BLENDED LEARNING:
Research reports & examples of best practices
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The B-Learn Project has been designed to offer learning and teaching possibilities that integrate traditional learning methods with methods offered by new technology. The idea of the Project was developed from a situation in which the e-learning support personnel of various universities was highly over-occupied and needed something that could help university lecturers – and in this way also educational technologists and other people engaged in developing new teaching opportunities – to design and develop blended learning courses. Integrating research and practical examples offers a good basis for initiating change in universities that by definition are based on research. A number of possible solutions are presented in the following pages.

The writers of this volume, Sofia Torrao from the University of Porto and Saima Tiirmaa-Oras from the University of Tartu, wish to acknowledge the contribution from all the participants in the Project B-Learn. The partnership consisted of:

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Introduction to the compendium

A few insights to blended learning

Dear Reader,

The volume presents a synthesis of case studies and research within the field of blended learning – a combination of good experience and theoretical knowledge. The term blended learning was first used in American literature and it meant to grasp the blend of traditional teaching and technology-based teaching using a wide variety of pedagogical methods and different forms for technology (Gynther 2005). The concept and understanding of the term blended learning is not a homogeneous field within learning theory. The major conclusion to be drawn is that blended learning is difficult to conceptualise as one idea. There are several understandings of the field and consequently many different aspects are investigated. The result is that blended learning is rather one mode to be used within other pedagogical models.

Blended learning is mostly understood as a way of blending face-to-face and technology-based teaching while there are different approaches in introducing blended learning into teaching. The main approach is how to get the two delivery modes into one. The major aspect of finding the right approach is to consider the possibilities, advantages, aspects and different priorities in face-to-face and technology-based teaching.

Blended learning is not a new approach in university teaching. What is new is the sheer range of possible components in a blend. The institutions must decide, through selected criteria, how these components should be blended to produce fruitful blends constantly determining the balance between face-to-face education and technological components in didactical methods. In designing, developing and delivering different types of blends – component, integrated, collaborative or expansive – the learning outcome must be in focus. This must be investigated with a look at learners, culture, learning resources, electronic infrastructure, the scalability and the maintainability of the proposed solution. The B-Learn Project has been designed to offer ways that integrate
traditional strategies with methods offered by the new technology for teaching and learning. The idea is to make it possible for teachers in traditional universities to find new innovative ideas to present and teach in both easy and acceptable ways. The Project has investigated research and practical examples which offer a good basis for initiating change in university pedagogy.

In the current volume the results of the collection of the national cases of blended learning collected from five European countries are presented. These examples are a good method of focusing on what blended learning could be used for. The compendium also contains four research reports which outline different theories on blended learning, examples on how blended learning can be integrated into traditional European universities, examples of different research projects and the use of blended learning in a commercial setting.

The project partnership believes that this introduction of blended learning models, theories and best practice will enhance the development of the future didactical approaches in traditional universities by offering broadbased insight into blending traditional teaching methods with technology. The primary target groups are seen to be the users of blended learning (teachers, students, instructional designers, educational technologists) mostly from higher education institutions, but from other types of institutions as well.

We wish to give our gratitude to all the people who worked within the partnership to collect and synthesise the data for the current edition. Our special thanks go to all the lecturers who demonstrated their blended learning courses for analysis and therefore made it possible for our Readers to benefit from their experience.
Introduction

This deliverable outlines the major findings of the literature review on blended learning. The report is divided into three parts, each focusing on different aspects of the phenomenon. As an introduction different terms and definitions of blended learning will be reviewed. The second part outlines different pedagogical theories using blended learning. In the third part some approaches to introducing blended learning as a didactical method are reviewed. The major finding of the literature review is that blended learning is difficult to conceptualise as one idea. There are several understandings of the field and consequently many different aspects are investigated.

‘Blended Learning’ - what is it?

Numerous articles and books deal with the theory of blended learning. The term itself refers to diverse aspects of learning and teaching. When studying the term, it is obvious that there is not only one definition or approach referring to the term. Another feature accompanying the phenomenon is that the term blended learning has no clear translations in other languages. The question could then be if other cases investigating and researching similar questions, not defined as blended learning, still deal with blended learning. It is possible to give a positive answer to this question if the research corresponds to the definitions of what blended learning is. To define research not using the term itself would be a major methodological task and this deliverable will therefore be based only on research where the term blended learning is used.

As many other authors, Gynther (2005) also claims that the gap previously existing in traditional- vs. web-based-, distant- or virtual learning is disappearing. In the near future all teaching will be supported by more or less digital or net based flexible solutions in their educational organisation.

A virtual dimension is on its way into all sorts of education, either still experimenting with it or already implementing it. The term blended learning is of American origin. It grasps the blend of traditional teaching and technology based teaching using a wide variety of pedagogical methods and different forms of technology.

Josh Bersin’s (2004) book, The Blended Learning Book: Best Practices, Proven Methodologies and Lessons Learned gives a definition of blended learning as the combination of different training “media” (technologies, activities, and types of events) to create an optimum training program for a specific audience. Bersin uses the term blended learning as traditional instructor-led training being supplemented with other electronic formats where blended learning programs use many different forms of e-learning, perhaps complemented with instructor-led training and other live formats.

Many of the authors using the term blended learning write “how-to-do” books basically for the company-audience. Bersin himself is in this category but also Kaye Thorne (2003) who considers blended learning as the most logical and natural evolution of our learning agenda. He finds blended learning an elegant solution to the challenges of tailoring learning and development to the needs of individuals representing an opportunity to integrate the innovative and technological advances offered by online learning with the interaction and participation offered in the best of traditional learning. It can be supported and enhanced by using the wisdom and one-to-one contact of personal coaches.
In Thorne’s book *Blended learning: how to integrate online & traditional learning* blended learning is defined as the mix of traditional forms of classroom training and one-to-one coaching with:

- Multimedia technology
- CD ROM video streaming
- Virtual classrooms
- Voicemail, email and conference calls
- Online text animation and video-streaming

As mentioned above, many of the books within the field of blended learning have a “how-to-do” approach with (private) companies as their main audience and deal with how the concerned companies can make training more efficient, less cost- and time demanding as their subject matter. These books address the reader in a very informal, non-academic style with phrases like “How can it help? Is it right for your organisation? How can you implement it?” They propagate blended learning as the training method for companies suggesting blended learning is hype, is new and solves nearly all training problems.

In addition to the “how-to-do” books, there are of course also several academic articles dealing with the term. Whitelock & Jelfs (2003) opened a journal special issue on blended learning where they introduced three definitions of the term:

1. the integrated combination of traditional learning with web-based online approaches;
2. the combination of media and tools employed in an e-learning environment; and
3. the combination of a number of pedagogical approaches, irrespective of learning technology use.

Of these, the first is considered by Singh (2003 in Oliver & Trigwell 2005) as the most common interpretation. The second is also widespread, although sometimes advocated in a more general form as concerning models that combine various delivery modes, rather than privileging e-learning. Oliver & Trigwell find that Singh gives a more substantial description that elaborates on the third possibility, based on what he sees as a much richer set of learning strategies or dimensions that can be blended in ways such as: offline with online; self-paced with live, collaborative; structured with unstructured; custom content with off-the-shelf; and so on.

Another approach is presented by Kerres & De Witt (2003). They discuss blended learning as a mix of different didactic methods and delivery formats. Their argumentation is based on the assumption that these two are independent of each other.

Oliver and Trigwell mention all of these articles but also refer to Driscoll’s summary of her book (2002) in which she identifies four different ‘concepts’ denoted by this term:

4. combining or mixing web-based technology to accomplish an educational goal;
5. combining pedagogical approaches (e.g. constructivism, behaviourism, cognitivism) to produce optimal learning
6. outcome with or without instructional technology;
7. combining any form of instructional technology with face-to-face instructor-led training; and
8. combining instructional technology with actual job tasks.

“The point is that blended learning means different things to different people, which illustrates its widely untapped potential” writes Driscoll (Oliver and Trigwell 2005). Oliver and Trigwell find the explanation offered by Hofmann (2001) more precise.
She proposes that “the idea behind blended learning is that instructional designers review a learning program, chunk it into modules, and determine the best medium to deliver those modules to the learner”. Oliver and Trigwell introduce one last perspective provided by Valiathan (2002), describing blends in terms of the focus for learning, or ‘intended’ learning:

1. skill-driven learning, which combines self-paced learning with instructor or facilitator support to develop specific knowledge and skills;
2. attitude-driven learning, which mixes various events and delivery media to develop specific behaviours; and
3. competency-driven learning, which blends performance support tools with knowledge management resources and mentoring to develop workplace competencies.

Oliver and Trigwell are critical of the use of the term blended learning in all contexts because they find that the feature shared by all of these examples and definitions is that they are all described from the perspective of the teacher, the instructor or the course designer.

The main result of this investigation into the use of the term of blended learning based on the articles from Oliver and Trigwell (2005), Whitelock & Jelfs (2003) and several others shows that the concept and understanding of the term blended learning is not a homogeneous field within learning theory.

Learning theory:

Another aspect of blended learning is its approach to the pedagogical theories. The theory of blended learning does not seem to “belong” to one learning theory but is rather a method used within different pedagogical approaches. In the articles describing blended learning, different pedagogical theories are used (Oliver and Trigwell 2005, Whitelock & Jelfs 2003). Hiltz and Murray (2005) present online learning as the latest in a long list of social technologies that have been introduced to improve distance learning by adding various augmentations, substitutions, or blending of new pedagogical approaches and technologies. The authors find online learning revolutionizing higher education both as a process and as a social institution. They describe online learning as a new social process that is beginning to act as a complete substitute for both distance learning and the traditional face-to-face class. Substituting both because it is a process that will infiltrate the ordinary face-to-face class and because it will radically change the nature of what is thought of as the typical college course.

Roberts (2004) stresses how ‘blended learning’ recently has come into fashion as a supplement to existing traditional lectures and tutorials by enabling external students to learn efficiently. He finds the two trends very apparent to all involved in the learning process. First, he describes the vast increase in the use of web-based materials to support courses. Secondly, many educators find interaction as the key component of the learning process for many learners. He finds the field of computer-supported collaborative learning (or CSCL) is the attempt to bridge the gap between interaction and learning, and stands as a paradigm of learning that seems likely to become pre-eminent in the twenty-first century.

Thorne (2003) finds blended learning is a way of making learning more individualized referring to Haward Gardner on how people respond positively to different learning stimuli. In this way organizations and schools can give people different ways of working by means of giving them freedom to be themselves. Other pedagogical approaches widely used are the activity theory and the social constructive learning theory (Bjarno 2005).
Taradi et al. (2005) introduce blended learning as one of three educational options in higher education. The three pedagogical principles are (Web)-based learning (WBL), Problem-based learning (PBL), Collaborative learning. Taradi gives a definition of blended learning saying a blended (hybrid) course combines traditional face-to-face and WBL approaches in an educational environment that is non-specific as to time and place.

Alonso et al. (2005) miss the effort of finding solutions to psychopedagogical problems in new educational category and claim that a psychopedagogical instructional model based on content structure is the latest in information processing psychology and social constructivism. The authors define a blended approach to the learning process. Technologically speaking, the instructional model is supported by learning objects, a concept inherited from the object-oriented paradigm.

Gynther (2005) points out that the term blended learning puts four different didactical questions in focus:

1. What kind of knowledge should the students get and what kind of pedagogical form will be necessary to organize the teaching from?
2. How do you need to organize the learning room?
3. How do you need to organize the learning milieu?
4. What kind of learning resources can build up under your choices?

The term blended learning is in its most common understanding used as the mix of traditional teaching and the use of net based teaching. Gynther claims that the American understanding of the term is very diffuse and argues that it is more fruitful to tie the term to a more concrete didactical method. He also adds that the questions mentioned above are important for the teacher to ask himself when designing a new model of teaching.

