and the contents of the database in the virtual environments systems used, including the successive versions of students' concept maps. The teacher was interviewed after the course on the students' conceptual maps created during the first course. Selected meetings from the second course were video-recorded. In addition, one student was interviewed on her conceptual maps after the second course.

Data analysis

Multiple analysis methods were combined in order to provide a multi-faceted and comprehensive picture of the course practices and the use of tools.

General analysis of the course activities

The overview of the activities in the courses was reconstructed from the teacher's written semi-structured teaching log, the participant's descriptions and the database structure and contents as well as video-recordings.

The analysis of the concept maps

Successive versions of the students' concept maps were analyzed with respect to their conceptual structure and its development. Particular attention was devoted to the characteristics of linking conceptualisations and unnamed links used by the students in organizing and grouping various conceptual nodes in their maps. This focus of analysis was based on the notion, shared by a number of researchers (Liu, 2004; Novak & Cañas, 2006; Mintzes & Wandersee, 1998), that learners' advancement in organizing conceptual relations and links in their concept maps is a central

indication of their conceptual development during the process of conceptual modelling.

A check-list representing potentially relevant relational frames in structuring information around the generic topic was created for the analysis of the students' conceptual maps. The list represents generic topic-centred conceptual relations used to organize content in various expository texts. It was based on the conceptual model developed and used by the first author in his interventional studies for guiding the participants' to structure text content around the text-topic in reading (Kosonen, & Hakkarainen, 2007). The elements of the check-list in many respects converge with the meanings of the predetermined link-types used in Texas Christian University Node-Link Mapping (TCU-NLM) (Dansereau, 2005).

The conceptualisations used by the students in the nodes of their conceptual maps were grouped according to larger topic-related conceptual categories. The following conceptual categories were created:

1. Research approaches
2. Concrete research methods or techniques
3. Tools used for data collection and analysis
4. Descriptions of research activities
5. Descriptions of research contexts
6. Philosophical frameworks

Subsequently, the linking conceptualisations and unnamed links were classified by using heuristic questions from the check list. Those links with similar meaning were scored into the same class determined by some of the conceptual relations of the check-list. Finally, the links were also scored into subclasses according to the conceptual category of the higher-level node that they referred to in the map analyzed.

The meanings of two or more links were interpreted as similar and scored into the same sub-class when: a) the phenomena (the target topic or a single node) that they referred to were identical or belonged to the same conceptual category, and b) the information conveyed by the links could be used to answer the same heuristic question regarding this common topic.

The meanings of unnamed links were interpreted on the basis of the conceptualisations of the two nodes that they connected. The most suitable question from the checklist was selected to describe the meaning of a question concerning the node higher in the hierarchy that was answered in the node at the lower level. This interpreted meaning served as a criterion for scoring an unnamed link into one of the classes of conceptual relations presented in the checklist. The unnamed links that connected the topic “Qualitative methods” and the concepts referring to various methodological or paradigmatic frameworks in the field were scored into the class “Forms of occurrence”. The links that pointed to the conceptualisation of a concrete research method, its functioning or a description of research activity were scored into the class “Activities functioning”. Into the category “Repeating phases” were scored those unnamed link-structures that by virtue of their spatial characteristics represented phase-like sequences of activities.

The findings from the analysis of the conceptualisations of the students’ maps were compared with the findings from the teacher’s interview regarding the issues related to qualitative methods that the students were supposed to reflect on during the course.

Analysis of the technological support

The analysis of the technology used is based on students’ and teacher’s comments and self-reflection as well as on the researcher’s observations. The results are still preliminary.

Results

General findings

All students prepared a presentation on the topics that they selected on their own. The presentations were created individually as well as in pairs. The course was found by some students to require more initiative on the part of the participants than the average course because it did not include lectures.

The students' own reflections indicated that they were repeatedly engaged in discussions on the presenters' or the other students' research problems and potentially relevant methodical solutions related to qualitative research. As a rule, the teacher promoted these discussions by raising methodological questions related to the presenters' or other students' research work. The students found the atmosphere of the course to be warm, supportive and encouraging of discussion.
In the teacher's pedagogical scenario, it was planned to illustrate professional research practices with an external researcher's presentation. During the first investigated seminar, this kind of visit, however, did not take place due to practical obstacles. During the second seminar, a professional researcher introduced the basic principles of grounded theory and examples of its practical application to the students. (This topic was related to the work of one student.)

The majority of the students had an opportunity to apply the examined methods to their own research work. However, some students, not having that opportunity, pointed out in their answers to the closing questions that they felt that not having a chance to approach concrete research problems from the perspective of the methods examined in the course was an issue.

Participants' conceptual maps

The analysis of the conceptual maps revealed that considerable differentiation (see Novak & Canais about the differentiation of concepts) of the participants' conceptualizations took place during the process through which the maps were iteratively constructed. This differentiation was visible in the increase of the number of links in the maps as well as in their progressing aggregation into hierarchically organized levels.

The following link-types relating the nodes higher in the hierarchy to the nodes at the lower level were most frequently used in the students' maps:

a) Links to the descriptions of types and forms of existence of the qualitative methods,

b) Links to the descriptions of various characteristics of the qualitative methods or their types

c) Links to the descriptions of various research activities and the means and tools used in them.

The students often began to conceptualize the main topic of the course by explicating in the nodes of their maps the general characteristics of qualitative methods and the various forms in which they exist. However, the majority of the attendees already linked the topic to some activities and research methods featuring the qualitative research in the first iterations of their maps. Surprisingly, only a minority of the students used link-types referring to definitions, purposes or functions although these kinds of conceptualisations are widely used in the introductions of text-books and expository texts. In addition, links to the descriptions of various research contexts were relatively rare.

As the participants advanced in their iterations, the majority of them began to conceptualize peculiarities of the diverse branches or paradigms of qualitative methods and specific characteristics of concrete research methods or their variations, as well as research procedures, tools and means used in the qualitative research. In addition, relational links in the maps indicated that the participants had been comparing diverse branches or paradigms of qualitative methods and had sought similar features between them.

Conceptualizations related to reflections on *more general scientific paradigms and frameworks exerting influence on qualitative methods* were relatively rare in the participants' conceptual maps. One participant briefly mentioned two differing scientific background traditions behind qualitative and quantitative methods. In the iterations of one pair's and one participant's conceptual maps, some general scientific and philosophical background traditions (such as hermeneutics, phenomenology or social constructionism) were explicated more clearly.

In some of the conceptual maps, the conceptual distinction between the diverse paradigms of qualitative methods and concrete research methods

remained unclear, and these were both presented at the same level of conceptual hierarchy.

In her interview, the teacher pointed out that she regarded as crucial such domain specific issues as the distinction between qualitative and quantitative research methods, the separate conceptualisation of the diverse paradigms of qualitative and concrete methods, procedures ensuring the validity of research as well as various philosophical approaches that have given rise to the development of qualitative methods. The findings from the analysis of the students' conceptual maps indicate that the majority of the students were indeed remarkably advanced in making sense of specific methodical and procedural solutions used in qualitative methods. However, the conceptual distinction between the paradigms of qualitative methods and the concrete methods used in qualitative research was found to be only vaguely explicated in some students' maps. In contrast to expectations, only a minority of students addressed the general scientific traditions and philosophical approaches that have exerted influence on the development of qualitative methods.

The support provided by the technology

Course 1

The majority of students found CMap-Tools to be relatively easy and flexible to use. According to the participants, not enough time was allocated for the preparatory work related to the use of FLE3. Some students found it difficult to use and felt that not enough help for sorting out problems was available (e.g. to create links on a discussion board). Some students did not understand the purpose of FLE3 in the course, and therefore did not use it very actively. Some students did not understand the idea of sharing background materials and did not know where to insert them in the system.

Students had laptops as tools during the seminar meetings. This caused some problems for those of the students who were not familiar with the login and file management practices of the University of Helsinki. The findings appear to imply that the implementation of two different technical

applications and a laptop computer (with the university file management system) was too challenging an objective given the relatively short duration of the course. The saving and sharing of knowledge products between the participants was constricted by the complexity of the technical infrastructure and the difficulties in integrating the use of several tools.

Course 2

In Course 2, a test version of an integrated collaboration environment 'KPE' was implemented. Due to technical problems, the use of the KPE environment was limited to the reloading of presentations and work on conceptual maps. These problems also led the teacher to favor the students' individual work on conceptual maps instead of work in pairs, because it was not possible to rely on virtual work between the face-to-face meetings. The students actively tried to use the functionalities of the VME and, in addition, raised ideas about how the functionalities could be improved. They, for instance, pointed out a wish to use colours, various shapes and sizing in marking various meanings on their conceptual map as well as to have links in the concept maps for resources related to concepts. The students also placed particular value on the use of visual hierarchies in organizing the elements of conceptual maps. Another desired functionality was the opportunity to move various sub-hierarchies of maps by grabbing only one of their nodes so that the whole previously created hierarchical pattern of nodes would move together with the grabbed "member-node".

Discussion

The results of the study indicate that the conceptual mapping activity promoted the creation of *concrete shared objects that mediated knowledge creation on the topic of the course, i.e. qualitative methods.* Collaborative conceptual mapping also allowed the students to explicate for each other their conceptions of this abstract and intangible topic. Collaborative creation of shared external representations can be thus concluded to *mediate the interaction between individual and social levels of the participants'*

efforts because it required the students to share their ideas and also to mirror the outcomes with their own understanding.

The maps supported *transformation and reflection between various forms of knowledge* because the students were able to, first, explicate their previous understanding into the first versions of the maps, and then elaborate the maps based on the new knowledge provided by other students' presentations and the teacher's explanations. The iterative updating of the conceptual maps served sustained *knowledge advancement.*

Analysis of the students' conceptual maps revealed that in addition to the static linking types serving the conceptual definition, characterization and typologization of the topic, the students already began to use dynamic link types in the first iterations of their maps. This finding can be interpreted as an indication of the students' pragmatic need to become familiarized with various practical aspects of the use of qualitative methods. On the other hand, the frequent use of various dynamic link types in the students maps demonstrate that they serve as a compact and easy means of externalization in explicating practices.

The analysis of the students' conceptual maps also permitted us to pinpoint some challenges that learners encounter in conceptualizing such an ontologically multifaceted topic as qualitative methods. One aspect of these challenges is a difficulty in making conceptual distinctions and connections between the various approaches and concrete research methods and techniques in the field. Another aspect is related to the understanding of the influence of various philosophical paradigms and frameworks on the development of qualitative methods. Given these findings, it appears legitimate to develop guiding practices facilitating the conceptual modelling of qualitative methods and the explication of those domain-specific phenomena and relations that students with low prior knowledge are prone to ignore.

The two iterations of the course were conducted with different types of learning technology, but they both encountered a number of problems and difficulties. One of reasons for this was that the applications and ways of using technology did not follow the more standard practice in the university. The aim was to use technology that supports the affordances of colla-

boration around a shared object which the standard solutions do not support well. In that sense, the pedagogical setting was too demanding for the standard manner of using technology. New pilot efforts are needed for revising paedagogical settings as well as technology solutions, but they might be difficult for the students as well as for the teacher. However, particularly the technology used during the second seminar proved to be very powerful for supporting all the technology-related activities in one environment.