Gynther (2005) finds that the term blended learning does not only regard the blend between technological and traditional classroom teaching but also regards the matter of what to learn and what pedagogical method and what kind of technology that promotes learning and different forms of knowledge are used in teaching. It is important to find technological solutions that support different didactical choices. Face to face communication is, today, just one of several ways to organize teaching and learning. The author describes how the future educational market puts the different educational institutions under new types of pressure due to new types of education, subjects and a new type of students. The new type of students demands a flexible educational design where new user profiles are in focus. This also has consequences for learning design.

The result is that blended learning is not one learning paradigm by itself but rather a delivery mode to be used within other pedagogical models. In this regard it would probably be sounder to introduce blended learning rather as a mode within pedagogy.

**Approaches to Blended Learning:**

Since blended learning is mostly understood as a way of blending face-to-face and technology-based teaching and it is further described as one approach to be used within other pedagogical approaches, it would be interesting to look at different kinds of approaches to blend face-to-face and technology-based teaching. Hiltz and Murray (2005) find that face-to-face courses skilfully blended with online learning technologies and methodologies generally are rated by students as significant improvements over traditional face-to-face classes but that the pace of this change depends upon different social factors.
Bersin (2004) offers two concrete approaches and finds that the goal of blended learning is to synthesize face-to-face and technology-based teaching into an integrated mix. In this way teaching can be tailored based on actual needs. First of all technology can complement traditional instructor-led programs and secondly it can complement technology-based training where the socialization process is lacking and where the students lack motivation and excitement from the instructor. From this thought Bersin finds two general approaches to blended learning:

1. The “program flow” model: a step-by-step curriculum that integrates several media into a chronological program or syllabus. The chapters build upon each other. It ends in an exercise or assessment to measure total learning. This model is comparable to a college or high-school course.

2. The “core-and-spoke” model: One fundamental training approach (onsite classroom training or web-based courseware) with other materials, interactivities, resources and assessments as “supporting materials, optional or mandatory materials that surround and complement the primary approach.

The first approach creates both a deep level of commitment and a high completion rate. Because of this students will feel more engaged and can plan their training over time. Bersin claims that this approach also lets the students find time to fit training into their existing schedules and at the same time it forces them to continue until the conclusion. The approach enables the teachers to track the progress and therefore also find any potential problems. Bersin finds that this approach fits well into classroom teaching. This fits into most instructional design paradigms (learn/try/assess). It serves well for a certification program and it is easy to modify and maintain.

The second approach presented by Bersin is designed with a single course using a single media (electronic or live) employing other media or learning activities as optional or supplementary material. The students decide for themselves which supplementary material to use and they do not need to complete the course at the same time. This approach assumes the students are motivated independent learners. This model speeds up the development process because the training organization can build the surrounding materials over time.

As mentioned in the beginning of the report, Valiathan (2002) introduces another approach in which he divides the approach into three: skill-driven learning, which combines self-paced learning with instructor or facilitator support to develop specific knowledge and skills, attitude-driven learning, which mixes various events and delivery media to develop specific behaviours and competency-driven learning, which blends performance support tools with knowledge management resources and mentoring to develop workplace competencies. Petra Neumeier (2005) has studied language learning in the course of designing, writing and implementing CALL-supported materials. She finds that course designers need a framework of parameters that help them decide on the individual, context-related implementation of blended learning. In order to achieve a better understanding of the factors that shape the practice and the experience of blended learning she introduces several parameters to form a blended learning environment.

Gynther (2005) mentions the increasing demand for better and less expensive education. This has for many been connected with the use of information technology because of the possibility of new and more effective learning outcomes. But the learning outcomes and the possible advantages of the use of technology must be studied in the same broad way as traditional teaching and learning
When starting with blended learning there are some aspects to consider:

1. What advantages does face-to-face teaching have?
2. What problems are known due to communication in virtual rooms?
3. What aspects should the teacher prioritize in face-to-face teaching and what can be put to the net based teaching?
4. How to prioritise between different media and forms of media based teaching?

The most important thing is to be aware of the problems and to consider things in advance. Each medium has advantages and disadvantages, in the sense that it can both support and narrow communication for those taking part in the given teaching/learning situation.

When choosing a blended learning approach to be implemented in teaching, the following things should be considered according to Gynther:

1. Do the media give the student a possibility to observe the teacher’s communication?
2. Do the media give the teacher a possibility to observe the student’s communication?
3. Do the media give the student a possibility to observe the other students’ expressed understandings of the study?
4. Do the media give the student a possibility to observe their own expressed understandings of the study?
5. Do the media offer the possibility of differentiating in the choice of information and in choice of ways to communicate?
6. Do the media give the teacher the possibility of organizing the communication between teachers/students? In groups and project work?
7. How does the use of different media and communication form together in the learning milieu?

The author finds that blended learning gives teachers different ways of transferring information to the students. In this way the student will develop a greater ability to understand the information and blended learning provides new forms for communication and new didactical possibilities, and students with different qualifications can develop a broader ability to learn the information.

There are different approaches of introducing blended learning into teaching. Some of them are outlined in this chapter. Since blended learning is mostly understood as a way of blending face-to-face and technology-based teaching, the main approach is how to get the two modes into one integrated mix. Regardless of the structure in the models, the approaches build on the integration of one or several media. It is based on self-paced learning with instructor or facilitator support. It has the choice between chronologically-based or random-based syllabus often ending in an either optional or mandatory assessment to measure total learning. The major aspect when finding the right approach is considering the possibilities, advantages, aspects and the different prioritising in face-to-face teaching vs. technology-based teaching.

**Summary**

The main result of this investigation into the term of blended learning is based on the articles by Oliver and Trigwell (2005), White-lock & Jelfs (2003) and several others shows that the concept and understanding of the term blended learning is not a homogeneous field within learning theory.
The result is that blended learning is not one learning paradigm by itself but rather one mode to be used within other pedagogical models, showing blended learning rather as a mode within pedagogy.

There are different approaches in introducing blended learning into teaching. In this deliverable some of them have been outlined. Since blended learning mostly is understood as a way of blending face-to-face and technology-based teaching, the main approach is how to get the two delivery modes into one. Regardless of the structure in the models, it has been found that the approaches build on the integration of one or several media. It is based on self-paced learning with instructor or facilitator support. It has the choice between chronology-based or random-based syllabus often ending in an either optional or mandatory assessment to measure total learning. The major aspect when finding the right approach is considering the possibilities, advantages, aspects and the different prioritising in face-to-face teaching vs. technology-based teaching.

The major finding of the literature review is that blended learning is difficult to conceptualise as one particular concept. There are several understandings of the field and consequently many different aspects are investigated.

**References**


Examples of strategies on how ‘Blended Learning’ can be integrated within traditional European universities
Introduction

This report will investigate strategies on how blended learning can be integrated within traditional European universities. The deliverable will outline examples from other projects that have integrated blended learning within traditional universities. First there is an introduction to the use of the term of blended learning before giving examples on strategies in teacher training, language education, strategies in health education, in social sciences and humanities and finally examples on strategies in engineering and natural science education.

‘Blended Learning’ - a short introduction

The term blended learning is in its most common understanding used as a mix of traditional teaching and the use of net based teaching. Whitelock & Jelfs (2003) opened a journal special issue on blended learning where they introduced three definitions of the term:

1. the integrated combination of traditional learning with web-based online approaches
2. the combination of media and tools employed in an e-learning environment; and
3. the combination of a number of pedagogical approaches, irrespective of learning technology use.

Of these, the first is the most common interpretation according to Singh (2003 in Oliver & Trigwell 2005).

If blended learning is going to be a used method in an educational institution, the Danish theorist Gynther (2005) points the fact that the term blended learning should put four different didactical questions in focus:

1. What kind of knowledge should the students get and what kind of pedagogical form will be necessary to organize the teaching from?
2. How do you need to organize the learning room?
3. How do you need to organize the learning milieu?
4. What kind of learning resources can build up under your choices?

The author finds these questions essential for the teacher to consider while designing a new mode of teaching.

Bersin, (2004) on the other hand, finds the biggest problem with instructor-led training to be the lack of scale. If you need to teach thousands of students, as is often done at a university, providing one-to-one teaching and hands-on experience is nearly impossible. Another problem is the timescale. The way, these problems are often solved in institutions, is to introduce technology into instruction. Bersin believes that blended learning in this sense can extend the instructor model in space and time. In this way blended learning could be provide education to a larger number of students. Blended learning is not only a method of reducing faculty time or re-focusing student time but also a way to admit more students to an academic program (Cottrell and Robison 2003).

This interpretation of blended learning could have a large impact on the social structure. Not only more students are able to get into higher education but as Aspden and Helm (2004) also mention, the presence of a virtual learning environment (VLE) in an on- campus setting can alter the dimensions of existing learning and teaching relationships. More students will then not necessarily be the same as there is less contact with teachers and the staff. Research literature indicates that increased engagement with
Educational technology can have the effect of drawing staff and students closer together (both physically and virtually) rather than encouraging campus-based institutions to deliver more of their provision at a distance. On-campus students can benefit from appropriate use of technology in ways that make them feel increasingly connected with their institution and their peers. Technology can help to bridge the physical gap between the students, their institution and their peers – even where the actual interactions between students take place offline – and the combination of physical and virtual learning environments can be used to create an effective learning and teaching experience.

Other authors claim that blended learning is not a new phenomenon. What is new is the sheer range of possible components in a blend. The basic factor within blended learning is to decide through selected criteria how these components should be blended. This is the only way to produce fruitful blends. The focus must always be the learning outcome together with learners, learning culture, learning resources, electronic infrastructure, scalability and maintainability in designing, developing and delivering different types of blends. Increasing choice is not an end in itself (Clark 2005).

Many of the books within the field of blended learning have a “how-to-do” approach. Most of these books are written for trainers within companies (see: Bersin 2004, Thorne 2003 and McGinnis 2005). Their main audience is companies and their main focus is on how companies can make training more efficient, less cost and time demanding. Blended learning is portrayed as a new phenomenon that solves nearly all training problems. These books address the reader in a very informal non-academic style with phrases like ‘How can it help?’ ‘Is it right for your organisation?’ ‘How can you implement it?’ and they propagate blended learning as a training method to be used in organisations.

It is difficult to find this kind of “how-to-do” solutions in more traditional academic literature. The academic literature is based on projects where blended learning has been put under investigation. The main goal for these projects is to find out whether the introduction of blended media has an impact on the learning outcomes (see: Taradi et al. 2005, Bjarno 2005, Neumeier et al. 2005, Voogt et al. 2004 and Concannon et al. 2005, Burgon and Williams 2003, Motteram 2006). In the following part, there will be an introduction to some of these academic research projects given.

**Examples on strategies in teacher education**

The educational law (UFD 1998) in Norway establishes that all pupils at all levels shall be provided with adapted learning. Bjarno (2005) describes how national research shows that teacher training students do not know how to integrate ICT as a constructive tool into the disciplines. Not ICT skills are needed, but, first of all, some good examples of how to use ICT as an integrated part of different disciplines. When The Ministry of Education and Science in Norway developed a new National Curriculum for Degree Program in Teacher Education in 2003 the Department of IT at Oslo University College regarded this as an opportunity of reorganizing ICT teaching and supervision in teacher education. The entire faculty supported the initiative, and started to plan a project aimed at developing multi-disciplinary didactics with ICT to reduce the gap between the lack of practice in teacher education and the needs in primary and secondary schools. In order to realize this the IT department used the concept of blended learning to arrange for the adaptation of learning.

Bjarnø (ibid) examined the combination of using blended learning for students preparing to integrate ICT as a tool for supporting learning processes when being a teacher to close the gap between the teachers’ ICT knowledge and their ability to use it for enhancing the learning process. Could ICT as a part of the lectures in the other disciplines be a way to prepare students for their work as teachers? Integrating ICT in all disciplines seemed to be a good solution to achieve the goal. The students had ICT skills but needed
examples on how to integrate it in their teaching. In order to realize this goal, the ICT Department started to help lecturers at the college to integrate ICT in their different disciplines instead of focusing on separate ICT courses. By incorporating the didactical use of ICT in the learning process, teacher training students were given a useful tool for further learning. The students used the teaching material in several ways, but mainly:

1. As a web-based teaching material – online
2. Get physical lectures (up to 350 students)
3. Get supervision connected to assignments in computer suites (up to 30 students)

Lectures were given on selected themes and consisted of a web-based teaching material with assignments. It also involved links to different media such as video-explanations, animations, pictures and soundtracks, connected to supervision in computer suites. The method required a computer suite equipped with a video-projector and one computer per student.

The results showed that there was a continuous need for a didactical dialogue between the Department of IT and the other lecturers in order to achieve successful ICT integration. Integration of ICT into all the disciplines showed that the focus was moving away from scheduled lectures towards new educational forms based on supervision, which allowed teachers to spend more quality time with each student.

One of the basic challenges for the implementation of the project at the University was the infrastructure. All the lectures had to get new computers installed with the same software as the students and the number of computers and video-projectors in the classrooms had to be increased. The findings of the project showed that there was an increase of 21% of students answering that ICT lessons and supervision were useful for the learning process compared to the year before the integration of ICT. Bjarno finds that the challenge is to move from delivering separate ICT courses to developing multi-disciplinary teaching material with ICT.

Not only teacher training students need to learn how to use technology in their teaching. Voogt et al. (2004) also report on how teachers lack skills of integrating technology into their instructional processes. The potential of technology in the classroom is hardly realized and the teachers’ learning of classroom use of technology is considered important. Voogt et al. (ibid) look at “blended” in-service arrangement to support secondary school teachers in the integration of technology into their classrooms. The arrangement consisted of workshops, exemplary curriculum materials and computer mediated communication. This blended approach to teacher professional development showed that it seemed to be a promising arrangement for supporting the integration of technology into education.

For teacher training students practice may be one of the most important parts of their education. In another example Motteram (2006) looks at the role of blended learning in teacher education at a Master’s program at Manchester University. The findings from this project also show how important the blended nature is for the students to get a balanced program that upgrade skills and knowledge and also enable them to reflect on past and future practice.

In another university teacher training course for prospective teachers of English the students had mini-practice, which implemented micro teaching in a classroom setting, as a part of the blended learning method. The learning concept was based on theories of situated learning in multimedia-enhanced learning environments where the activities included classroom recordings and multimedia-based case stories and electronic interview with an expert who was an experienced grammar school teacher. The practice offered guided insights into analyzing teaching materials, hands-on experience with lesson planning and the experience of acting as
a teacher in an authentic teaching context.

Case studies used as a didactic tool in teacher education were supposed to contribute to a closer and more reflective relationship between theory-driven and practice-oriented aspects of teacher education. The multimedia-based case studies were hypertexts designed as essential components of computer-based learning modules that supported various ways and styles of learning. Students worked with the case study material either in guided or in self-regulated scenarios several times during the course. It has been found that there are three types of learners: students who mainly create and apply experiences, students who mainly study theoretical resources, and students who create experience by focusing on a selection of resources (Kupetz and Ziegenmeyer 2005).

**Examples on strategies in language education**

Language learning should not only activate the teacher but also the students in a way that makes them learn. It is not only important for the language teacher to learn to use technology in their teaching but may also be fruitful for students taking part in a language course. In this perspective, both teachers and students need systems designed in such ways that will enhance learning. Petra Neumeier (2005) looks at language learning in the course of designing, writing and implementing CALL-supported materials. She finds that course designers need a framework of parameters that help them decide on the individual, context-related implementation of blended learning. In order to achieve a better understanding of the factors that shape the practice and the experience of blended learning she has found several parameters to form a blended learning environment. The main parameters have been derived from and influenced by the research and development project JoblineLMU at Munich University:

**Parameter Individual descriptors**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Individual descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mode • Focus on mode</td>
<td>• Distribution of modes • Choice of modes</td>
</tr>
<tr>
<td>2. Model of integration • Sequencing individual modes</td>
<td>• Level of integration</td>
</tr>
<tr>
<td>3. Distribution of learning content and objectives and setting aims</td>
<td>• Parallel or isolated</td>
</tr>
<tr>
<td>4. Language teaching methods</td>
<td>• Use of teaching methods in each of the modes employed</td>
</tr>
<tr>
<td>5. Involvement of learning subjects</td>
<td>• Interactional patterns: individual vs. (students, tutors and teachers) collaborative language learning activity • Variety of teacher and learner roles • Level of autonomy</td>
</tr>
<tr>
<td>6. Location</td>
<td>• Classroom, home, outdoors, computer room, institutional settings</td>
</tr>
</tbody>
</table>

The parameters describe and conceptualize a blended learning environment for language learning and teaching purposes (Neumeier 2005:167).

The author finds that if the parameters are applied successfully, the idea of blended learning could serve as a bridge between the broader community of language teachers, learners, CALL experts and practitioners.
Another project involving language learning was the introduction of a web-based learning program of English for Academic Purposes (EAP) for British students from ethnic minority backgrounds described by Harker and Koutsantoni (2005). The students participated in two different modes of learning during the 9-week long program - blended learning and distance learning. The authors find that the blended learning mode is much more effective in student retention, whilst student achievement levels are similar in both groups. In addition, formative and summative feedbacks from the students suggest that most students in both groups are satisfied with this web-based EAP program.

Examples of strategies in health education

Ellis et al. (2006) report a phenomenographic investigation into students’ experiences of learning through discussion both online and face-to-face. The study context was a second-year undergraduate course in psychology for social work in which the teacher designed discussion tasks to begin in face-to-face mode and to continue online. A combination of open-ended questionnaires and semi-structured interviews was used to investigate students’ conceptions of what they were learning, what their intentions and their approaches were to learning through discussion.

The analysis of the interviews and open-ended questionnaire data has identified a number of qualitatively different conceptions, intentions and approaches to learning through discussion. Associations have been found between what students thought they were learning through discussions their approaches to learning through discussion and their course grade. The authors have found that students with a cohesive conception and students adopting a deep approach got better course grades. Furthermore, the findings show that there is no significant difference between deep and surface approaches to face-to-face discussion and course grades.

Davies et al. (2005) examined BSc Physiotherapy students’ experience of developing their neurological observational and analytical skills using a blend of traditional classroom activities and computer-based materials at the University of Birmingham. New teaching and learning resources were developed and supported in the School of Health Sciences using Web Course Tools combined with a wide range of video clips of patients with neurological disorders on CD-ROM. These resources provided students with the opportunity to observe “real patients” prior to clinical placements, thus bridging the gap between their theoretical understanding of these disorders and their practical experience of evaluating abnormal movement in the clinical setting.

Another example for the health sector is given by Guldberg and Pilkington (2006). They analysed a sample of online discussions to evaluate the development of adult learners as reflective practitioners within a networked learning community. Their analysis demonstrate that students belong to an overarching community of practice with different subsets, like these students being parents and carers of people with autistic spectrum disorder (ASD), worked together at sharing and co-constructing common understandings. The shared discourse and common notions of what constituted good practice helped to create a safe interaction space for the students. Once group identity was consolidated, more challenging questions emerged and the group was able to define further common values, understandings and goals through processes of resolution.

Examples of strategies in social sciences and humanities education

Both in the social sciences and the humanities producing texts is a major part of education. Learning by producing text has been done by the use of technology like computers for a long time. Several text shaping programs have been introduced over the last few years. Cox et al. (2004) evaluated the educational effectiveness of online chats at a Humanities postgraduate course and in the final year of a Commerce course. The authors have found that the roles of blended course design, group dynamics, and facilitation style in
the use of online collaboration within face-to-face courses facilitate more inclusive learning conversations than what is possible with exclusively face-to-face interaction.

Webb et al. (2005) suggest that it is the model of learning and its fit with supporting technologies, rather than the presence of technology per se, which enhances learning outcomes. The authors looked at four distinct semester-long treatments, which varied the mixes of classroom and online discussion. This was used to teach a graduate Management Information Systems (MIS) survey course. Their findings suggest that by using Web technology, college instructors may offer students the option of participating in high-quality courses using the case method pedagogy in an online environment. Furthermore, the findings show that the students not only appear to do as well as in the traditional classroom, but that students in the online environment may perform better at multiple levels of learning outcomes, especially when using a blend of classroom and online technologies. Furthermore, the precepts of the case method pedagogy may be enhanced by the use of online discussions. The authors suggest that instructors employing the technique may find their own importance devalued, while the time demands of the approach can be much greater than for traditional classes.

**Examples of strategies in engineering and natural science education**

In engineering and natural sciences education the use of technology may be much more common than in many other disciplines. Still Derntl and Motschnig-Pitrik (2005) find that there has been little attention in research paid to integrating technology to improve the learning process in terms of depth and scope. The experiences and evaluations of one major academic course on Web Engineering indicates that blended learning adds value only when facilitated by educators with high interpersonal skills, and accompanied by reliable, and easy-to-use technology.

In 2002, the teaching of radiological anatomy to first-year medical students was changed from group learning (20-30 students with a preceptor and films at a view box) to a blended learning model that included a brief didactic introduction followed by small group (7-8 students) web-based structured learning modules with rotating lab instructors. In 2003, the modules were changed to include self-study cases prior to the lab, follow-up cases, and twice-weekly optional review sessions. The findings show that integration of computers as didactic instruction with small and large student groups is well-accepted by students and make the students conform to accept theories (Shaffer and Small 2004).

**Summary**

The current report shows that there are several ways to integrate blended learning within traditional universities. Blended learning is not a new approach within university teaching and learning. What is new is the sheer range of possible components in a blend. The institutions must decide, through selected criteria, how these components should be blended to produce fruitful blends. A blended course must constantly determine the balance between face-to-face and technological components in using blended learning as a didactical method. This calls for educational designers to be sensitive.

Blended learning is not only to blend different media. In designing, developing and delivering different types of blends - component, integrated, collaborative or expansive – the learning outcome must be in focus. This cannot be investigated without a look at the learners, the learning culture, the learning resources, the electronic infrastructure, the scalability and the maintainability of the proposed solution.
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Academic research and projects related to ‘Blended Learning’
Introduction

The term blended learning is used in several research projects. In these projects and articles, blended learning is defined in several ways and the approach to the term also differs from project to project. Gynther (2005) argues that blended learning was first used in American literature. The term should grasp the blend of traditional teaching and technology based teaching using a wide variety of pedagogical methods and different forms of technology.

The projects mentioned in this deliverable are projects using blended learning as a term in the research described. Though using the equivalent term the main focus in the projects differs and they are therefore put into four categories. First, looking at projects where the integration of technology into teaching has been one of – or the main goal, secondly, looking at projects where perceptions of blended learning, the experience and the results of communication and social relationship are the main focus. Thirdly, there will be a look at the effects on the didactics in traditional teaching and fourth, at the organizational changes based on blended learning. There are several research projects where the approach of blended learning has been the main focus, but the deliverable will only mention a selection of them. In the Appendix to this deliverable there is a list of other projects dealing with this approach.

Academic research and projects related to the integration of technology and technology standards

Many projects focus on how technology can be integrated into different subjects. Though the use of technology and online teaching are not new, it has become more common within the academic settings recently. Kennedy (2005) points out that during the period of growth, there was time for the development of standards to ensure its quality. Yet the standards that have emerged tend to be derivatives of the standards for conventional, classroom teaching. They do not adequately address the specific demands of online education. Kennedy studied how nurse educators could generate credible standards for their online practice and identified flaws in the current guidance for online teachers. Knowledge of standard setting in the health service could be a way of supporting standard setting in higher education. The author has also found that the most useful guidance for the online teacher did not come from the education sector but from the industrial sector, specifically from the IT industry. Nurse educators at the University of Paisley used these findings to develop standards for their online teaching practice.