References

Benson, A. & Blackman, D. (2003) Can research methods ever be interesting?, *Active Learning in Higher Education,* 4, 39–55.

Dansereau, D. F. (2005). Node-link mapping principles for visualizing knowledge and information. In S. O. Tergan & T. Keller (Eds.), *Knowledge and information visualization: Searching for synergies*. Lecture Notes in Computer Science 3426, 61-81. Heidelberg: Springer-Verlag.

Eitel, F. (2000). Do we face a fourth paradigm shift in medicine - Algorithms in education*. Journal of Evaluation in Clinical Practice, 6*, 321-333.

Edwards D.F. & Thatcher J. (2004). A student-centred tutor-led approach to teaching research methods. *Journal of Further and Higher Education*, 28(2), .195-206.

Farrand, P., Hussain, F., & Hennessy, E. (2002). The efficacy of the mind map study technique. *Medical Education, 36*, 426-431.

Forrester, M. & Koutsopoulou, G. (2008). Providing resources for enhancing the teacher of qualitative methods at the undergraduate level: Current practices and the work of the HEA Psychology Network Group. *Qualitative Research in Psychology, 5,* 173-178.

Hansen, S.,Rapley, M. *(*2008). Editorial: Special Issue of *Qualitative Research in Psychology* on 'Teaching Qualitative Methods'. *Qualitative Research in Psychology*, 5, 171–172.

Kosonen, K. & Hakkarainen, K. (2007). Facilitative effect of a conceptual meta-model on a young blind learner's reading comprehension. *European Journal of School Psychology*, 5, 11-37.

Liu, X. (2004). Using concept mapping for assessing and promoting relational conceptual change in science. *Science Education*, 88, 373-396.

Mintzes, J. J., & Wandersee, J. H. (1998). Reform and innovation in science teaching: A human constructivist view. In J. J. Mintzes & J. H. Wandersee & J. D. Novak (Eds.), Teaching science for understanding: A human constructivist view. San Diego: Academic Press, 29-58.

Nesbit, J. & Adesope, O. (2006). Learning with concept and knowledge map: A meta-analysis. *Review of Educational Research, 76*, 413-448.

Navarro, V. (2005). Constructing a teacher of qualitative methods: A reflection. *International Journal of Social Research Methodology, 8,* 419-435.

Novak, J. D. & Cañas, A. J. (2006). The theory underlying concept maps and how to construct and use them [online] Technical Report IHMC CmapTools 2006-01 Rev 01-2008 [Date ofconsulta-tion:15/03/08]<http://cmap.ihmc.us/ Publications/Research Papers/ TheoryCmaps/Theory Underlying Concept Maps.htm>

O'Donell, A.M., Dansereau, D.F., & Hall, R.H. (2002). Knowledge maps as scaffolds for cognitive processing. *Educational Psychology Review, 14*, 71-86.

Paavola, S. & Hakkarainen, K. (2009). From meaning making to joint construction of knowledge practices and artefacts – A trialogical approach to CSCL. In C. O'Malley, D. Suthers, P. Reimann, & A. Dimitracopoulou (Eds.), *Computer supported collaborative learning practices: CSCL2009 conference proceedings* (pp. 83-92). Rhodes, Creek: International Society of the Learning Sciences (ISLS).

Paavola, S., Lipponen, L., & Hakkarainen, K. (2004). Models of innovative knowledge communities and three metaphors of learning. *Review of Educational Research 74*(4), 557-576.

Patterson, M. E., Dansereau, D.F., & Newbern, D. (1992). Effects of communication aids and strategies on cooperative teaching. *Journal of Educational Psychology, 84*, 453-461.

Tashakkori, A., & Teddlie, Ch. (2003). Issues and dilemmas in teaching research methods courses in social and behavioral sciences: A US perspective. *International Journal of Social Research Methodology, 6 (1),* 61-77.

EXPERIENCES IN TEACHING COMPUTER USABILITY IN SECOND LIFE

Antti Leino

Introduction

The Computer Science curriculum at the University of Helsinki includes a course in user interfaces and usability, as suggested by the IEEE / ACM Computer Science curriculum recommendations (ACM 2001). Until the latest curriculum reform in 2008, the course was mandatory for B.Sc. Students and recommended for the spring term of the first year, but recently it has been changed to an elective course, as the ACM core requirements for human-computer interaction are covered elsewhere in the introductory programming and software engineering courses. Historically, the course has had roughly 60–80 students each time it has been taught; this is less than the number of students who start annually, as attending the lectures and exercises is not the only way to fulfil the requirements.

The course is titled User Interfaces, and accordingly its emphasis has traditionally been in designing and evaluating graphical user interfaces. Nevertheless, its full scope includes theoretical background in the usability of computer systems, ultimately stemming from the psychological basis for human cognition and perception, and lately there have been sentiments within the department that these more theoretical aspects of usability should get more coverage than they have in the past. Having agreed to teach the course on a temporary basis during the spring term of 2009, it seemed a good time to try a new approach in terms of both content and methods.

Previously the course had included 2×2 hours of lectures and another 2 hours of exercises per week, followed by an exam; the grades were determined by the student's performance at the exam and activity during the exercises, with weights of 25 and 5 points of a total of 30, respectively. The 2×2+2 hours per week with a teacher / tutor remained this time as

well, but now the plan was to make the exercises into a single project work, with a weekly tutoring session and an overall weight of half the grade points.

The course was scheduled to start in mid-January, so I had already started planning for it in the early autumn. By September I had a rough view of the course schedule, and copies of the new textbook had already been ordered for the library. More detailed planning, from the contents of individual lectures to the exact format of the project work, was of course still unfinished. At this stage, in early December, the question of the department's presence in Second Life popped up in a completely unrelated context.

Figure 1. The auditorium at the Second Life Kumpula campus.

The University of Helsinki had had a small-scale presence in Second Life since the previous spring, and our department already had a small plot of land, seen in Figure 1. While some earlier lectures had been presented there as video streams, there had not yet been any larger-scale attempts at using Second Life for teaching. This was clearly the overall goal,

though, and the general feeling was very much as Pence (2007) put it: “Second Life is presently the best venue for learning how to teach in virtual space, and now is the best time for faculty and administrators to prepare themselves to deal with this test.” The plan was to start with a small presence, and eventually work our way towards an operative virtual campus, to use the terminology of Jennings and Collins (2007). Everyone agreed that the User Interfaces could be a good candidate for gaining new experiences on how this environment could be used.

Planning for the course

In some ways it was easy to select the User Interfaces course as a pilot case for Second Life based teaching. In the past, the course had included several exercises in designing user interface prototypes on paper; it seemed that the building tools available in the virtual world could get the students one step further into prototyping. It also seemed likely that some of the material already existing elsewhere in the world could be used for the course.

Using the building tools for course work was very tempting, as I had already decided to restructure the course so that this part would be roughly half of the student workload. In a virtual world setting the course work would become an user interface design project, done in groups of five students or so. I also had hopes of presenting the work along the lines of problem-based learning. While Albanese (2000) reviews prior research that is critical regarding the benefits of PBL as far as learning outcome is concerned, he also points out that there are clear indications that the method increases the socialisation of the students – which would be a clear benefit, considering the traditional stereotype of computer science students being introverted nerds.

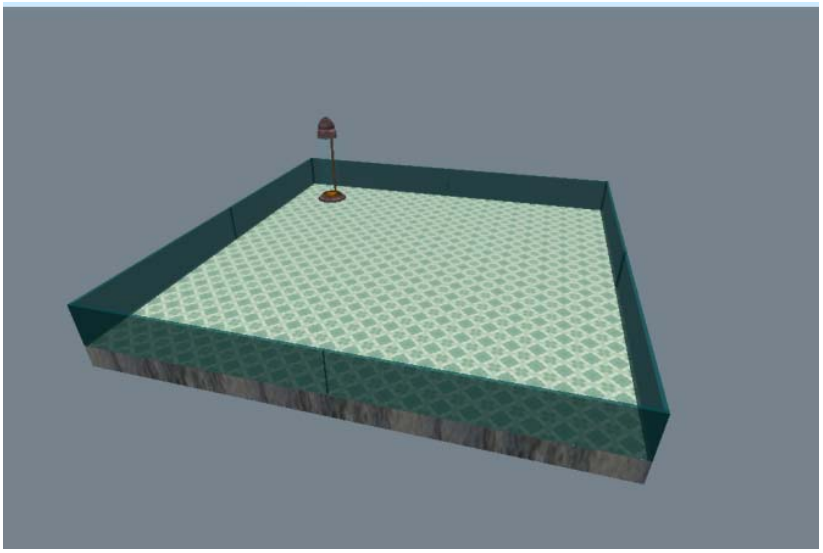


Figure 2. An empty group working space

The course was also to be my first attempt at blended learning. The lectures would be held simultaneously in both worlds, so that the students would have a choice of where they'd prefer to attend them. The course work would be done mostly in the virtual world, with each group having their own working space like the one in Figure 2, although there would be weekly tutoring sessions in a real-world computer lab for two groups or so at a time.

As this was to be the first course to be taught in Second Life both for me and the department as a whole, I did some quick tests on whether the equipment was up to the task. The desktop computers both in my office and in the main auditorium had no problems, and even my elderly lightweight laptop was usable, although only barely. I also warned the departmental IT support about my plans, including my need to have the lecture slides visible in both worlds. The rest of December I spent mostly travelling around in Second Life, both getting used to the world and looking for places useful as support material for the course. In all honesty, I must admit I enjoyed this part very much.

Experiences

As the course involved experimentation with new teaching environments and methods, it should not be surprising that the experiences were rather

mixed. The virtual world clearly made it possible to do things that would have been impossible in a more traditional environment, but on the other hand there were so many new things that problems were also inevitable. The first ones appeared right at the start.

Setting up for the first lecture, it turned out to be very difficult to present the lecture slides in both auditoriums at once – in fact, we only managed to work this out in time for the third one. The difficulty was partly due to my desire to have the same lecture simultaneously in both Second Life and the physical world: showing the slides in either auditorium would have been easy, but synchronising the two meant that we had to send the physical-world slide set to Second Life as a video stream, and this was not without its problems. In any case, the technology was not very robust at the start, and roughly for the first half of the course I had a technical support person present in the physical-world auditorium. By mid-course we managed to get to a point where it was sufficient for him to be present only in the Second Life auditorium.

Towards the end of the first week an even worse issue came up. I had in December visited Second Life using a few different computer set-ups, in order to make sure it would be usable for the students as well as myself. Unfortunately, I had not realised that the computers teachers had available for themselves in the lecture halls were more powerful than those in the computer labs, and in the end it turned out that the department did not have a lab where students could access Second Life. New display adapters were promptly ordered for one lab, but for the first weeks the exercises had to be adapted for life without Second Life. Of course, this was just the time that I had originally intended for learning to work with the virtual world, so also the project work had to be adapted to the resulting lower skill level. In the end, the project work became significantly smaller than originally planned.