Though online teaching is not a new phenomenon, standards like this could make the integration easier. Christensen (2003) has found in the study of an introductory course in instructional design at Brigham Young University (Utah) that the balance of face to face and online components is important if blended learning should be successful. Standards could ease this process also for teachers in their work. Voogt et al. (2004) applied and evaluated the blended approach to teachers’ professional development in two studies. The authors have found that many studies report on the implementation of technology in education as a complex innovation. Particularly teachers lack the skills to integrate technology into their instructional processes and the potentials of technology in the classrooms are therefore hardly realized. Voogt et al. (ibid) studied a “blended” arrangement consisting of workshops, exemplary curriculum materials and computer mediated communication to support secondary school teachers in the integration of technology into their classroom. The results of both studies show that this blend seems as a promising arrangement for supporting the integration of technology into education. However, realizing the potential of technology to create communities of practice remains difficult because, for most teachers, the use of technology is not yet congruent with their daily routines.

Another project grasps this lack of technology as a part of teachers’ daily routine. Not ICT skills are needed, but, first of all, some good examples of how to use ICT as an integrated part of different disciplines. Bjarno (2005) has found that integrating ICT into all disciplines seemed to be a good solution to achieve the goal. The students had ICT skills but needed examples on how to integrate
it in their teaching. In order to realize this the ICT Department started to help lecturers at the college to integrate ICT into their different disciplines instead of focusing on separate ICT courses. The findings of the project show that there was an increase of 21% of student answering that ICT lessons and supervision were useful for the learning process compared to the year before the integration of ICT. Bjarno has found that the challenge was to move form delivering separate ICT courses to developing multi-disciplinary teaching materials with ICT.

A further project was carried out by Motteram (2006) who illustrates how important the blend is for the teachers to get a balanced program that upgrades skills and knowledge as well as it enables them to reflect on past and future practice. The author rests his findings on the study about blended learning in teacher education at a Master’s program at Manchester University. The experience helped them to make use of educational technology in the language classroom.

The above mentioned projects illustrate how blended learning serves as a method for people, who use technology in their daily routines, to become familiar with technology as a tool in other subjects. Blended learning becomes a vehicle through which a new subject is learnt at the same time with learning the technology itself.

**Academic research and projects related to perceptions and social relationship**

The integration of technology within teaching institutions has also very much to do with expectations and perceptions. This is another approach to be found in different projects dealing with blended learning. One of those is given by Rogers et al. (2003) and examines the development of a class at Brigham Young University (Utah) that blends distance and face-to-face students in a synchronous class. The study focuses on how a blended learning environment was experienced by the distance and face-to-face students, as well as by the instructor. While another study done by Ruiz et al. (2006) claims that e-learning allows learners to tailor their experience in order to meet their personal learning objectives. The study is based on a diverse medical education context and the authors have found that students did not experience e-learning as replacing traditional instructor-led training but as a complement to it, forming part of a blended-learning strategy. The authors see innovations in e-learning technologies as pointing toward a revolution in education, allowing learning to be individualized as a more adaptive learning method. It enhances learners’ interactions with others in a more collaborative learning context, and transforms the role of the teacher.

This social aspect is also what Aspden and Helm (2004) have found in a study of virtual learning environments (VLE) in an on-campus setting. They have found that the use of VLEs could alter the dimensions of existing learning and teaching relationships. The authors mention that research literature indicates that increased engagement with educational technology can have the effect of drawing staff and students closer together, both physically and virtually, rather than encouraging campus-based institutions to deliver more of their provision at a distance. The authors explain how on-campus students can benefit from appropriate use of technology in ways that make them feel increasingly connected to their institution and their peers. Using qualitative data they have explored how effective use of technology could help to bridge the physical gap between the students, their institution and their peers, even where the actual interactions between students take place offline – and how the combination of physical and virtual learning environments could be used to create an effective learning and teaching experience. The question of how social communication and communities of practice can enhance learning is also examined by Motteram (2006) when studying the role of blended learning in teacher education at the Master’s program at Manchester University. Communities of practice were one way of capturing students’ experience by using a number of online tools. The experience was particularly relevant and helped them to make use of educational technology in the language classroom.
Another project focusing on the positive learning effect of interaction and student communication was carried out by Guldberg and Pilkington (2006). By means of analysing a sample of online discussions the authors studied the development of adult learners as reflective practitioners within a networked learning community. Their analysis demonstrates that students belong to an overarching community of practice with different subsets, like these students being parents and carers of people with autistic spectrum disorder (ASD), worked together at sharing and co-constructing common understandings. This shared discourse and common notions of what constituted good practice helped to create a safe interaction space for the students. Once group identity was consolidated, more challenging questions emerged and the group was able to define further common values, understandings and goals through processes of resolution.

As a contradiction to the findings of Aspden and Helm (2004) as well as those of Guldberg and Pilkington (2006), Welker and Bernardino (2005) have found, from a study of students at the State University of New York Institute of Technology, reduced social interaction along with confusion and more work are disadvantages for a blended learning course. The results of study are not entirely negative as students also mentioned flexibility, convenience, and independence as advantages together with a net economic gain for students as tuition and financial aid remain unchanged while expenditure in time and travel were reduced.

The question of how student communities and social communication can enhance learning has been a field within learning theory for years. The focus on technology within this is studied within the CSCL field (computer supported collaborative learning).

### Academic research and projects related to didactics and learning strategies

The didactical aspect is of course always an issue whenever teaching is an issue. The blended learning method will have an impact on didactical solutions and student learning strategies. Taradi et al. (2005) looked at a project in providing educational services for an undergraduate second-year elective course in acid-base physiology. A rich, student-centred educational Web-environment designed to support PBL was created by using Web Course Tools courseware. The course is designed to require students to work in small collaborative groups using problem solving activities to develop topic understanding. The aim of the study is to identify the impact of blended WBL-PBL-collaborative learning environment on student learning outcomes. The students’ test scores and satisfaction survey results from a blended WBL-PBL-based test group were compared with a control group whose instructional opportunities meant a traditional in-class PBL model. WBL students scored significantly better on the final acid-base physiology examination and expressed a positive attitude to the new learning environment in the satisfaction survey. Expressed in terms of a difference effect, the mean of the treated group (WBL) is at the 76th percentile of the untreated (face-to-face) group, which stands for a medium effect size. Thus, student progress in the blended WBL-PBL collaborative environment was positively affected by the use of technology.

Romano et al. (2005) indicates how growth in distance education increases the need to examine students’ learning strategies in distance and blended learning environments. The authors measured and compared students’ cramming or spaced-review behaviours across delivery formats as well as examined relation to course achievement and attitudes across a term. Although theory would predict that spaced study rather than last minute cramming would yield higher achievement, researchers report mixed findings in both areas. One hundred fifty-seven students in distance and blended course formats were blocked into 5 groups based on their cramming/spaced-review patterns a week prior to each of 3 post-tests. Significant differences were observed in cramming/spaced review behaviours between delivery formats and for achievement and attitudes.

Another project looking at learning strategies is Nuckles et al. (2004). They study the use of learning diaries to find out the students’ written reflections of their learning experiences and outcomes over the course of university seminars. The writing of the diaries was...
‘tutored’ by a computer program named eHELp. eHELp supports the writing of sophisticated learning diaries through a modelling and scaffolding of the phases of planning, production and revision. In addition, the learning diaries got published, by uploading them onto a cooperation platform, so that the learners could read and discuss their peers’ diaries. The authors have found that the main function of such public learning diaries was to enrich traditional university courses with blended learning as additional elaborative, organisational, critical reasoning, and metacognitive activities in order to foster a deeper processing and better retention of the contents to be learnt.

In another project Yeh et al. (2005) aimed to discover the relationship between learning records and the learning effect in a blended e-learning environment through multiple regression analysis. The learning records included the grades for online assignments, reading time, the total number of login times, and the total number of online discussions. The learning effect was defined as the total grade for two monthly exams and one final exam. To collect learning record data, an e-learning system was designed that integrated the data collection functionality of learning activities with a teaching material managing module so that the learning records of all the learners were recorded automatically. With this system, an experiment was conducted on a program design course in a local high school. The results differed from those obtained in a ‘pure’ e-learning setting, and the online homework performance was the only item that significantly accounted for the learning effect, which is a natural result of learning procedural knowledge.

Gynther (2005) notes that most of the institutions offering net-based teaching in Denmark provide this in the form of practise communities and informal networks. At Holbaek College of Education a project was carried out in cooperation with the students to develop, test and implement some didactical principles: ‘What kind of knowledge should the students get and what kind of pedagogical form will be necessary to organize the teaching from?’, ‘How do you need to organize the learning room?’, ‘How do you need to organize the learning milieu?’, ‘What kind of learning resources can build up under your choices?’. The student group was formed of people that normally would not have the possibility to take a face-to-face course. Gynther has found that the students were very positive to the flexibility that they had in the course. The virtual conferences were used as a storing and distribution channel. The grades from the exam showed that the results were better than those of the students in the traditional course. Gynther has also found that in order to get the students involved there were some specific processes that had to be present; Processes of participation; Processes of “meaning something”; Processes of mutual engagement; Processes of a mutual goal; Processes of knowledge sharing.

**Academic research and projects related to organizational aspects in learning**

The blended aspect will also have an organisational effect as well as a didactical. As long as learning is a part of an institution, the methods used for teaching will also have an organisational effect. Boeker and Klar (2006) have found that didactical and organizational aspects determine the success e-learning offers as well as influence the general development of e-learning more than technical features do. They explain how e-learning has been established in education and training of physicians in various types: linear, sequential and hyper-textual forms of multimedia presentations and texts, tutorial systems and simulations. Case-based e-learning systems are of special importance in medicine because they allow for mediation of process and practical knowledge by presentation of authentic medical cases in a simulated environment. The integration into medical education and advanced professional training is crucial for the long-term success of e-learning. In case-based systems this can be accomplished by blended learning approaches which combine elements of traditional teaching with e-learning. Learning management systems (LMS) support integration of traditional teaching and e-learning by serving as an organisational platform for the content of teaching. Furthermore, they provide means of communication for trainers and trainees, authoring tools, interactive components, course management and a role-based sharing concept. The authors have found that the dissemination of e-learning can be fostered by paying attention to requirements and user analysis, early adoption to organizational structures, curricular integration and continuous cooperation with students.
Another organisational effect and maybe a major treat for organisations to implement technology within the institution may be the possibility to get more students enrolled and concurrently reduce time spent by the personnel of the organisation. Cottrell and Robison (2003) describe a large enrolment accounting course at Brigham Young University (Utah). The case study focuses on the possibility of using blended approaches to reduce faculty time, re-focus student time, and raise the possibility of using blended learning as a way to admit more students to an academic program.

As mentioned above, Welker and Berardino (2005) studied the outcome of blended learning at the State University of New York Institute of Technology. Responses from faculty revealed enrolment as a major factor in the increased use of this course design; quality of assignments and course grades that are as good or better; and courses that produce improved writing and discussions. Course management technology and course design recommendations were provided for faculty consideration. The findings show that while the design was easy to use, the faculty reported more work on their part and some loss of traditional classroom dynamics.

Blended solutions may also have an organisational effect on students' location and may also solve the time/space dimension. The emergence of cross-cultural classrooms has been steadily increasing in Australian tertiary institutions, due to the growing population of international students enrolling to complete their degrees. Research has suggested that students from different cultures have varying compatibility with different learning environments. Lanham and Zhou (2003) explain how the increase in numbers of international students has signified a change in the student demographics, and the recognition of the differences in students’ learning styles. Because of this a more flexible approach for learner content delivery is needed. The authors suggest that in order to ensure that all students are able to participate in this domain; preparations are needed to accommodate all cultural types.

Summary

The field of blended learning is diverse in its nature and it investigates several different aspects of the learning process and the learning environments. This deliverable has reviewed blended learning from four different angles: first, projects in which the integration of technology into teaching has been one of the main goals, secondly, projects in which the experience of learning has been the main focus, thirdly, didactical consequences and finally, in which organisational changes as a result of blended learning has been the main issue. Different findings are reported based on which of the four above mentioned aspects is emphasised.

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Examples of ‘Blended Learning’ used in commercial practice
Introduction

The most common understanding of blended learning is the integrated combination of traditional learning with web-based online approaches. Also the understanding of blended learning as the combination of media and tools employed in an e-learning environment is often in use while other authors interpret it as the combination of a number of pedagogical approaches, irrespective of learning technology in use (Whitelock & Jelfs 2003). This deliverable will introduce blended learning models from a few authors interested in the commercial practice of blended learning. Secondly, it will give some examples of the introduction of blended learning into industry.

Models in commercial practice

While many authors use blended learning as a tool to investigate the use within learning, other authors are interested in the actual use of blended learning within industry and commercial practice. These authors see blended learning as the integrated combination of traditional learning with web-based online delivery modes. Thorne (2003) as mentioned in deliverable 2.1 and 2.2 write books based on an audience interested in implementing blended learning as a training method within the company and industry sector. Thorne sees blended learning as a way of making learning more individualised and refers to the theorist, Howard Gardner, on how people respond positively to different learning stimuli. In this way, organisations and schools can give people different ways of working, based on multiple intelligences.

As Thorne (ibid) sees it, one of the real advantages of blended learning is the opportunity to be more focused and specific about the learning need. Blended learning provides the opportunity of tailoring learning to the individual rather than applying a one size fits all approach. From this, he puts up a list of seven points to help identify the basic needs:

1. Establishing the level of demand/timescale. The very nature of the blend builds in flexibility.
2. Recognizing different learning styles. Asking the question of how students do things differently takes into consideration different learning style preferred.
3. Looking creatively at the potential of using different forms of learning, i.e. matching the learning need to different delivery methods and identifying the best fit. The integration of blended learning represents an opportunity to take what exists and evolve it into a different dimension using new technologies - by presenting the learner with a wide range of options.
4. Working with the current providers, internal and external, to identity the learning objectives and to ensure that the provision meets the current need. (For a university this should already have been done. For a new subject this should be done)
5. Undertaking an educational process and developing a user-friendly demonstration to illustrate the potential of blended learning
6. Being prepared to offer follow-up coaching support
7. Setting up a monitoring process to evaluate the effectiveness of the delivery (Thorne 2003: 36ff).

Furthermore, Thorne sees several benefits based on what type of medium the content is available in:

- The class is not kept waiting while the trainers help a few delegates to catch up on basic knowledge
- Delegates have the chance to cover the basic material at their own pace.
- Reference to the intranet / internet several times for extra support
- Dissemination to a wider audience
A larger body of training materials can be made available to users
If people miss a day, they can catch up using multimedia packages
Saving time and travel costs
The ability to make geographically dispersed virtual teams
The lessons and the activities can be studied prior the one-to-one sessions or the classroom activities freeing time for more practical activities in the classroom.
Creating individual courses supplementing classroom tuition and examinations
Cost-cutting because of saved time in tutoring
Learning can be more targeted, focused, just-in-time to the learner
Learners can interact with tutors, fellow students. (Thorne 2003).

Another writer within this tradition is Bersin (2004). He points out that since the advent of computers in the 1960s’ organizations have been trying to apply technology in the learning and training process. He finds that the first technology-based training approach came with mainframe and mini-computers in the 60s and 70s and mentions a pioneering system of such named Plato, a system developed in 1963 by Control Data at the University of Illinois. Plato pioneered the use of computers in traditional educational settings and still exists today. Bersin puts up two general approaches to blended learning:

1. The “program flow” model: a step-by-step curriculum that integrates several media into a chronological program or syllabus. Like taking a college or high-school course. The chapters are building on each other. It ends in an exercise or assessment to measure total learning.

The “program flow” model creates a deep level of commitment and a high completion rate. Learners feel engaged and can plan their training over time. It gives learners the time to fit training into their existing schedules but forces them to continue until the conclusion. It enables the teachers to track the progress and if people drop out or miss steps, it will be possible to know precisely where they have a problem. It fits into the normal flow classroom training that most people expect. Many learners are used to learning in this way through their academic careers over semesters and years. This is also the model most existing contents use, and it fits into most instructional design paradigms (learn/try/assess). It serves well for a certification program and it is easy to modify and maintain.

2. The “core-and-spoke” model: One fundamental training approach (onsite classroom training or web-based courseware) with other materials, interactivities, resources and assessments as “supporting materials, optional or mandatory materials that surround and complement the primary approach.

In the “core-and-spoke” model approach, the program is designed with a single course using a single media (electronic or live) and uses other media or learning activities as optional or supplementary materials. The main difference between the core-and-spoke approach and the program flow model is that the supplementary materials are optional and not explicitly scheduled. The students decide which supplementary material to use and the students do not necessarily complete the course at the same time. Using reference material is an easy way to build a core-and-spoke model. In general, it is easier to build in stages in this approach. If you build the core curricula, you can launch it immediately and add the supplementary materials over time. But this approach assumes you have a motivated independent learner. The core-and-spoke model speeds the development process because the training organization can design the surrounding materials over time. The spoke material can be made more important with exercises and events and be specialized for special needs. The core-and-spoke model is effective when learners are motivated, experienced, and already experts. It gives them the choice of media and resources to succeed.
How is one going to choose the right blended model? Bersin lists eight criteria for selecting the blended learning model:

*Program type:* driven by business needs like costs. If the problem is a training issue and not a management issue and has an impact on the management.
*Cultural goals:* create relationships, linkage and shared values.
*Audience:* size, education level technology competence access, motivation to learn, personal motivation, time.
*Budget:* development.
*Resources:* time, money and persons. Time to launch and complete the program and the content.
*Learning content:* complexity and interactivity.
*Technology:* standards, plug-ins, bandwidth, display, security.
*What effects program cost:* Total audience size.
*Media selection:* In-house vs. outsourced.

Furthermore, the following model in blending different teaching media is suggested:

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<tr>
<th>Model</th>
<th>Defining Feature</th>
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<td>e-learning self-study with other blended media or event</td>
<td>A self-study course as the central learning program. The learner accesses multiple media elements surrounding an online core-and-spoke course</td>
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<tr>
<td>Instructor-led program blended with self-study e-learning</td>
<td>e-learning used as prerequisites, activities during the class and between classes</td>
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<tr>
<td>Live e-learning centred with other media added</td>
<td>Webinars, e-learning events, self-study</td>
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<td>On-the –job training</td>
<td>On the job training with a instructor</td>
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<tr>
<td>Simulation and lab-centred</td>
<td>IT and application training where an entire environment can be simulated</td>
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(Bersin 2004: 85)

The model may work for blending traditional teaching and technology in both traditional universities and in workplaces. He also lists four examples of types of corporate training:

**Type 1:** Information Broadcast:
Typical e-Learning or training Interactivities: Read, listen, watch
Typical Blended Media: Conference call, webinar, e-mail or newsletter

**Type 2:** Critical skills transfer
Typical e-Learning or training Interactivities: Read, listen, watch and ask and answer questions
Typical Blended Media: PowerPoint-based courseware, live e-learning webinar, track completion but not scores
**Type 3**: Skills and Competencies

*Typical e-Learning or training Interactivities*: Read, listen, interact, practice, ask questions, interact with others, take an examination, get feedback

*Typical Blended Media*: Web-based courseware, instructor-led class, conference call, onsite labs, simulations

**Type 4**: Certification (as represented or meeting a standard)

*Typical e-Learning or training Interactivities*: Read, listen, interact, practice, answer questions, take an examination, get feedback, pass or fail

*Typical Blended Media*: Web-based courseware, instructor-led class, conference call, onsite labs, simulations, external or internal testing, tracking by LMS for completion and expiration date.

Another main thing in doing blended learning in a program is how much tracking and reporting is necessary. Tracking refers to the technology and the processes to measure the enrolments, activity, completion, scores, certifications and satisfaction of the program. The business requirements determine which level of tracking and reporting is needed in the company. Practice has shown that people will not complete more than one or two hours of self-study per week unless this is explicitly allocated in their work schedule. Bersin’s suggestions are that when you know the business problem - have an idea of the program strategy and an appropriate budget - you should design and develop the program. You have to find the right media for your problem, audience and budget (Bersin 2004).

Other authors offering blended learning models for companies are Semler (2001) and Troha (2002). Semler (ibid) finds that blending online learning methods with classroom training makes training sessions shorter and allows your learners to take the training wherever they go. He suggests some relatively simple techniques to help you convert courses into blended delivery. There are three overall objectives to this activity: 1) increase learning impact, 2) increase learner satisfaction and ease of use, and 3) reduce the total cost of training. By focusing the classroom portion of the course on skill practice and application, learning impact can be increased. Learners are also allowed to explore and work with the content wherever it makes sense for them. By offering portions of a course as online self-study, the length of face to face training sessions and the associated delivery and travel costs can be reduced. Troha (ibid) provides a model intended to guide you and your team through the process of blended learning design. By virtue of its checks and balances, a successful outcome is virtually assured. Accompanying the model there is a list of sections for an instructional design document, which, as it is developed and fine-tuned, provides a vital discussion document and focal point for all parties involved in the project. The list contains the following items: Course Title, Purpose Statement, Audience Description, Duration, Prerequisites, Learning Objectives, Constraints, Content / Learning Activities Outline, Transfer of Learning Strategy and Evaluation Strategy Content Sourcing.

Some of these books give examples on how blended learning is incorporated in different companies. In the following there will be an introduction of some of these examples.

**Examples from industry training**

Blended learning is a well-spread model in the US commercial setting, but is less exemplified in the European area. Research confirms that technology has low use today in most organisations’ leadership-development programs. Evidence points to growing use, but the researchers do not expect quick and dramatic change, because rapidly changing technology does not necessarily imply accelerating adoption unless the culture is conducive to technology use. But a number of driving forces are likely to boost the adoption of technology in leadership-development programs such as:
1. Leadership portals
2. Simulations for interactive, experiential learning - often in blended formats and
3. Rich media content.

The authors claim that as technology becomes more user-friendly and easier to use, technology will find new applications in leadership development (Trondsen 2006).

Brennan (2004) claims that online delivery of training (i.e., e-learning) has surpassed the early-adopter stage, and companies find that the longer they use it, the more they use it. A cost-cutting slant has been effective in fostering its growth as a tool at the disposal of training professionals. However, training and development professionals should recognize that cost savings will not perpetuate themselves and should focus their energies on increasing the value of their services to the corporate mission by efficiently and effectively delivering content that supports both organizational and individual goals.

There has been a rapid growth in trade union involvement with ICT to support both vocational learning/workforce development and trade union education. Most European confederations and many individual unions now have some level of involvement with technology and learning, and we can start to learn from each others’ approaches and experiences.

Six case studies were conducted between June and October 2004 along with an online survey. There were five national case studies from Italy (Confederazione Italiana Sindacati Lavoratori), Germany (Deutscher Gewerkschaftsbund (DGB) Bildungswerk), the Netherlands (Federatie Nederlandse Vakbewegingen), Sweden (Landsorganisationen i Sverige) and the British (Trades Union Congress) and one transnational case study from the European Trade Union College (ETUCO). These cases illustrate some of the diverse ways in which trade unions are approaching the use of ICT to support formal and informal learning, vocational and trade union training, blended learning, organisational and self-paced learning; and national and transnational learning. The case studies reveal a range of approaches towards the use of ICT in trade union learning which reflects a variety of organisational priorities and responses in particular national contexts. Differing industrial relations environments, union cultures, national government policies and initial experiences with ICT in learning are among the factors contributing to this diversity (Creanor and Walker 2005).

Bersin (2004) comes with an example from General Motors. This company relies heavily on video-based instruction to train dealers. The aviation Industry CBT Committee developed the most useful and widely implemented approach to enrolment, tracking, reporting, and book-marking electronic content. AICC standards were built into almost every course and every LMS available in the marketplace today. Today SCORM (Sharable content object reference model) a superset of AICC, is slowly becoming the new standard for content packaging and interoperability. SCORM builds on AICC and adds concepts such as reusability, sequencing, and searchable metadata.