The technical problems during the first lectures may have contributed to the first social issues as well. During the second lecture the slides were not yet visible in the Second Life auditorium, and while I was speaking my tech support was frantically trying to fix the screen there. When a new

plywood screen appeared in front of the old one, I thought this was a part of the effort and simply continued my lecture. However, pretty soon assorted other objects started to pop up all over the auditorium, including a gigantic horse head and a cottage; eventually the entire auditorium was full of blue bubbles. At this stage none of the staff present had the necessary technical privileges to do anything, so I simply asked the person responsible to stop and then continued the lecture. This didn't do too much to end the incident, and at the end of the lecture I found that the blue spheres had pushed me into the stream running beside the auditorium, seen at the bottom of Figure 1.

We never found out whether the disruption was created by a student who was frustrated by the lack of lecture slides or by an outsider. In any case, I started the next lecture with a brief talk about manners, reminding the students that a lecture is a lecture regardless of the venue and that while everyone is free to not attend, it is unfair to actively sabotage the attempts others may have at learning. This, or finally getting the slides to work, helped so that the rest of the lectures went rather smoothly. It seems clear, though, that some see Second Life as a game and act accordingly.

Another case of treating Second Life as a game came up towards the end of the course, when one of the students came in late and parked his motorcycle in front of the whiteboard. By now I had the necessary in-world privileges, however, and could stop the disruption before it got out of hand. The next day the student apologised and explained what had happened: apparently he had left his computer unlocked while taking a break, and a friend had decided to have some fun at his expense. As seen, it is not quite sufficient that the students themselves know how to behave in a virtual classroom.

Fortunately, the bad experiences were balanced by good ones. By the end of the second week it was becoming clear that the lectures were drawing a larger crowd than usual. At our department it is common that roughly half the students attend lectures; this time about one third were turning up at the auditorium in the physical world, but the one in Second Life had about as many. Some of the students said already during the

course how easy it was to come to lectures in a virtual world – one had even attended lectures and the weekly tutoring session while on a business trip in New York. Finding the tutor required some help, though, as this had not been planned in advance.

Student feedback was severely bipolar. This can be seen both in the regular post-course feedback and in a separate study in student opinions about Second Life (Junttila and Karjalainen 2009), which collected most of its raw material from the students of this course. In short, a large number of students considered Second Life the best feature of the course, while others were equally convinced that it was the worst part.

The primary gripe, quite clearly and also predictably, was that the virtual world was not easily accessible for several weeks at the start of the course. Comparing the mixed student opinions to the overwhelmingly positive ones reported by Ritzema and Harris (2008), this seems to be a major issue. One of the main things to learn is that everything must be tested thoroughly in advance, and simply testing the usability of Second Life on a few “high-power” and “low-power” computers turned out to be not enough. Even if everything looks fine one should prepare for unexpected glitches: one day there were some technical problems with the Second Life servers that were resolved only some minutes before my lecture started. The situation could equally well have lasted for an hour more.

Another big issue for some students was that they did not see a reason to have the lectures in a virtual world. For these students, using Second Life meant mainly the extra hassle of getting yet another user account and learning yet another computer environment, when the lectures could have been equally well distributed as a simple video stream over the Internet. According to them, this would have left more time to concentrate on the course material instead of the medium.

A third issue, somewhat related to the second one, was that the choice of using Second Life was not clearly connected to the course goals. This is largely a result of my having to modify the course contents while teaching it. Because of the technical problems, there was much less time to get

used to working in the virtual world than I had planned, and therefore the time spent there learning the course-related material was also much shorter. Not only was the course work different than planned, but also most of the excursions to in-world sites had to be cancelled.

On a more positive note, the students were happy about having a viable option for distance learning – a way to attend both the lectures and group sessions even when unable to be physically present. This had been one of my original goals, and I am glad that at least this part worked as intended, despite the initial trouble. Moreover, quite a few of the students felt that attending a lecture in an auditorium in Second Life was preferable to a more traditional video stream of the same lecture. That said, a teacher should be careful to pay equal attention to all students, not just those who are present physically.

Another aspect of the new course format was the opportunity to experiment and learn by doing. Again, this was one of the original goals for using Second Life, especially in the context of getting the course work a step beyond user interface prototypes drawn with pen and paper. It was very nice to hear that despite the problems at least some of the students felt they got what I hoped to give them. Some others did not, however, although in their case a part of the problem was that the emphasis of the course content had changed from user interfaces towards usability in general, as can be clearly seen in Figure 3. These students felt – and rightly so – that the design of graphical user interfaces could more effectively have been learned with more traditional design tools, and did not feel the benefits of Second Life in getting a more general view on usability.

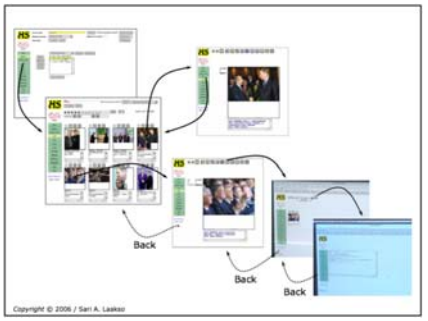


Figure 3. Change of emphasis from the previous incarnation of the course. Left: analysing graphical user interfaces in the 2006–2008 course; Right: end result of one group's design project in the 2009 course.

From the teacher's point of view the new course format meant a lot of work, on several different levels. First of all, becoming familiar with Second Life took some time, and that just opened the way for looking for suitable in-world building and teaching tools and learning to use them. Redesigning the course for the new environment was a major task, and one that did not succeed as well as I had hoped. Even giving a lecture in two different auditoriums at the same time brought its own element of additional excitement.

The department's technical support team was a real life-saver. This was especially true at the start of the course, but I was a frequent customer during the entire length of the course. Looking back, it appears that I would have needed more support during the preparatory phases, but I did not realise it at the time and so did not ask for it. Moreover, there were several issues along the way that were new not only to me but also to the support personnel – and it should be kept in mind that we are a department of Computer Science, with a dedicated IT support person for educational applications and some prior experience with Second Life. Without this level of organisational support one should prepare very carefully before imposing Second Life on real students.

In hindsight it is clear that the hardware requirements should have been checked more thoroughly. It is not enough to trust that a computer that is sufficiently powerful for normal computer lab use would be good enough, as Second Life has some rather specific and not very well documented requirements. The display adapter is the most important component, and

while Linden Labs has a list of supported and suggested adapters, in practice there will be surprises both ways: unexpected low-end set-ups work sufficiently well for basic use, while on the other hand some do not perform nearly as well as one might think. We finally got a Second Life capable computer lab only halfway to the course; if the course involves visiting virtual worlds from a computer lab in the physical world, one should make sure that the computers in the lab can in fact run Second Life sufficiently well. This should be checked far enough in advance that any necessary upgrades can be ordered and installed.

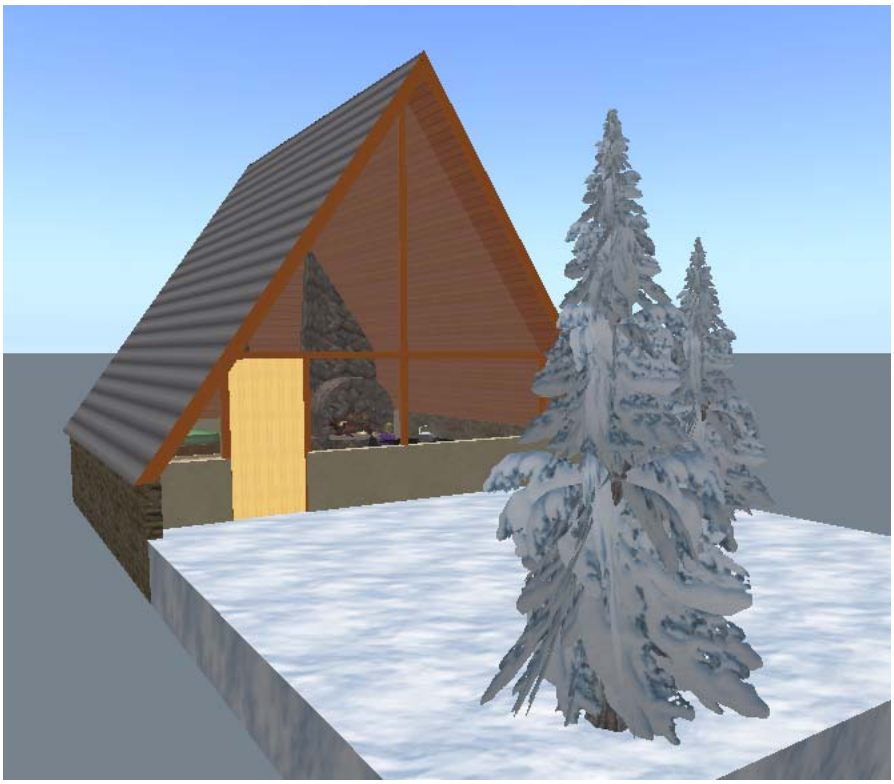


Figure 4. Office, floating in the sky below the student working spaces.

All in all, while teaching this course was more work than usual, it was also a lot of fun. This of course is a matter of taste, but I enjoyed working in the virtual world environment a great deal, also outside the teaching context. It is worth noting, though, that this kind of personal commitment was useful for course-related matters – and as pointed out by Robbins (2006),

mixing personal and official roles and spaces helps to build a deeper relationship between the teacher and students. As an example of more immediate benefits, towards the end of the course, very late one night I was able to advise one somewhat desperate student on how to submit his course work. His e-mail queries had been caught by the spam filter used by our department mail server, but he was able to find me in my virtual office, seen in Figure 4, working on matters completely unrelated to the course.

As a teaching environment, Second Life offers the possibility to do things that are not possible in the physical world (for a more thorough discussion of this, see e.g. Mason 2007). The virtual world has already numerous museums and displays in a wide variety of disciplines, and it is easy to have students to visit these. The building tools, while relatively simple, make it possible to do surprising things in short time, especially when augmented by existing content, a lot of which is freely available. Above all, though, Second Life is a place for students to work independently and in groups, regardless of their physical location.

Conclusions

From the experiences during this course, it is clear that Second Life is a useful addition to the toolbox of a university teacher. However, one should be careful when moving classes to a virtual world, since the technology is still relatively new and not necessarily well known. As with all unfamiliar teaching tools there is a risk of making mistakes, both technical, social and pedagogical. Still, as long as one takes the time to familiarise oneself with the environment there are clear benefits for using it.

In preparation, one should check well in advance that the existing hardware is up to Second Life requirements. Even after this has been verified, it is good to be prepared and have technical support nearby, especially at the start. Also, Linden Labs has occasional unexpected service outages. While it is not certain that any given course will be hit by one of these, it is prudent to have at least a rough backup plan.