A European alternative to the SCORM model is the IMS-LD model (Learning Design) researched and developed by the Dutch Valkenburg group. The model introduces standardised ways to describe learning activities both within the man-computer context and also in the face-to-face one, which has been one of the short comings of SCORM. Providing tools and techniques to lay out blended learning activities such as instructor based learning, e-learning and collaborative approaches online and in face-to-face meetings is the strength of the IMS-LD model. This makes the IMS-LD approach viable for blending learning technologies and methods (Koper and Tattersall 2005).
When a large global oil company decided to redesign their entry-level engineering training on petroleum practices, they realized that socialization was critical to the success of the program. Their blended program, which was months in duration, used online and face-to-face activities in a structured mix. The program included self-study, web-based modules, classroom instruction, synchronous online chat and online assessments. They were located all over the world but met each other in a training facility near the end of the program where they could face-to-face reinforce the cultural community they had created online. When incorporating blended learning for a study program, it was necessary to ask how important it was to develop a sense of culture and social experience in the program (Bersin 2004:43f).

Another company dealing with distribution for industry products wanted to find a new way to get busy telephone sales representatives to take online courses on a new version of a SAP system. Last online course turned out to be disaster since people was too busy to take the training. This was a problem since the company wanted people to be completely proficient before the new system went live. Not only were people too busy to take the training but there was no time during the software rollout to let people practice. The company decided to focus on cultural factors and created a blended program. They started with a series of conference calls and local meetings held by regional coordinators. The coordinator brought people together and created a local “social context” for the training. By adding socialization and local presence the learning results turned out to be three to four times higher than those of the previous e-learning program (Bersin 2004:44f).

As described below Bersin introduces the “program flow” model and the “core-and-spoke” model. In this section Bersin shows examples on where the different models are in use:

The “program flow” model:

**Ex.1**
Roche Pharmaceuticals made a program for learning their SAP order processing system. One of the lessons learned from these programs is that process training is just as important as application training. The company had to go back and develop a face-to-face module, which included whiteboard pictures and diagrams, to explain the business process from a functional perspective. It was after this took place that the blended learning model started to work.

**Ex. 2**
The company BT had a new product to launch and wanted to start a training course but found that their employees would use too much time to cover all the topics. They therefore decided to start a blended learning project starting with a hosted conference call before they had a two-hour e-learning program, an instructor-led check-in conference call to answer questions, a second one-two-hour e-learning program and finally an instructor-led one-day event with real world practice. In his way they managed to shorten down the time previously allocated.

**Ex.3**
A major U.S. bank had each year 2,400 new employees to train. Before the blended learning program was introduced, the company used the course that took six weeks to be completed. The goal of the new program was to shorten it down to four weeks. The team in charge of the blended learning program developed a series of web-based training courses with different scenarios, simulations, role plays, group discussions and briefing sessions with the manager. The program took nearly twelve months to develop but had excellent results and facilitators reported that learners reported being on the same level of mastering as reported after five weeks in the prior instructor-led program.
Ex.4
In 2001, CAN Insurance needed to roll out an entirely new performance planning process to more than 2,000 managers before the end of the year. E-learning efforts in the past were disappointing due to low enrolment and lack of interest. The new approach was blended learning. The company implemented an innovative web-based platform that enabled learners to enter the blended environment online. On this environment each student was members of a cadre, which is a team of fifteen to thirty people who work through the program in the same schedule, score each other’s exercise and interact throughout the program. In addition they had an online coach that served as a tutor, advisor and teaching assistant. Through the platform a high-impact blended learning was made and the learner satisfaction and business impact went up dramatically (Bersin 2004: 36ff).

The “core-and-spoke” model:

Ex.1
In a semiconductor manufacturing engineer training program, the blended learning program combines online component with hands-on lab sessions. By doing this, nine in-class days was reduced to two ten-hour self-paced online courses followed by two eight-hour lab sessions and a short instructor-led event to reinforce information, practice and answer questions they had.

Ex.2
A large retailer with 650 stores around the US found that online learning was not enough to learn modules concerning topics like “how to sell HDTV”, “understanding stereo components”, etc. The result was a core-and-spoke program where they introduced a checklist where the learners had to walk through the store, identify items and perform tasks. By this simple approach the company improved their e-learning investment.

Ex.3
Rolls-Royce PLC
Since 2000, Rolls-Royce plc has been faced with training requirements to support a large Enterprise Resource Planning implementation, involving major changes to company processes and the introduction of SAP as the IT system to support the processes. Based on best experience they changed the model for training from computer-based training as a prerequisite to instructor-led training to online learning where the instructor led training reinforced the online lessons and used the face-to-face element as a vehicle for communication in change and introduced the online learning lessons so delegates are prepared for online learning – post-workshop.

Summary

This deliverable introduces blended learning models from a few authors interested in the commercial practice of blended learning. Models on how to blend materials and instructional methods are described, and also criteria for selecting between them. Examples from the industry sector are provided and two of the main models for sequencing content are described: the “program-flow” and “Core and spokes”. Further, examples are given of successful implementations of both models, also explaining the reasoning behind the decision of which model to use.
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<td>Training Reference</td>
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<td>Blended learning home page. Here you’ll find: * New projects &amp; case studies * General news * Research, studies and reports * Articles * Books * Supplier information</td>
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<td>ECOSME (Enhancing College/SME Blended Learning Networks) is an ESF Objective 3 project, launched in 2004, with the intent of achieving better practice in college-supported education and training in Small and Medium sized Enterprise (SMEs). The study, led by Glenrothes College, encompasses the work of SFEU, Learndirect Scotland and ten ofScotland’sColleges, helping to ensure that SMEs benefit from the potential of e-Learning and blended learning.</td>
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<tr>
<td>Alison Davies, Jill Ramsay, Helen Lindfield and John Couperthwaite</td>
<td>A blended approach to learning: added value and lessons learnt from students’ use of computer-based materials for neurological analysis</td>
<td>2005</td>
<td>British Journal of Educational Technology</td>
<td>36</td>
<td>839-</td>
<td>This paper examines BSc Physiotherapy students’ experiences of developing their neurological observational and analytical skills using a blend of traditional classroom activities and computer-based materials at the University of Birmingham. New teaching and learning resources were developed and supported in the School of Health Sciences using Web Course Tools combined with a wide range of video clips of patients with neurological disorders on CD-ROM. These resources provided students with the opportunity to observe “real patients” prior to clinical placements, thus bridging the gap between their theoretical understanding of these disorders and their practical experience of evaluating abnormal movement in the clinical setting.</td>
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This paper considers how this blended approach to learning enhanced students’ experiences of developing their neurological skills and of preparing for their clinical placements. This paper also discusses the lessons that have been gained from students’ experiences to provide future or similar projects with the opportunity to learn from these experiences.

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<td>Allison Rossett, Felicia Doug lis, and Rebecca V. Frazee</td>
<td>Strategies for Building Blended Learning</td>
<td>2003</td>
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At a recent conference, a practitioner was overheard saying, I can see why blending makes sense. But what do I put with what? We have a hundred instructors and e-learning modules. If I put them together, is that a blend? What is a blend and how do I make it work in an organization that prefers a quick fix? Those questions and more are tackled in this article. Blending a course is another method for moving towards the concerted systems that are essential to learning and performance. Blends are characterized by customization, integration, purpose, flexibility, and redundancy. The alternative one-size-fits-all is no way to serve a global workforce. The author gives number of tips of “how to blend” (for ex. what methods to use, how to communicate, etc).

Web-based e-learning education research and development now focuses on the inclusion of new technological features and the exploration of software standards. However, far less effort is going into finding solutions to psychopedagogical problems in this new educational category. This paper proposes a psychopedagogical instructional model based on content structure, the latest research into information processing psychology and social constructivism, and defines a blended approach to the learning process. Technologically speaking, the instructional model is supported by learning objects, a concept inherited from the object-oriented paradigm.
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<td>Alvin Hwang, J. B. Arbaugh</td>
<td>Virtual and Traditional Feedback-Seeking Behaviors: Underlying Competitive Attitudes and Consequent Grade Performance</td>
<td>2006</td>
<td>Decision Sciences Journal of Innovative Education</td>
<td>4</td>
<td>The electronic medium continues to play an increasingly important role in the delivery of management education despite a paucity of empirical studies on its impact and efficacy. Results from a study of competitive attitudes and feedback-seeking behaviors across seven “hybrid” electronic class live classes showed that Kiasu-Negative (a competitive attitude directed at preventing others from getting ahead of oneself) and Kiasu-Positive (a competitive attitude directed at personal diligence to get ahead of others) (Hwang, Ang, &amp; Francesco, 2002) were related to two electronic discussion board feedback-seeking behaviors. These feedback-seeking behaviors, in turn, were related to grade performance as measured by multiple-choice tests. Traditional feedback-seeking measures of asking the professor in class or outside the class, and checking with fellow students for their views on class topics did not have a positive influence on multiple-choice test performance. In light of these findings, educators should consider how best to encourage participation on electronic discussion boards for hybrid type courses, while researchers should further examine the underlying causes of learning from such electronic exchanges. Other implications of these findings are also discussed.</td>
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<tr>
<td>Anita Pincas</td>
<td>Gradual and Simple Changes to Incorporate ICT into the Classroom</td>
<td>2003</td>
<td><a href="http://www.elearning.europa.com">www.elearning.europa.com</a></td>
<td></td>
<td>Computer-based delivery is expanding the continuum of learning environments, especially the blended courses. Since many campus-based instructors are sceptical of wholesale shifts, this short paper suggests gradual and simple changes to lighten the new instructors ICT learning load and improve student learning. The article is based in the Online Education and Training (OET) course from the Institute of Education, University of London.</td>
</tr>
<tr>
<td>Aspden, Liz; Helm, Paul</td>
<td>Making the Connection in a Blended Learning Environment</td>
<td>2004</td>
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<td>41</td>
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</table>
Research literature indicates that increased engagement with educational technology can have the effect of drawing staff and students closer together (both physically and virtually) rather than encouraging campus-based institutions to deliver more of their provision at a distance. This paper will explore how on-campus students can benefit from appropriate use of technology in ways that make them feel increasingly connected with their institution and their peers. Using qualitative data we explore how effective use of technology can help to bridge the physical gap between the students, their institution and their peers—even where the actual interactions between students take place offline—and how the combination of physical and virtual learning environments can be used to create an effective learning and teaching experience.

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<tr>
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The following material resulted from an ANTA-funded project which set out to investigate blended learning through a series of interviews with teachers. Interviewees were encouraged to reflect on their blending practices and on what they’d learnt along the way. In every case the teachers quoted are out there doing it, exploring how they can take advantage of the possibilities of computers and the Internet. Step-by-step Handbook (containing 4 booklets) on how to plan blended learning.