The contents and syllabus of the course should also be designed to fit the new tools: new things should not be tried simply because of the novelty,

but because of the potential pedagogical benefits. To take one's class to a virtual world is still a huge leap, and so it should only be taken if the course can in fact utilise the strengths of this medium. Even so, while designing the course for the new medium one should prepare for potential problems that might require falling back to more traditional methods. If the virtual world is unavailable the course will still have to be taught.

The new way of teaching will be new for students as well as the teacher. Some of them may be completely new to virtual worlds, others may be used to gaming in a similar-looking setting. Both prior experiences and lack thereof may result in difficulties dealing with a virtual learning environment, so it is good to spend a little time at the start to remind everyone that the goals of university studies and to some extent also the expected behaviour remain the same regardless of the environment. If someone doesn't want to attend a lecture they are free to leave – but it is unfair to make it harder for those who do want to study. And if one doesn't consider it appropriate to ride a motorbike wearing only skimpy underwear to a physical-world auditorium, it might not be a very good idea to do the same in a virtual world either. Even after pointing this out, though, a teacher should prepare for disruptions.

Given that this is a new environment, it is even more important than usual to keep the students up to date about what is going on. Information about the course, its schedule and learning environments must be up to date and clearly understandable. As changes appear, the students must be informed right away. The more informed they are, the better they can concentrate on their real job, learning.

Fortunately, while preparations are important, one does not have to start from scratch. There is already a large number of teachers active in Second Life, and Linden Labs itself is actively supporting educational uses of their virtual world. Help, guidance, examples and role models are available, so it is not too hard to start. Good luck, and welcome!

References

ACM (2001). Computing curricula 2001. *Computer Science. The joint task force on computing curricula*, IEEE Computer Society – Association for Computing Machinery. <http://www.acm.org/education/education/education/curric_vols/cc2001.pdf>.

Albanese, M. (2000). Problem-based learning: why curricula are likely to show little effect on knowledge and clinical skills. *Medical education* 34(9), 729–738.

Jennings, N. & Collins, C. (2007). Virtual or virtually U: Educational institutions in Second Life. *International Journal of Social Sciences* 2(3), 180–186.

Junttila, J. & Karjalainen, A-L. (2009). *Second Life opetus- ja oppimisympäristönä opiskelijoiden kokemana*. Project report, TAMK University of Applied Sciences Teacher Education Centre.

Mason, H. (2007). Experiential education in Second Life. *Proceedings of the Second Life Education Workshop 2007*, 14–18.

Pence, H. E. (2007). The homeless professor in Second Life. *Journal of Educational Technology Systems* 36(2), 171-177.

Ritzema, T. & Harris, B. (2008). The use of Second Life for distance education. *Journal of Computing Sciences in Colleges* 28(6), 110-116.

Robbins, S. (2006). “Image slippage”: navigating the dichotomies of an academic identity in a non-academic virtual world. In D. Livingstone & J. Kemp (Eds.), *Proceedings of the Second Life Education Workshop 2006*, p. 35–38.

BLENDED LEARNING EXTENDING TRADITIONAL LEARNING ENVIRONMENTS

DEVELOPING EVERY STUDENT IN A BLENDED LEARNING ENVIRONMENT OF CARE AND CHALLENGE

Lea Kuusilehto & Päivi Kananen

Foundation of the international Master's Degree Programme in Educational Leadership

The two-year international Master's Degree Programme in Educational Leadership (MPEL) as acknowledged by the Act of University degrees 2006, commenced in the Institute of Educational Leadership (IEL) at the University of Jyväskylä in 2007. It is the first programme in Finland awarding a degree in education, with a specification in educational leadership. The programme is for international students aspiring to leadership, management, research, expert, or consultancy posts in the fields of educational administration, leadership and policy making.

Sensitivity to customer needs arising from the changing environment of educational administration since the 1980s, which can also be approached from the angle of a university's societal responsibility, was the incentive in launching a principals' qualifications programme of 25 ECTS at the University of Jyväskylä in 1996 as the first one in Finland. The programme is aimed at persons aspiring for leadership positions in educational organizations. In 1999 the Institute of Educational Leadership was founded by University President Aino Sallinen. In 2001 an advanced 35 ECTS programme in educational leadership studies was launched for principals and in 2008 for superintendents and chief educational officers. The 1st doctoral programme commenced in 2002, followed by the 2nd cohort in 2004. Currently the 3rd cohort, an international PhD programme is to be launched in 2010. The MPEL programme was launched at a stage, when through the consistent development work the strategic framework of the institute had materialized and borne fruit in the form of an IEL learning environment culture.

In this learning environment customer needs are the focus of delivery, and a web of campus faculty, alumni, home university and international partners and practitioners in the field had grown to trust and feel pride of the programmes, having each contributed and committed to their immersion. It can be defined as a culture of cumulative leadership. (Alava 2006, 9-10). Simultaneously, internationalization had become one of the strategic focuses of Finnish higher education.

The culture of accessing every student, taking them into consideration as distinguished clients and unique human beings conveying a remarkable input into the MPEL programme, is parallel to the customer culture characteristic of the Finnish programmes of the IEL, through qualification to advanced studies and PhD programmes. The student cohorts coming from all corners of the world, an additional approach of care and caring has been developed into the programme (Starratt 2003, 2005; Noddings 2005) to ensure meeting the students' needs expeditiously and to secure a steady progress in their academic achievement.

Critical mass of educational expertise as basis for provision of the MPEL

The University of Jyväskylä is the home of the most remarkable concentration in educational sciences, teacher training, educational research, evaluation, open university and continuing education in Finland. It houses the Faculty of Education divided into the Department of Educational Sciences and Teacher Training College, the Finnish Institute for Educational Research, the Finnish Education Evaluation Secretariat, an Open University with the University of the Third Age and the Centre for Continuing Education. The long roots of the field of education are acknowledged as one of the cornerstones of the University of Jyväskylä.

With this accumulated critical mass of provision in the field of education on the campus, both in terms of instruction and research, a new Master's Degree Programme can rely on the availability and stability of high quality teaching resources in the most varied areas of education. Additionally, the Faculty of Economics with its Management Department is a further pro-

vider of expertise in leadership and management studies within the home university. The exchange and interaction of teaching resources also contributes to an increase in each party learning not only about the other one's discipline and research, but also about pedagogy, and methodology, hence creating new knowledge and new efforts. This interaction is also adamant in increasing trust between the interacting institutions. Consistent with the aim and strategy of the Institute to attend to the needs in its environment, the Institute has additionally responded to the internationalization strategy of the university and higher education by involving expert professors in international comparative education and in educational leadership and management in teaching in the programme. (Alava 2006, 2-3.)

Foundations of blended learning pedagogy in the MPEL

The concept of blended learning implies combining facilitating learning both on campus and in the e-learning environment. Blended learning pedagogy in this programme derives naturally from the objectives decreed to the international master's programmes by the Finnish legislation, demanding the programmes equip their students with skills necessary in working life and further studies.
The curriculum highlights the programme's conceptual approach to learning as follows:

1. Respect for the worth, integrity and equality of every human being also in their role as learners, and the conviction that learning is a mutual process. The instructors are also learners, thus deepening our value basis, which will be radiating via the future experiences of the students.

2. The concept of the human being is based on the humanistic-socioconstructivist views. The faculties are committed to enhancing every human's right, capability and potential to grow towards

becoming themselves, the growth taking place in relation to another human being.

3. The programme has elements of the socio-constructivist perspective of knowledge building, with the belief in knowledge growth, creation and realization from the social context where it is encountered and researched.

Thus, the pedagogical solutions applied are based on the needs of the learners and their previous learning experiences. The focus is on learning. Learning is constructed in the interaction and reflection of research based knowledge and learners' learning processes and learning background, with one objective being to build a community of learners." (MPEL curriculum 2007; 2009, 6).

Blended learning is firstly implemented through the interaction of the instructor pools from the campus, national and international network teacher forces. Secondly, through the interaction of the instructors and the students, thirdly through that of the students in the group discussions and problem solving in class environments and in private. Fourthly, the other major forum of learning, though subjected to the personal interaction, is the work conducted on the e-learning platform and through the web.

As McLuhan (1968) advocated, the medium is the message. According to this statement, a new medium or application in itself affects the message, the deliverer of the message and eventually the entire communication process (Tella et al. 2001, 190). Applying McLuhan's insight to the above multifaceted blended learning concept at the IEL, and bearing in mind the humanistic-socioconstructivist concept of learning, it can be claimed that the blended learning opportunities arise in multidimensional environments. Tella et al. (2001, 190) state that learning on the e-learning platforms or in the web is changing from a monological, one-dimensional interaction into a more dialogical, participative and empowering learning process and environment. This shift is definitely materializing in the blended learning environment of the MPEL: Monological interaction in facilitating learning takes place only to a limited degree in lectures, few of

which are exempt of inserted group discussions reflecting the issues from the intercultural perspectives of the peer learners, and in completing individual course assignments either as essays or in the few written exams, or retrieving learning materials in the web. The dialogical dimension abounds in the interaction between instructor and learner both in class and through e-learning facilities, between peer learners in class, in private and via e-learning outside of classes.

Implementing the promise made to the customers: challenging goals with support of study

The MPEL is a two-year programme comprising 120 ECTS, i.e. a workload of 120 x 27 hours of work. The promise to the customers for them to graduate in two years with outstanding learning, knowledge building, presentation, interaction and problem solving skills, begins with acknowledging the customer needs, remaining sensitive to them, and learning together to respond to them. The programme is structured in a school like form in the first two semesters, with regular classes to attend and regular attendance required. This is because through interactive and constructivist methodology, our concept of man, knowledge and learning is put into practice. The hypothesis is that to build a community of learners from total strangers in a new context requires regular contacts in order for all the parties to get to know each other and accumulate trust.

During those first two semesters students will be provided with all the necessary ICT skills needed during their studies, and to equip them for the work life. The most subtle challenge for the faculty is to recognize and perceive the students who would require further tutoring. In the last two semesters the students have few regular campus classes and the focus of study is on the thesis research and writing. An important facility for maintaining the regularity of contacts, and on the other hand for responding expeditiously to student needs, is the ICT environment: the platform and the email.

The proud and advocated objective of the institute is to implement the programme in such a way as to facilitate a 100% graduation outcome, and

that of the students likewise, in order to return to make a contribution as leaders of change in their respective countries. In sum, it can be stated that the goals of the customers (students) and the organization (the institute) are uniform at the beginning. The challenge is to sustain the commitment for two years. As Barron (2003) puts it, students focusing on the assignment and on solving it, committed to the process and striving for the shared ground, learn effectively.

It is a recognized truth that the culture of the organization plays a decisive role in whether the study environment is conducive to learning or not. In order to achieve good learning outcomes and to implement effective education, high expectations and challenging goals need not be combined with not only excellent teaching and learning facilities, but also with a supportive learning environment. Essential factors in building an environment conducive to learning are the organizational culture and a pedagogy responsive to customer needs. (E.g. Dimmock, Walker 2005; Noddings 2005, Schein 1992.)

Instruction methods

As stated above, the methodological and pedagogical solutions applied are based on the needs of the learners and on their previous learning experiences. Academic research based knowledge is reflected on in the interaction of the students, facilitated by the instructors, with each student conveying varying practical professional experiences and diverse cultural backgrounds. This again is reflected on in the interaction of the students and the instructors of the programme.

The instruction methods combine lectures, class and group discussions and debates, individual reflections, student presentations, assignments completed individually or in groups, assignments solved on the e-learning platform, retrieving materials from the web, tutoring by peers and instructors, and only a few written exams.

Teaching is not only about having students respond to stimuli, gaining cognitive skills, or constructing learning in the social and societal context. The claim is that the behaviorist, cognitive and socio-constructivist theories of learning are not sufficient. What is relevant in this pedagogy is both

parties committing to a common cause. It is about the roles of teacher and student blurring into both becoming learners towards a shared goal within the community, which is possible to create within the culture of the institute. Teaching, studying and learning is also art and feeling, a shared experience transcending what individual learning can achieve. Hence the culture base, the mental mode of addressing students' needs, created in the institute is an essential prerequisite for such a community of learners to emerge. It can only emerge in circumstances of trust and patience, where sincere care, willingness, and learning to solve problems jointly is in place. (Alava 2006, Kuusilehto 2009)

Function of e-learning facilities and skills

With the technological revolution changing the learning environment around the globe, the e-learning facilities as a medium are a natural vehicle in attaining the objective of the programme: providing skills necessary in working life and further studies. In the MPEL programme the basic tools are the web and the e-learning platform of the university called Optima in addition to the most common office tools.

Yet, the ICT facilities are also a focus of study in themselves in the MPEL, as a few of the students have hardly had access to ICT prior to engaging in the programme, or having held leadership positions, it has been the duty of their secretaries to provide the ICT skills for their organization. Hence the range of skills is from nil to excellent at the beginning of the programme, so that individually tailored instruction in ICT skills with back-up tutoring needs to be supplied. This extra effort places a strain on the student in question for months to come, and also on the instructors, as the heterogeneity of skills has an effect on instruction arrangements and requires a sensitive touch due to the fact that these students often come from cultures where admitting a failure in skills is equivalent to losing face, and is hence rather concealed. In case of a male student, a male instructor in private renders the best yield in learning, especially in the first two semesters.

In addition to the ICT skills necessary for retrieving research based knowledge, adopting it, organizing and producing it, another challenge is the

communication skills necessary when working in interaction with peers on the e-learning platform, e.g. participating in a discussion forum or in group assignments, a finding similar to that of Matikainen (2009, 28).

E-learning facilities are applied in conveying information and learning materials, fostering interaction between peer students for tutoring and groupwork purposes, offering discussion forums, assignment delivery, development and feedback opportunities, and for enhancing everyone having an individual voice in the cohort.

Tella et al (2001, 181–189) define the purposes of the use of ICT facilities as the pedagogic tool purpose, the instrumental, collaborative and informational purpose, each existing mostly in combination with any other. In the MPEL programme the e-learning platform and the ICT office tools serve the instrumental, informational and collaborative purposes intertwined. In contrast, only a few pedagogic tools have been used and the student feedback clearly indicates that they need to be tightly combined to interactive, regular classroom reflection and sharing in order to keep the students motivated.

Graham (2006, 13) presents the objectives of blended learning as an enabling blend, an enhancing blend and a transforming blend. Compared to that definition, the MPEL blended learning approach can be considered an enabling blend, where ICT is used to access the students, to maintain the connection, to share information and to distribute learning materials. The enhancing blend is enhancing learning by e.g. peer interaction in solving a problem or planning a presentation or in groupwork assignments, or by providing for individual tutoring or guidance. The transforming blend, where the teaching and learning experience could not have been conducted but for the ICT, could be represented by an example from a massive assignment where students prepared a summary of a large number of articles, first peer rewiewing the summaries submitting the reviews by ICT, then editing the final version and distributing it by ICT facilities. We would conclude the transforming blend to correspond to the intertwined use of the instrumental and collaborative purposes of ICT, referred to above (Tella et al. 2001).

Support to study

As stated above, sensitivity to customer needs is in the culture of the institute created in the first 10 years in the field, prior to the launch of the MPEL . When living through this programme, a new element in facilitating learning, or a shade of meaning of learning started emerging and being conceptualized in the regular daily contacts with the students.

Nel Noddings (2005) uses the concepts of *the carer* and *the cared for*, the connection between the two being that true caring exists where the cared for feels/addresses he/she is cared for, thus resulting in the absence of the well-known claim in educational institutions, “nobody cares”. Caring in this sense is beyond what we used to call *sensitivity to customer needs*. The international students being on campus regularly, in contrast to the other programmes of the institute, and having a different orientation and dynamics inside their group, and in view of the environment, posed a new challenge. Responsiveness to it came naturally from the basis of the institute’s culture: faculty’s flexible accessibility to the students became evident, as did also their readiness for interventions on an individual basis, be it in the form of negotiating assignment delivery deadlines, finding resources, comforting heartbreaks, fears and happiness when falling in love, intercultural conflicts, grief in family, etc.

All in all, it is irreversibly impossible to conceptualize the MPEL implementation without the blended learning environment, as it both broadens the individual’s potential to learn, and on one hand individualizes their learning paths, on the other hand enables sharing learning paths collaboratively, and ensures accessibility to information and interaction to all parties. The objective of the programme is that the student will have adopted the mental mindset of our learning culture and the ability to develop their blended learning skills necessary in their future careers.

References

Alava, J. (2006). Quality is not accidental. A case of cumulative leadership. In P. Maoyan, F. Yihong & Z. Y. Xiamen (Eds.), *UNIQUAL Conference Proceedings. Key to University Quality Assurance: Faculty/Staff Development in the Global Context.* China.

Barron, B. (2003). When smart groups fail. *The Journal of the Learning Sciences* 12 (3), 307-359.

Dimmock, C. & Walker, A. (2005). *Educational leadership. Culture and diversity*. London: Sage

Graham, C.R. (2006). Blended learning systems: Definitions, current trends and future directions. In C. J. Bonk & C.R. Graham (Eds.), *Handbook of blended learning: Global Perspectives, local designs,* 3-21. San Francisco, CA: Pfeiffer Publishing.

Kuusilehto, L. (due in autumn 2009). *Research report on the Master's Degree Programme in Educational Leadership*. University of Jyväskylä: Institute of Educational Leadership.

Matikainen, J. (2009). Maisteriohjelma verkossa – verkkoviestinnän muuntokoulutus WERMU. In T. Joutsenvirta & A. Kukkonen (Eds.), *Sulautuva opetus,* 25-36. Helsinki: Gaudeamus.

McLuhan, M. (1968). *Ihmisen uudet ulottuvuudet*. Porvoo: WSOY.

MPEL (Master's Degree Programme in Educational Leadership) Curriculum 2007;2009. University of Jyväskylä: Faculty of Education.

Noddings, N. (2005). *The Challenge to care in schools: An alternative approach to education (2nd ed)*. New York: Teachers College Press.

OECD Education at a Glance 2001-2008. Available online at: http://www. oecd.org.

Sandholm, L. (2008). *Responsible leadership with an ethics of care and caring*. Lecture series given at the University of Jyväskylä, Finland.

Schein, E. (1997). *Organizational culture and leadership (2nd ed).* San Francisco, CA: Jossey-Bass Inc.

Starratt, R. J. (2003). *Building an ethical school*. London: Routledge Falmer.

Starratt, R. J. (2005). ´Responsible leadership´, *The Educational Forum* 69 (2), 124-133. Retrievable at http://www.informaworld.com/smpp/content~db=all?content=10.1080/00131720508984676

Tella, S, Vahtivuori, S, Vuorento, A., Wager, P. & Oksanen, U. (2001). *Verkko opetuksessa – opettaja verkossa*. Helsinki: Edita.

Välijärvi, J., Linnakylä, P., Kupari, P., Reinikainen, P. & Arffman, I. (2000). *The Finnish success in PISA and some reasons behind it*. Available online at: http://ktl.jyu.fi/ktl/pisa/english.

LINKING INNOVATION AND LEARNING

Student Teams as Innovation Developers for Small Enterprises

Helena Forsman

Introduction

This paper introduces a concept in which innovation projects of small enterprises were used as vehicles for creating entrepreneurial learning challenges to university students. From the students' point of view, the learning concept aimed at designing an entrepreneurial learning environment that stimulates creative thinking, innovation generation and exposes students to new business opportunities. From the point of view of small enterprises (SEs), the concept aimed at boosting their innovation efforts by creating and developing new inventions and concepts to improve their businesses. From the university's point of view, the aim was to integrate the university's R&D tasks with entrepreneurship education. The learning concept was organised at the universities of applied sciences of Finland within the framework of an innovation competition. In order to facilitate individual and collective learning, both synchronous and asynchronous virtual environments were used.

Project-based learning was incorporated into working in such a way that the expected project outcomes were both task and learning based. The learning outcomes were assessed by the students themselves and by their local instructors. The project outcomes were assessed by entrepreneurs and business experts. The evaluation criteria consisted of four dimensions: Learning and future potentiality, project efficiency, business impact and customer impact. In addition, this paper assesses the applicability of the innovation competition from the students' point of view and from the point of view of small enterprises. Further, the challenges of incorporating innovation capability building into education have been discussed from the point of view of university instruction.

The empirical evidence poses both pedagogical and organisational challenges to educational institutions. The evidence demonstrates that learning situations embedded in SEs' innovation projects can be used as vehicles for the effective learning of innovation and entrepreneurship. In addition, it suggests that in such a setting a blended solution can enrich the students' opportunities to have support and rich feedback from a variety of external sources. Further, the evidence draws a pattern in which learning is entwined with innovation development: The diversity of the learning process seems to affect the nature of the created invention while the nature of the invention appears to affect learning through the richness of the development challenge. At a practical level, this presentation brings in ideas of how the learning process of students and the innovation development process of enterprises can be supported through virtual environments. At a theoretical level, the presentation gives some views to researchers to assess the elements and dimensions which shape entrepreneurial learning implemented as a blended solution.

Background to Linking Learning with Innovation

Related to entrepreneurship education, universities have been criticised for providing students with past knowledge through teacher-led passive pedagogical methods that are overwhelmingly biased towards understanding and analysis of huge amounts of information (e.g. Gibb 1993; Henderson and Robertson 2000; Morrisette and Schraeder 2007; Rasmussen and Sørheim 2006; Solomon 2007). To complement the above bias, it has been suggested to utilise student-led active pedagogical methods based on search, opportunity discovery and experimentations in a wider context, resting not only on analytical knowledge but also on practical experiences, values, imagination and emotions (Asheim 2007; Carayannis, Evans and Hanson 2003; Fiet 2001). The learning process should be designed and implemented in such a way that it nurtures and rewards innovation, creativity, flexibility, self-direction and capacity to respond to different entrepreneurial situations. McMullan and Long (1987) continue that students should be exposed to innovations, new business

opportunities and product development. This approach connects innovation and learning so that innovation can be described as an embodiment of learning, and vice versa (Tran 2008). The innovation process exposes the individuals involved in it to learning and capability creation, and thus it creates an iterative process in which improved capabilities lead to new innovations which, in turn, lead through learning to new levels of capabilities.