After nearly 2 years of research in blended learning, and detailed interviews with more than 30 companies, we find that blended learning is replacing e-learning as the next big thing. Our research finds that blended learning programs are perhaps the highest impact, lowest cost way to drive major corporate initiatives. Companies have discovered unique and powerful methodologies for selecting the right media to solve a given business problem. The biggest challenges companies face include
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<td>Bersin, Josh</td>
<td>The Blended Learning Book: Best Practices, Proven Methodologies and Lessons Learned</td>
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<td>San Francisco, California. Pfeiffer</td>
<td>The book focuses on the corporate training market. Blended learning is the latest step in a long history of technology-based training. In the context of this book, blended learning programs use many different forms of e-learning, perhaps complemented with instructor-led training and other live formats. The book defines blended learning as the combination of different training media (technologies, activities and types of events) to create an optimum training program for a specific audience.</td>
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<td>Bjarnø, Vibeke</td>
<td>Information and communication technology in teacher education - Adapted learning carried out by blended learning.</td>
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<td>HiO-rapport : New teaching and learning practices: experiences with eLearning projects at Oslo University College 1998-2005. Oslo University College, Faculty of Education.</td>
<td>There was a need to close the gap between the teachers' ICT knowledge and their ability to use it to enhance learning. Integrating ICT in all disciplines seemed to be a good solution to achieve this goal. Oslo University College wanted to see how they could make the students more competent to use ICT in their teaching situation and teach them how to integrate ICT as a tool for supporting learning processes as teachers. The students had ICT skills but needed examples how to integrate it in their teaching. To do this, the ICT department started to help lecturers at the college to integrate ICT in their different disciplines instead of focusing on separate ICT courses. In the first year there was an increase on 21% on the students answering that the ICT integration in lessons and supervision in other disciplines were useful for the learning process.</td>
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<td>Boeker, M; Klar, R</td>
<td>[E-learning in the education and training of physicians. Methods, results, evaluation]</td>
<td>2006</td>
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<td>E-learning has been established in the education and training of physicians in various types: linear sequential and hyper-textual forms of multimedia presentations and texts, tutorial systems and simulations. Case-based e-learning systems are of special importance in medicine because they allow for mediation of process and practical knowledge by presentation of authentic medical cases in a simulated environment. The integration into the medical education and advanced professional training is crucial for the long-term success of e-learning; in case-based systems this can be accomplished by blended learning approaches which combine elements of traditional teaching with e-learning. Learning management systems (LMS) support integration of traditional teaching and e-learning by serving as an organizational platform for content of teaching. Further, they provide means of communication for trainers and trainees, authoring tools, interactive components, course management and role-based sharing concept. The dissemination of e-learning can be fostered by attention to requirements and user analysis, early adoption to organizational structures, curricular integration and continuous cooperation with students. Summarized, didactic and organizational aspects determine the success of our own e-learning offers as well as they influence the general further development of e-learning more than technical features.</td>
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<th>A Dynamic, Systematic Method for Developing Blended Learning</th>
<th>2005</th>
<th>Education, Communication &amp; Information,</th>
<th>5</th>
<th>221-232</th>
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<td>The focus of this paper is how to improve a course using a blended learning approach. The paper advocates a methodology that is pedagogically driven. The nature of the blend is determined by an analysis of the range and nature of the problems faced by learners. The components and relationships in the blend are developed to tackle these problems systematically to produce an overall solution that makes a</td>
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measurable impact on student performance. The methodology is illustrated by a major case study where a marked impact on student performance was demonstrated. The paper concludes by discussing how better conceptual representation can underpin the evolution of more powerful methodologies for blended learning development.

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<td>Presents a critique of the five case studies of blended learning environments in this issue. Comments are organized around the following four frameworks: (1) the J-curve of implementation; (2) the theory of Engaged Collaborative Discourse; (3) adaptation to individual differences; and (4) Validity-Centered Design.</td>
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<td>Describes an undergraduate religion course at Brigham Young University (Utah) in which seven learners pursuing an online baccalaureate degree were invited to join 49 on-campus students. This case study presents an evaluation of the course based on interviews with distant learners, on-campus students, and instructors.</td>
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<td>Danchak, Michael M, Huguet, Marie-Pierre</td>
<td>Designing for the Changing Role of the Instructor in Blended Learning.</td>
<td>2004</td>
<td>IEEE Transactions on Professional Communication</td>
<td>47 200-210</td>
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<td>Denis, B.</td>
<td>A conceptual framework to design and support self-directed learning in a blended learning program. A case study: the DES-TEF</td>
<td>2003</td>
<td>Journal of Educational Media</td>
<td>28 2-3</td>
</tr>
<tr>
<td>Denis, B. &amp; Piette, S-A.</td>
<td>Regulation of training system for adults in educational technology.</td>
<td>2003</td>
<td>G.Davies &amp; E.Stacey (Eds). Quality Education @ a Distance.</td>
<td>221-230</td>
</tr>
<tr>
<td>Derntl, Michael and Renate Motschnig-Pitrik</td>
<td>Patterns for Blended, Person-Centered Learning: Strategy, Concepts, Experiences, and Evaluation</td>
<td>2004</td>
<td>ACM Symposium on Applied Computing</td>
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| Derntl, Michael, Motschnig-Pitrik, Renate | The role of structure, patterns, and people in blended learning. | 2005 | Internet & Higher Education | 8 | 111-130 | Recently, much e-learning research has been devoted to producing e-content, describing it with metadata, and to constructing e-learning systems. Considerably less attention has been paid to integrating technology to improve the learning process in terms of depth and scope. In this paper, that gap is filled by considering learning support from a technological as well as from a socio-psychological perspective. Didactically, well-proven educational principles from the Person-Centered Approach are adopted to drive educational processes. Technically, a layered framework for deriving Web-based support from these educational principles is proposed. The study focuses on the contribution of visual modeling of blended learning scenarios, on their semi-formal description as patterns, and on the use of patterns as sources for user-centered Web support modules. The experiences and evaluations of one major academic course on Web Engineering indicate that blended learning has added value only when facilitated by educators with high interpersonal skills.
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<th>Author(s)</th>
<th>Title</th>
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<th>Journal</th>
<th>Volume</th>
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<tr>
<td>Dodero, Juan Manuel, Camino Fernández, and Daniel Sanz</td>
<td>An Experience on Students Participation in Blended vs. Online Styles of Learning</td>
<td>2003</td>
<td>inroads The SIGCSE Bulletin</td>
<td>34</td>
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<tr>
<td>Donald Clark</td>
<td>Blended Learning and Blended Learning in Practice</td>
<td>2005</td>
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This work compares two learning experiences developed with different styles during an academic semester in two universities. The objective of the study has been to test the advantages of the blended style of learning, in terms of students’ participation and initiative in the learning process, compared with those of pure virtual e-learning. The study shows how information technologies act as an incentive to improve students’ participation during traditional classroom-located teaching, but do not help to increase their participation when the learning process is completely virtual and not complemented by regular classes.

We have seen how blended learning is not new. What is new is the sheer range of possible components in a blend. We must decide, through selected criteria, how these components should be blended to produce fruitful blends. People hold on to the familiar. This is sometimes what draws them towards blended learning. Vendors of e-learning have been at fault in presenting build it and they will come models based on large catalogues of content and an LMS. Attention to motivation and people was rare. On the other hand cultural inertia, the reactive, protective attitude that resists change is also common. It is equally as destructive. Blended learning is an attempt to rise above these crude positions. In designing, developing and delivering different types of blends - component, integrated, collaborative or expansive - we must be sure that we have thought about the learning outcomes, learners, culture, learning resources, electronic infrastructure, scalability and maintainability of the proposed solution. Increasing choice is not an end in itself. Good cocktails are not normally made by including as many different drinks as you can muster. They are carefully crafted blends of complementary tastes, where the sum is greater than the parts.
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<th>Author</th>
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<th>Journal</th>
<th>Volume</th>
<th>Pages</th>
<th>Abstract</th>
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<tr>
<td>Eilif Trondsen</td>
<td>Use of Technology in Leadership Development</td>
<td>2006</td>
<td></td>
<td></td>
<td></td>
<td>The research confirms that technology has low use today in most organizations' leadership-development programs. Evidence points to growing use, but we cannot expect quick and dramatic change, because rapidly changing technology does not necessarily imply accelerating adoption unless the culture is conducive to technology use. But a number of driving forces that the report discusses are likely to boost the adoption of technology in leadership-development programs: 1) Leadership portals: Providing a range of learning tools and resources. 2) Simulations for interactive, experiential learning: Virtual, hands-on learning experiences and team-based simulations, often in blended formats combining computer- and classroom-based delivery. 3) Rich media content: video players on the Internet open the opportunities for use in formal and informal learning programs for executives and managers. As technology becomes more user-friendly and easier to use technology will find new applications in leadership development.</td>
</tr>
<tr>
<td>Ellis, R.A, Goodyear, P, Prosser, M, O'Hara, A.</td>
<td>How and what university students learn through online and face-to-face discussion: conceptions, intentions and approaches.</td>
<td>2006</td>
<td>Journal of Computer Assisted Learning</td>
<td>22</td>
<td>244-256</td>
<td>This paper reports a phenomenographic investigation into students' experiences of learning through discussion both online and face to face (F2F). The study context was a second-year undergraduate course in psychology for social work in which the teacher had designed discussion tasks to begin in F2F mode and to continue online. A combination of open-ended questionnaires and semi-structured interviews was used to investigate students' conceptions of what they were learning, their intentions and their approaches to learning through discussion. Analysis of the interview and open-ended questionnaire data identified a number of qualitatively different conceptions, intentions and approaches to learning through discussion.</td>
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Associations were found between what students thought they were learning through discussions, their approaches to learning through discussion and their course grade. Students with a cohesive conception and students adopting a deep approach (to learning through online discussion) got better course grades. There was no significant difference between deep and surface approaches to F2F discussion and course grade. The outcomes of this study have implications for the design of online and F2F discussion tasks and in particular for helping students adopt richer conceptions of what they stand to gain through discussion.

Fiona Concannon, Antoinette Flynn and Mark Campbell

What campus-based students think about the quality and benefits of e-learning

2005 British Journal of Educational Technology 36 501-512

There is a trend in Irish universities to utilise the benefits of the e-learning as a mechanism to improve learning performance of campus-based students. Whilst traditional methods, such as face-to-face lectures, tutorials, and mentoring, remain dominant in the educational sector, universities are investing heavily in learning technologies, to facilitate improvements with respect to the quality of learning. The technology to support reuse and sharing of educational resources, or learning objects, is becoming more stable, with interoperability standards maturing. However, debate has raged about what constitutes effective use of learning technology. This research expands upon a study carried out in 2003 examining students’ perceptions of e-learning in a large undergraduate accounting class environment. As a result, improvements were made to the instructional design of the course, to enable students to engage interactively with content. The subsequent study, reported in this paper, adopted a broad range of techniques to understand students’ learning experience in depth. The findings of this research provide an insight into how these students really work and learn using technologies, if at all. It is hoped that our
findings will improve the experience for both students and lecturers who engage in teaching and learning through this medium.

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<th>Author(s)</th>
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<th>Journal</th>
<th>Volume</th>
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<tr>
<td>Fitzgibbon, Karen, Jones, Norah</td>
<td>Jumping the hurdles: challenges of staff development delivered in a blended learning environment.</td>
<td>2004</td>
<td>Journal of Educational Media</td>
<td>29</td>
<td>25-35</td>
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<td></td>
<td>When the University of Glamorgan embarked upon an ambitious e-learning development project, it quickly became clear that before teaching online, academic staff would need a training programme, which could introduce them to the pedagogy associated with this very different form of teaching and learning. This paper addresses the challenges for the staff development process when delivered in a blended learning environment. The paper is presented in three sections, the first outlines the development process of an e-learning initiative, the second examines the model of teaching and learning, and the final section outlines the challenges to change encountered along the way. The paper concludes that a blended learning environment lends itself well to staff development for e-learning initiatives. The authors also explore future developments including further module and course development inspired by this successful model.</td>
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<tr>
<td>Gary Motteram</td>
<td>‘Blended’ education and the transformation of teachers: a long-term case study in postgraduate UK Higher Education</td>
<td>2006</td>
<td>British Journal of Educational Technology</td>
<td>37</td>
<td>17-</td>
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<td></td>
<td>This paper discusses the role of blended learning in teacher education on a Master’s programme at Manchester University. Blended learning is the bringing together of traditional physical classes with elements of virtual education. The paper focuses on one particular module of the degree and attempts to capture students’ experiences of using a number of online tools. As our students are primarily in-service teachers, this experience is particularly relevant and equips them to make use of educational technology in the language classroom. Some comparisons are also made with a cohort of teachers studying the programme at a distance. The paper explores a range of issues that currently feature in the adult education literature, namely, deep and surface learning, communities</td>
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of practice, and the importance of educational dialogue. The paper illustrates how important the blended nature of this module is for the teachers to get a balanced programme that upgrades skills and knowledge, but which also enables them to reflect on past and future practice. A transformative education scale is used to show that teachers can be transformed. The paper is a case study that makes use of data that explore the student perspective on a series of research questions.