On the other hand, the innovation performance of small enterprises (SEs) has been in the focus of policy incentives due to the important role the SEs play in economic development and growth. Despite the efforts devoted to business development activities, the overall success rate of new innovations has remained low over the years (for example Cooper and Kleinschmidt 2000; Stevens and Burley 1997). Even more challenging is the successful innovation in SEs whose lack of resources is combined with knowledge limitations, distrust towards formal training, sluggish technology utilisation, poor opportunity identification practices, propensity to avoid risks and challenges in networking with universities and research institutions (Julien 1998; Forsman 2008, 2009a; Scozzi, Garavelli and Crowston 2005). Due to the above-mentioned limitations, small enterprises need support with their innovation efforts. It is a common recommendation that university-SE links need to be firm for overcoming the knowledge needs and limited resources.

The concept that will be introduced in this paper aims at contributing to the above challenges. The following section will introduce the concept of the Innovation Competition and its tools for supporting virtual collaboration. In the last section, the effectiveness of the concept and the importance of virtual tools will be discussed. Finally, the practical implications will be outlined.

Innovation Competition as a Blended Learning Solution

The goal of the "*Perfect Hit*" innovation competition was to link learning and innovation in such a way that the innovation efforts of small enterprises (SEs) would serve as learning challenges for university students. In

order to achieve these goals, university students from different faculties got together to work as teams creating concrete ideas and plans to be implemented by small enterprises. Students from seven universities of applied sciences (polytechnics) participated in the competition. The Perfect Hit was expanded by a variety of associations to support the implementation of the competition. Several nationwide student associations, Junior Chamber International Finland (JCI), the Junior Achievement-Young Enterprise Finland, the Finnish Jobs and Society, the Confederation of Finnish Industries and local business associations joined the Perfect Hit forming all together a multidimensional network of students, educators, entrepreneurs, experts of business and other practitioners from real business life following the ideas stimulated by Wenger (1999).

From the point of view of an enterprise, the competition aimed at boosting its innovation process by creating and developing fresh ideas and plans to improve its businesses. From the student's point of view, the competition targeted at designing an entrepreneurial learning environment that stimulates creative thinking, challenges for problem solving and team working and further, exposes the student to new business opportunities. In addition, the aim was that the students got an insight into entrepreneurship and into the daily life of an entrepreneur, which had so far been unknown to them.

Project-based learning was incorporated into project work in such a way that expected project outcomes were both task and learning based. From the JCI members' point of view, the competition was linked as an event to their leadership training program - "Leadership by Coaching". The implementation process of the innovation competition consisted of three stages: network building to support learning (Stage 0), innovation development as SME-student team collaboration (Stage 1) and Virtual Innovation Final (Stage 2). In order to support the implementation of the innovation competition, both synchronous and asynchronous virtual environments and tools were developed and assembled. The process and virtual tools have been illustrated in Figure 1.

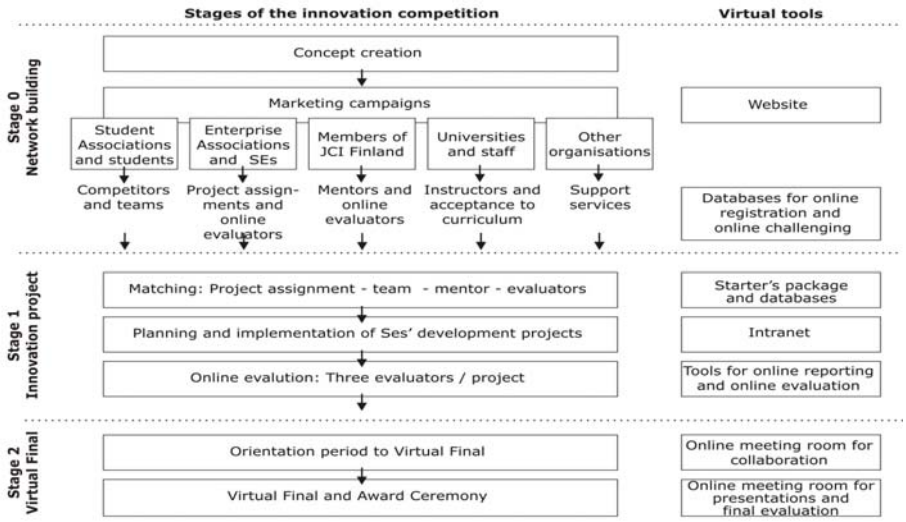


Figure 1. Implementation of the innovation competition

Stage 0 – Network building

The Perfect Hit concept was launched with the help of an extensive marketing campaign. A variety of associations and numerous students were in a key role in encouraging enterprises, students and JCI members to join the competition. Student associations started the campaign by encouraging their members to participate in the competition. After joining the competition, each student took it further by challenging her/his friends promising a lot of hard work, pains of creation and an unforgettable learning experience. Correspondingly, enterprise associations encouraged their members to participate in the competition by providing project assignments to the competing teams. In addition, entrepreneurs and the owner-managers of enterprises were invited to join the evaluation teams to assess and give feedback to the students on their project outcome. Further, the Association of Junior Chamber International Finland (JCI) spurred its members into joining the competition to act as mentors of the student teams.

A public website was designed and built to support marketing and effective information sharing. Four online databases were linked to the website in order to enable easy registration of students, mentors and evaluators.

Further, enterprises could submit their project assignments via the website. The received assignments were forwarded through the intranet to be available for the student teams. In addition, the website aimed at supporting a “quick commitment process”; if a visitor became interested in, s/he was encouraged to register, which in turn enabled sharing user group segmented information. Figure 2 introduces a view of the public Perfect Hit website.

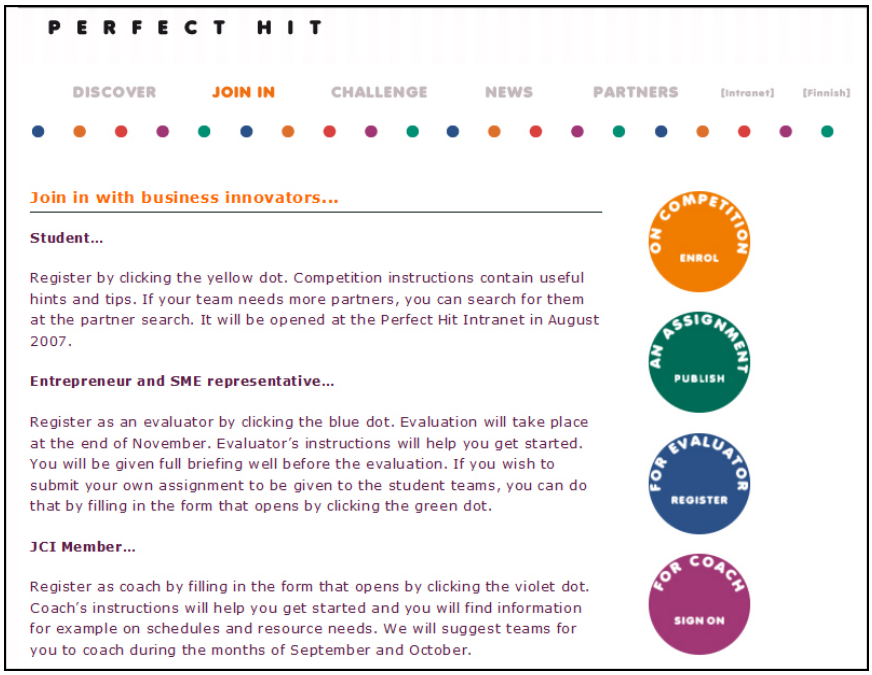


Figure 2. A view of the public website of the innovation competition

Stage 1 – Innovation Project with a Small Enterprise

The proper competition started as student team–enterprise collaboration, in which the student teams planned and carried out an innovation related development project in SEs – the project as a competition entry. The members of JCI offered support to the student teams providing the views of young business managers in the roles of mentors. Before the competition could start, it was necessary to match the students’ learning goals

with the development goals of the enterprise. A student team interested in a particular project was searched for to every project assignment received from an enterprise. Further, mandated by a student team, a mentor interested in the project goal was appointed to support the students' working. Finally, an evaluation team consisting of entrepreneurs and business experts was assigned to every project.

The first stage, i.e. the design and implementation of the project, took approximately 3-5 months. All the projects were related to the early stages of the development work consisting of opportunity identification and assessment, idea generation, market and technology analysis, product definition and project planning (cf. Alam 2006; Cooper 1997). The competition entries were assessed and commented upon by evaluators - SE representatives and experts from a variety of business fields. For the evaluation purposes, the teams presented their projects and outcomes with an online tool. The first evaluation round was carried out as an online evaluation. The evaluation teams, each of them consisting of three evaluators, assessed the entries and scored them based on the evaluation criteria with four dimensions: project efficiency, business impact, customer impact and future potentiality and learning (modified from Forsman 2008).

The intranet environment was implemented to facilitate matching and project implementation. It provided instructions, user-related information packages and project management tools. In addition, the aim of the intranet was to provide an environment for discussions, collaborative planning and mentoring. The access to the intranet environment was provided to all participants; students and their instructors, mentors and evaluators. The student teams submitted their competition entry as a report. It comprised of the description of the project and its implementation and the self-assessment of the project outcome following the evaluation criteria. After a student team had submitted the competition entry, the report generated based on it was sent to three evaluators. They scored the work on the basis of the evaluation criteria and submitted their scores and comments through an online tool developed for this purpose. Figure 3 introduces the features of the intranet environment. It comprises of general tools and forums such as real-time chat, urgent news, materials and reading hints

(InnoCafé). In order to provide user group segmented information and collaboration opportunities, each group also had their own lounge, such as Student's Lounge, Coach's Lounge and Evaluator's Lounge.

Figure 3. A view of the intranet environment

Stage 2 – Virtual Innovation Final

Four student teams were selected to the second stage - Virtual Innovation Final - based on the reported and demonstrated project success during the first stage. The competition culminated in an intensive weekend during which the teams nurtured their knowledge by reviewing and reflecting experiences in order to learn to re-innovate and to leverage their knowledge into new fields. As a result of this process, the student teams transformed their project experience into new entrepreneurial inventions. The preceding coaching period was provided to facilitate the preparation for

the Virtual Innovation Final. It covered coaching for fast-speed working during the final and training to sell the teams' ideas to the jury. In addition, the students were coached to capture the virtual synchronous environment in order to improve their abilities to give a powerful online presentation. Finally, the students' stamina was enhanced by coaching for ardent team spirit.

After the coaching period, the finalists and the members of the jury got together for one Saturday working online through a virtual real-time meeting room. During the virtual final the jury gave the competing teams time-limited assignments with a view to transform their project experience towards entrepreneurial inventions. The teams faced new customers and were asked to commercialise the project service provided initially to their SE partner. The virtual final ended in an open presentation followed by an audience and the press. The teams presented and "sold" their competition work to the jury. The jury assessed the presentations through the lenses of investors. The winning teams were awarded pecuniary reward. The second stage of the innovation competition was implemented by utilising a synchronous virtual environment as a main tool. It was used in both the coaching period and in the virtual final.

Innovation Competition as a Challenge for Two Types of Learners

In this section, the experiences gathered through the implementation of the innovation competition will be summarised and the applicability of the concept will be discussed based on the learning processes of the four teams which were selected to the Virtual Innovation Final. Finally, the roles of synchronous and asynchronous virtual environments will be discussed in relation to different learning approaches. In order to provide grounds for reasoning, this section starts by a brief introduction of the teams, their partner enterprises and projects (Cases A, B, C and D). Thorough case descriptions and more detailed analyses are available in the articles discussing how to balance capability building for radical and

incremental innovations (Forsman 2009b) and how the innovation projects of enterprises can be used as vehicles for learning (Forsman 2009c).

Case Descriptions

Case A - The partner enterprise was a manufacturer of shop fittings whose main customers were stores in the Nordic countries. The team consisted of two business students supported by two industrial design students. The original goal of the project was to produce new and fresh ideas for the visual convertibility of the product line. The team distributed questionnaires to existing customers in order to crystallise their needs and proposals for product improvements. As a project outcome, the enterprise obtained the results of the questionnaires and based on them detailed proposals and concepts for product improvements. In addition, the enterprise obtained graphic designs that visually outlined the new solutions. The innovative nature of the project outcome was assessed as incremental. During the second stage the team transformed their project experience into entrepreneurial inventions by introducing the concept of an R&D service. The innovativeness and novelty value of the idea were assessed as being low. In spite of the fact that the definition of the service concept was wobbly, the team could introduce several innovation tools to be utilised when running their business.
Case B - The enterprise was a small, recently founded media enterprise focused on video sharing through an internet portal. Its customers were day-care providers. The team consisted of three business students, one of them an employee of the partnering SE. The goal of the project was sales promotion and the solicitation of customers for a new photo and video diary. The team created ideas, explored new opportunities and planned a marketing campaign for the new service. As an outcome, the SE obtained a feasible plan to carry out the campaign, brochures and marketing material. The innovative nature of the project outcome was assessed as slightly radical. In the second stage, the team transformed their project experience into entrepreneurial inventions by launching a new promotion concept for a photo and video sharing service. The innovativeness and

novelty value of the idea were assessed as being high, but the definition of the business concept was not crystallised in detail.

Case C - The partner enterprise was a seaside hotel founded over 30 years ago. Its main guests were families with children. The team, consisting of four members, had a combination of social welfare and technology knowledge. The goal of the project was to produce scenarios and ideas for new customer acquisition. The team investigated the business operations of the hotel, produced ideas for new customer segments and outlined improvements for the overall view and exterior features of the hotel building. In addition, the team designed a proposal for a marketing mix. The innovative nature of the project outcome was assessed as incremental. In the second stage, the team transformed their project experience into entrepreneurial inventions by introducing a concept of management consultancy. The innovativeness and novelty value of the idea were assessed as being quite low, but the service concept was well-defined, like a chapter in a course book.

Case D - The enterprise was a casual style restaurant providing a cross-kitchen style menu catering to middle-class customers, most of whom were employees of the businesses located near the restaurant. The team consisted of four students with a similar knowledge background. The goal of the project was to design a new business model for the enterprise. The team produced a new business concept, outlined customer segmentation, designed a business plan and created ideas for interior design, menu and drink lists. The nature of the project outcome was assessed as slightly radical. In the second stage, the team transformed their project experience into entrepreneurial inventions by introducing a concept of a restaurant consultancy. The innovativeness and novelty value of the idea were assessed as being quite high. The business concept was well-defined and finalised.

Learning Approaches and the Role of Virtual Environment

The evidence is in line with Rasmussen and Sørheim (2006) in that the learning situations embedded in innovation projects of small enterprises can be used as vehicles for the effective learning of innovation and entrepreneurship. The student teams were able to produce viable solutions to their enterprise partners during the front-end phase of the innovation process. The evidence encourages increasing enterprise-student team collaboration, but it seems highly challenging to integrate teacher-led learning with the development phase of innovation. University instruction tends to direct working based on a planned and sequential process while development work in small enterprises tends to be integrated into their daily business (Forsman 2008), and thus the process is often discontinuous characterised by variation and search. In general, the experiences gathered through the Innovation Competition suggest developing capabilities to utilise virtual tools and environments in a way that fast-speed iterative process with variation can be supported. The major challenge is not technological but human in nature. There is a need to renew knowledge, working style and behaviour of individuals and organisations.

When comparing the phases and nature of the process for learning, it can be found that the diverseness of the learning process seems to affect the diverseness of the developed capabilities (cf. Tran 2008). In line with Slater and Narver (1995, 1998) and Bessant (2005), the case evidence demonstrates the existence of two types of learning: adaptive and generative. In addition, the findings support the view that these two types of learners have divergent aspirations to utilise virtual environments. The question how the utilisation of virtual tools diverges will be discussed resting on practical experiences accumulated during the implementation of the innovation competition.

Learning characterised by a sequential and planned process, the utilisation of analytical knowledge and focus on existing customers or expressed customer needs, seems to lead to adaptive learning and incremental inventions. The learning process of student teams (A and C) was character-

ised by features similar to adaptive learning and their working orientation can be described by "*Do it better*" (cf. Bessant 2005). These teams utilised the asynchronous virtual environment mainly to search information, instructions and facts and figures. The content is "The King" for them, not communication. In communication situations, they preferred using personal email. The content of messages was well-considered and formal in nature focused on procedures, deadlines, quality requirements and reporting structures. The "Do it better" oriented teams were not willing or capable to share their knowledge or problems through virtual environment with other participants. The student teams utilised the asynchronous virtual environment with a less conducive way to support their innovation and learning processes, and their working style was introvert through the eyes of other users. In the Virtual Innovation Final, these teams had difficulties to utilise effectively and in a relaxed-style manner the synchronous virtual environment for selling their ideas to the members of the jury.

On the other hand, the learning process characterised by discovery, search and experimentation with a focus on unexpressed customer needs and potential future markets, seems to lead to generative learning and inventions more radical in nature. The learning process of student teams B and D, had similarities with generative learning and their working style can be summarised by "*Break the borders*" (cf. Bessant 2005). The teams utilised the asynchronous virtual environment not only to search information and instructions, but also to discover new ideas, potential partners and the knowledge of other members or just for fun. Their communication was informal in nature and the content of the messages reflected the use of not only analytical knowledge, but also of emotions, imagination and experiences for creating revolutionary ideas and for finding practical solutions. Their working style was a combination of introvert and extrovert. In relation to the details of their competition entry, they were introverts while in relation to their problems and challenges they were extroverts. In the Virtual Innovation Final, these teams demonstrated much better abilities to utilise the synchronous virtual environment for selling their ideas to the audience and convincing the members of the jury. Figure 4 (Modified from

Forsman 2009b) illustrates the approaches: “Break the Borders” and “Do it Better”.

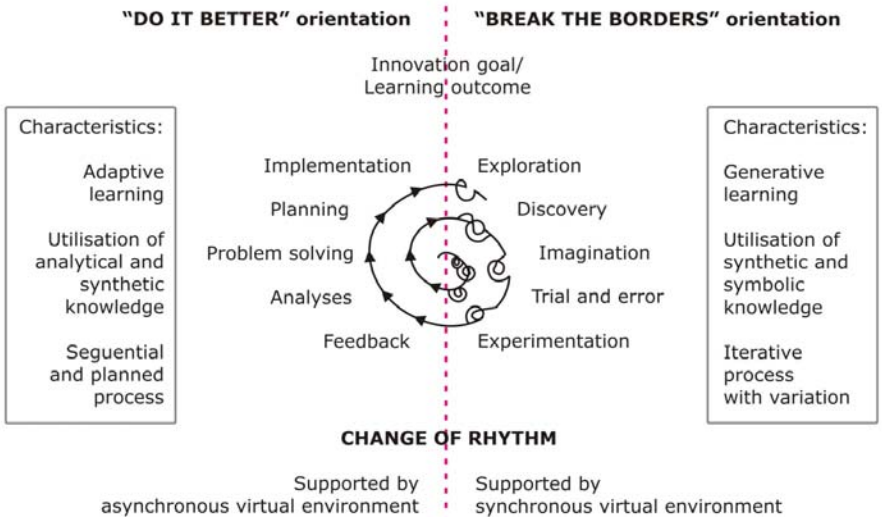


Figure 4. Two learning approaches and the role of virtual environments

Discussion and Conclusions

There does not exist only one way to achieve goals. Despite the differences between the pairs of teams, both of them created successful project and learning outcomes – but divergent in nature. In line with Connor (1999), the above two approaches are not contrary to each other but complementary options to develop solutions which satisfy the needs of today’s and tomorrow’s customers. The question how to interconnect these two processes, which have a divergent rhythm, divulges both pedagogical and organisational challenges. The degree of challenge increases when virtual learning is included in the process.

Traditionally, universities have operated on the left side of Figure 4. It is an environment characterised by predictability, planned and sequential processes, low risk propensity and a disciplined way of working. It is an easier environment to orchestrate “the groups of students” to develop and learn. The asynchronous virtual environment suits well the logic of tradi-

tional universities, and it provides a favourable setting to direct the learning process in a controlled way resting on teacher-led instruction. It is an efficient platform to share user segmented information and instructions on what to do, when to do and what is expected to be done. With “Do it better” oriented users, it can be used without allocating significant efforts for trust building and socialisation processes. Sharing analytical knowledge in predefined situations needs less trust than e.g. sharing knowledge affected by values and emotions. What are the advantages of using a synchronous virtual environment? Related to “Do it better” orientation, the main benefits can be realised from internal planning, solution finding and feedback situations. This evidence suggests that fostering an adaptive learning process in virtual environments does not necessarily need dramatic organisational considerations, the challenges are pedagogical. The process can be supported by instruction characterised by content expertise, enforcement of a disciplined way of working, orientation to solution finding, and a code of rules and capabilities to lead the groups of people to designing solutions down to the finest detail. (cf. Deschamps 2005; Salmon 2007).

The right side of Figure 4 is an embodiment of the opposite environment. It is characterised by uncertainty and potential risks, iterative and spontaneous processes, exploration and errors, the use of a diversity of knowledge types discovered from a variety of sources. In addition, a great deal of creativity is required. In this environment, learners should be empowered to direct their learning process and capability building. Traditional teacher-led instruction can even inhibit learning and development. This process is well-suited to produce new and extraordinary ideas and to strengthen personal attributes like creativity and entrepreneurial attitudes, but it is ill-suited to produce standard outputs or to develop skills like critical judgment, analytical skills and techniques. (Forsman 2009b.) During the innovation competition, the asynchronous virtual environment could support this side of the process not only by providing information and instructions, but also by providing opportunities to change ideas, share problems, innovate and communicate with others.

The “Break the boarders” users were not infatuated with the features of asynchronous virtual environment, but the utilisation of it was more diversified. When the “Do it better” users were looking for answers to such questions as what to do, when to do and what is expected to be done, the “Break the borders” users were mainly interested on the views of how to find, how to do it and how to exploit it. The more communicative and collaborative use of virtual environment and the utilisation of synthetic and symbolic knowledge demand directing significant efforts to the trust building and socialisation processes. The advantages of using synchronous virtual environment with the “Break the borders” users are related to ideation, imagination, trials and experimentations. Their process can be supported by coaching characterised by curiosity and openness, risk propensity, willingness to experimentations and a capability to inspire and motivate individuals. If this phase is implemented as a virtual solution, it demands utilising tools and procedures that are characterised by a short response time, an ability to transmit emotions and encouragement, a continuous and timely feedback and informal communication. This right side of the Figure 4 demands adopting a more collaborative style of working which changes the traditional role and capability requirements of instructors. In addition, it generates several organisational challenges, e.g. cultural change, resource allocation, partnerships and industry-academia collaboration, operating procedures, etc.

The Innovation Competition itself introduced in this paper was as an educational concept, one sort of disruptive innovation in respect to the degree of virtuality included in the process, the extent of partnership network and the method of implementation. It seems to be very easy to develop such a concept, quite easy to create the required technical environments and tools and painless to pilot the concept. Instead, it seems to be extremely difficult and challenging to incorporate the concept into the daily life of traditional educational institutions. Christensen, Horn and Johnson (2008) describe that disruption is often a two-stage process. In the first stage of disruption, the new concept will be developed, but it is difficult to utilise it in an old landscape. In the second stage of disruption, the systems need to be changed in order to make virtual student-centric learning a reality.

The first stage of disruption can be solved resting on pedagogical and technical solutions while the second stage demands organisational development at educational institutions. It tends to be a management challenge.

References

Alam, I. (2006). Removing the fuzziness from the fuzzy front-end of service innovations through customer interactions. *Industrial Marketing Management*, 35(4), 468-480.

Asheim, B. (2007). Differentiated knowledge bases and varieties of regional innovation systems. *The European Journal of social Science Research*, 20(3), 223-241.

Bessant, J. (2005). Enabling continuous and discontinuous innovation: Learning from private sector. *Public Money & Management*, January, 25(1), 35-42.

Carayannis, E.G., Evans, D. & Hanson, M. (2003). A cross-cultural learning strategy for entrepreneurship education: Outline of key concepts and lessons learned from a comparative study of entrepreneurship students in France and the US. *Technovation* 23(9), 757–771.

Christense, C.M., Horn, M.B. & Johnson, C.W. (2008). *Disrupting class. How disruptive innovation will change the way the world learns*. NY: McGraw-Hill.

Connor, T. (1999). Customer-led and market-oriented: A matter of balance. *Strategic Management Journal*, 20(12), 1157-1163.

Cooper, R. G. (1997). Fixing the fuzzy front end of the new product process. Building the business case. *CMA Magazine*, 71(8), 21 – 23.

Cooper, R. G. & Kleinschmidt, E. J. (2000). New product performance: What distinguishes the star products. *Australian Journal of Management*, 25(1), 17–45.

Deschamps, J-P. (2005). Different leadership skills for different innovation strategies. *Strategy & Leadership*, 33(5), 31 – 38.

Fiet, J.O. (2001). The pedagogical side of entrepreneurship theory. *Journal of Business Venturing*, 16(2), 101 – 117.

Forsman, H. (2008). Business development success in SMEs. A case study approach. *Journal of Small Business and Enterprise Development,* 15(3), 606 – 622.

Forsman, H. (2009a). Innovation capabilities of small enterprises. A cluster strategy as a tool. *International Journal of Innovation Management*, 13(2). 221-243.

Forsman, H. (2009b). Balancing capability building for radical and incremental innovations. *International Journal of Innovation Management,* Vol. 13, (Forthcoming).

Forsman, H. (2009c). Fostering front-end innovation process in SMEs. Case study of SME – student team collaboration. *Inter-ICSB, Issue 2009*. [Online]. Available at www.icsb.org.

Gibb, A. (1993). The enterprise culture and education: Understanding enterprise education and its links with small business, entrepreneurship and wider educational goals. *International Small Business Management Journal*, 11(3), 11–34.

Henderson, R. & Robertson, M. (2000). Who wants to be an entrepreneur? Young adult attitudes to entrepreneurship as a career. *Career Development International*, 5(6), 279–287.

Julien, P-A. (1998). *The state of art in small business and entrepreneurship*. Aldershot: Ashgate Publishing Company.

McMullan, W. E. & Long, W. A. (1987). Entrepreneurship education in the nineties. *Journal of Business Venturing*, 2(3), 261–275.

Morrisette, S. & Schraeder, M. (2007). Affirming entrepreneurship: The best hope for organizations. *Development and Learning in Organizations,* 21(1), 15–17.

Rasmussen, E.A. & Sørheim, R. (2006). Action-based entrepreneurship education. *Technovation*, 26(2), 185–194.

Salmon, G. (2007). *E-Moderating. The key to teaching & learning online (* 2nd ed). London: RoutledgeFalmer.

Scozzi, B., Garvelli, C. & Crowston, K. (2005). Methods for modeling and supporting innovation process in SMEs. *European Journal of Innovation Management,* 8(1), 120-137.

Slater, S. and Narver, J. (1995). Market orientation and the learning organization, *Journal of Marketing*, 59(3), 63-74.

Slater, S. and Narver, J. (1998). Customer-led and market oriented: let's not confuse the two. *Strategic Management Journal*, 19(10), 1001-1006.

Solomon, G. (2007). An examination of entrepreneurship education in the United States. *Journal of Small Business and Enterprise Development*, 14(2), 168–182.

Stevens, G. A. & Burley, J. (1997). 3.000 Raw ideas = 1 commercial success! *Research Technology Management,* 40(3), 16–27.

Tran, T. (2008). A conceptual model of learning culture and innovation schema. *Competitiveness Review: An International Business Journal,* 18(3), 287-299.

Wenger, E. (1999). *Communities of practice. Learning, meaning and identity*. Cambridge: University Press.

NOTES ON THE CONTRIBUTORS

Editors

Taina Joutsenvirta, Lic.Soc.Sc., is a specialist in educational technology at the Faculty of Social Sciences at the University of Helsinki. Her research interest focuses on blended learning and technologically mediated every day working life at Universities.

Liisa Myyry, D.Sc., is a pedagogical university lecturer at the Faculty of Social Sciences at the University of Helsinki. Her research interests are moral psychology and professional ethics.

Writers

Tapio Auvinen worked as a research assistant at the Department of Computer Science and Engineering at the Helsinki University of Technology, where he finished his master's thesis on a rubrics based assessment tool. He was the head assistant on the Data Structures and Algorithms course and has participated in the development of the TRAKLA2 learning environment. Currently, he is on leave to perform civilian service at the Department of Computer Science at the University of Helsinki.

Helena Forsman, D.Sc. in Engineering and Technology Management, is working as a "virtual" Senior Researcher at Lappeenranta University of Technology, Lahti School of Innovation, Finland. Her research interest focuses on business development and innovation management in the context of small business.

Ari Haaranen, MSc in Health Sciences, is working in the University of Eastern Finland as coordinator in the Finnish University Network in Health Sciences. He has been teaching on line for several years for example health promotion and research methods. In addition, he has actively developed web-based teaching in Department of Nursing Science and in the

Institute of Public Health and Clinical Nutrition. His areas of research include health promotion and especially group activity in the health promotion of families with small children.

Lasse Hakulinen, B.Sc, works as a research assistant at the Department of Computer Science and Engineering at the Helsinki University of Technology. He is preparing his master's thesis on computer supported collaborative learning. He is currently the head assistant on the Data Structures and Algorithms course and has participated in the development of the TRAKLA2 learning environment.

Päivi Kananen, Med, works for the Institute of Educational Leadership at the Department of Educational Sciences in the University of Jyväskylä. She is senior virtual designer and project director.

Kirsi Kettula-Konttas is a researcher, teacher and PhD student at the Department of Forest Economics at the University of Helsinki.

Ari Korhonen , Adjunct Professor , works as a lecturing researcher at the Department of Computer Science and Engineering at the Helsinki University of Technology. He lectures the Data Structures and Algorithms course, and his research focuses on algorithm animation and computer science education.

Lea Kuusilehto, MA, works for the Institute of Educational Leadership at the Department of Educational Sciences in the University of Jyväskylä. She is a researcher and programme director in the international Master's Degree Programme in Educational Leadership. Her fields of research are ethnography of the MPEL programme and educational administration and leadership.

Antti Leino, Ph.D., is an adjunct professor in Finnish language and applied computer science at the University of Helsinki, and a computing specialist at the Research Institute for the Languages of Finland.

Eila Lindfors, PhD works as a senior lecturer in craft science in the University of Tampere in the Faculty of Education. Her main research areas are user-centred design and innovation in pedagogical contexts. She has developed computer supported collaborative learning in design and technology in international projects.

Timo Portimojärvi has been working in the Department of Teacher Education, University of Tampere since 1997 in the fields on media education and online learning pedagogy. His recent research interests are mainly focused on combining problem-based learning with online and blended learning.

Leena Rantala is a doctoral student in the Department of Education, University of Tampere. Her doctoral study focuses on media education in school. In 2008-2009 she worked as a senior assistant on media education in the Department of Mass Communication and Journalism, University of Tampere.

Jouko Rikkinen is a professor of botany at the Faculty of Bio- and Environmental Sciences at the University of Helsinki.

Kalle Romanov works as senior lecturer in the field of medical informatics at the Faculty of Medicine at the University of Helsinki. His research activities include networked learning and the use of virtual patients in medical education.

Lena Sjöberg-Tuominen is a clinical teacher at the Department of General Practice and Primary Health Care at the Faculty of Medicine at the University of Helsinki. She is working on her thesis, which focuses on the reproductive health of women with childhood-onset diabetes.

Norman Vaughan, DR. works as an assistant professor at the Department of Education and Schooling in Mount Royal University, Calgary, Alberta, Canada.

Viivi Virtanen works as a pedagogical university lecturer at the Faculty Bio- and Environmental Sciences at the University of Helsinki.

Publisher: Faculty of Social Sciences at the University of Helsinki
ISSN 978-952-10-5084-8
Address: http://www.helsinki.fi/valtiotieteellinen/julkaisut/blended_learning_Finland.html