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<th>Journal/University</th>
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<tr>
<td>Gerard Prendergast</td>
<td>Blended Collaborative Learning: Online Teaching of Online Educators</td>
<td>2004</td>
<td>GlobalEducator</td>
</tr>
<tr>
<td>Glenda Cox, Tony Carr &amp; Martin Hall</td>
<td>Evaluating the use of synchronous communication in two blended courses</td>
<td>2004</td>
<td>Journal of Computer Assisted Learning</td>
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</table>

Blended Collaborative Learning is essentially a tutor-led distance learning method that blends available face-to-face and online techniques on a foundation framework of facilitated asynchronous conferencing. Blended Collaborative Learning actively encourages the modern form of ‘communities of practice’ and permits dispersed individuals to contribute and gain from this kind of group involvement. By embedding human interaction in learning programmes, the online educator exploits the human need for socialisation to aid learning through blending face-to-face experiences with synchronous online tools, asynchronous online methods and even Computer Based Training knowledge objects in an appropriate mix. In this article, the author explores the advantages and disadvantages of using online learning environments to teach academic staff about teaching online and so shares his considerable experience in online education to suggest practical techniques for the online teaching of future online educators and in the process, creating effective blended collaborative learning educators.

Residential universities are increasingly integrating online interaction within courses in the form of synchronous online chats, asynchronous online discussions and access to interactive resources. This article evaluates the educational effectiveness of online chats within a
| Guldberg, K; Pilkington, R | A Community of Practice Approach to the Development of Non-Traditional Learners through Networked Learning | 2006 | Journal of Computer Assisted Learning | 22 | 159-171 |

This paper analyses a sample of online discussions to evaluate the development of adult learners as reflective practitioners within a networked learning community. The context for our study is a blended learning course offering post-experience professional training to non-traditional university students. These students are parents and carers of people with autistic spectrum disorder (ASD). We use Lave and Wenger’s “communities of practice” as a theoretical framework for establishing how students develop a learning community based upon mutual engagement, joint enterprise and shared repertoires. Those three aspects are analysed according to two measures. The first focuses on learner appropriation of the professional discourse, values and goals of the ASD carer through the network. The second relates to changes in the quality of collaborative activity over time. Our analysis demonstrates that students belong to an overarching community of practice, with different subsets who work at sharing and co-constructing common understandings. This shared discourse and common notions of what constitutes good practice help create a safe interaction space for the students. Once group identity is consolidated, more challenging questions emerge and the group are able to define further common values, understandings and goals through processes of resolution.
<table>
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<th>Author(s)</th>
<th>Title</th>
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<th>Journal/Editor</th>
<th>Volume</th>
<th>Issue/Page</th>
<th>Summary</th>
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<tr>
<td>Gynther, Karsten</td>
<td>Blended learning : IT og læring i et teoretisk og praktisk perspektiv</td>
<td>2005</td>
<td>Kjøbenhavn : Unge Pædagoger</td>
<td></td>
<td></td>
<td>Looks at how to implement blended learning in teaching situations based on a research project for teacher students at a traditional University College in Denmark.</td>
</tr>
<tr>
<td>Harold W. Webb, Grandon Gill and Gary Poe</td>
<td>Teaching with the Case Method Online: Pure Versus Hybrid Approaches</td>
<td>2005</td>
<td>Decision Sciences Journal of Innovative Education</td>
<td>3</td>
<td>223-</td>
<td>The impact of hybrid classroom/distance education approaches is examined in the context of the case method. Four distinct semester-long treatments, which varied mixes of classroom and online discussion, were used to teach a graduate MIS survey course. Specific findings suggest that by using Web technology, college instructors may offer students the option of participating in high-quality courses using the case method pedagogy in an online environment. Students not only appear to do as well as in the traditional classroom, but the data suggest that students in the online environment may perform better at multiple levels of learning outcomes, especially when using a blend of classroom and online technologies. Furthermore, the precepts of the case method pedagogy may be enhanced by the use of online discussions. Instructors employing the technique may find their own importance devalued, while the time demands of the approach can be much greater than for traditional classes. The findings infer that it is the model of learning and its fit with supporting technologies, rather than the presence of technology per se, which enhances learning outcomes.</td>
</tr>
<tr>
<td>Hiltz, Starr Roxanne, Turoff, Murray</td>
<td>EDUCATION GOES DIGITAL: The Evolution of Online Learning and the Revolution in Higher Education.</td>
<td>2005</td>
<td>Communications of the ACM</td>
<td>48</td>
<td>59-64</td>
<td>The article presents a discussion on the evolution of online learning and the revolution in higher education. Online learning is the latest in a long list of social technologies that have been introduced to improve distance learning by adding various augmentations, substitutions, or blending of new pedagogical approaches and technologies. Online learning is revolutionizing higher education both as process and social institution.</td>
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It is a new social process that is beginning to act as a complete substitute for both distance learning and the traditional face-to-face class. This is because it also is a process that will infiltrate the ordinary face-to-face class and radically change the nature of what is thought of as the typical college course. Face-to-face courses skillfully blended with online learning technologies and methodologies are generally rated by students as significant improvements over traditional face-to-face classes. The pace of this change depends upon many social factors; it may take 10 years or it may take far longer. Countervailing forces might take the form of resistance or an entirely new conception of the role of education in society.

<table>
<thead>
<tr>
<th>Hofmann. Jennifer</th>
<th>Blended Learning Case Study. Available at:</th>
<th>2001</th>
<th><a href="http://www.learningcircuits.org/2001/apr2001/">http://www.learningcircuits.org/2001/apr2001/</a></th>
<th>Proposes that ‘the idea behind blended learning is that instructional designers review a learning program, chunk it into modules, and determine the best medium to deliver those modules to the learner’.</th>
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<tr>
<td>J. Pearson &amp; S. Trinidad</td>
<td>OLES: an instrument for refining the design of e-learning environments</td>
<td>2005</td>
<td>Journal of Computer Assisted Learning</td>
<td>21 396</td>
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<tr>
<td>Jared M. Carman</td>
<td>blended learning design: five key ingredients</td>
<td>2002</td>
<td></td>
<td>The author argues that all the humans are blended learners - there just has the right balance to be found.</td>
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Author suggest five elements for blended learning process as the key ingredients of blended learning in business-case. These five are: 1) live events, self-paced learning, collaboration, assessment and performance support materials.

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<tr>
<th>Jeanine Romano, Tary L. Wallace, Ina J. Helmick, Lou M. Carey and Lisa Adkins</th>
<th>Study procrastination, achievement, and academic motivation in web-based and blended distance learning</th>
<th>2005</th>
<th>The Internet and Higher Education</th>
<th>8</th>
<th>290-305</th>
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<td>Growth in distance education is increasing the need to examine students’ learning strategies in distance and blended learning environments. Students’ cramming or spaced-review behaviors were measured and compared across delivery formats as well as examined related to course achievement and attitudes across a term. Although theory would predict that spaced study rather than last minute cramming would yield higher achievement, researchers report mixed findings in both areas. One hundred fifty-seven students in distance and blended course formats were blocked into 5 groups based on their cramming/spaced-review patterns a week prior to each of 3 posttests. Significant differences were observed in cramming/spaced-review behaviors between delivery formats and for achievement and attitudes.</td>
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<th>Jelfs, Anne; Nathan, Roberta; Barrett, Clive</th>
<th>Scaffolding Students: Suggestions on How to Equip Students with the Necessary Study Skills for Studying in a Blended Learning Environment</th>
<th>2004</th>
<th>Journal of Educational Media</th>
<th>29</th>
<th>85-96</th>
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<td>In this paper we consider the implications of moving from a paper-based delivery of study support materials to electronic delivery. The paper is based on telephone interviews with 60 students who had received a range of study support materials from a series of ‘student toolkits’, which are printed resource booklets for students of the UK Open University. McLoughlin (2002) sees the integration of electronic delivery at the primary, secondary and tertiary education levels as requiring an extension to current concepts of scaffolding. The extension we propose in this paper is the need to establish study skills plus the ways and means to seek support in a resource-based environment. However, there is a delicate balance between increased provision and overloaded provision in resource-based learning.</td>
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<td>Joergen Bang</td>
<td>eLearning reconsidered. Have e-learning and virtual universities met the expectations?</td>
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<td>Joke Voogt, Marinus Almekinders, Jan van den Akker and Bert Moonen</td>
<td>Blended in-service arrangement for classroom technology integration: impacts on teachers and students</td>
<td>2004</td>
<td>Computers in Human Behavior</td>
<td>21</td>
<td>523-539</td>
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<tr>
<td>Josh Bersin</td>
<td>What Works in Blended Learning</td>
<td>2003</td>
<td>Learning Circuits</td>
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What are the best ways to blend delivery types? When do you blend? What blends work best with what? And the $million question: Will the term blended learning replace e-learning? Bersin & Associates set out to understand these issues. In 2002 and 2003, Bersin & Associates partnered with IDC to conduct a study of more than 30 corporate blended learning programs to understand what works. The biggest conclusions were that blended learning can be most cost-effective way of delivery, moreover BL is a good tool to force companies to calculate the processes and costs carefully. Bersin puts forward five success-elements of BL: large scale audience, speed of delivery, effective throughput, complexity of the curricula, optimized cost. Authors argue that BL is effectively replacing e-learning. Its simply the natural evolution of e-learning into an integrated program of multimedia applied toward a business problem in an optimum way.

<table>
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<tr>
<th>Kennedy, David M</th>
<th>Standards for online teaching: lessons from the education, health and IT sectors.</th>
<th>2005</th>
<th>Nurse education today</th>
<th>25</th>
<th>23-30</th>
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Online teaching is a growing, but not a new, phenomenon. It is most associated with distance education, but it also features in classroom education, in the form of blended learning. During this period of growth in online teaching, there has been time for the development of standards to ensure its quality. Yet the standards that have emerged tend to be derivatives of the standards for conventional, classroom teaching. They do not adequately address the specific demands of online education. Is this acceptable for online teachers? Is it supportive of online students? This contribution to the debate outlines how nurse educators can generate—and are generating—credible standards for their online practice. It identifies flaws in the current guidance for online teachers. It points out that knowledge of standard setting in the health service can support standard setting in higher education. And it highlights that the most useful guidance for the online teacher comes not from the education sector but from the industrial sector, specifically from the IT...
Kerres, M. & De Witt, C.  
**A Didactical Framework for the Design of Blended Learning Arrangements**  
2003 Journal of Educational Media 28 2-3  
They discuss blended learning as a mix of different didactic methods and delivery formats. Their argumentation is based on the assumption that these two are independent of each other.

Kerry Shephard  
**Questioning, promoting and evaluating the use of streaming video to support student learning**  
2003 British Journal of Educational Technology 34 295-  
This paper uses case studies to describe how streaming video is currently used to support student learning in post compulsory education in the UK. It describes the current role of streaming video and identifies processes that could extend the application of streaming in education. It attempts to establish a case for more formal evaluation and communication of educational processes involving streaming and identifies elements of a research agenda that could further develop the application of streaming technology in education.

Klein, James D., Michael Spector, Barbara Grabowski, Ileana de la Teja  
**Instructor competencies Standards for face-to-face, online, and blended settings**  
2004 Greenwich, IAP Information Age Publishing  
This book is written by four persons in The International Board of Standards for Training, Performance and Instruction (ibstpi). The mission of ibstpi is to develop, validate and promote the implementation of international standards to advance training, instruction, learning and performance improvement for individuals and organizations.

Lanham, Elicia; Zhou, Wanlei  
**Cultural Issues in Online Learning-Is Blended Learning a Possible Solution?**  
The emergence of cross-cultural classrooms has been steadily increasing in Australian tertiary institutions, due to the growing population of international students enrolling to complete their degrees. This increase in international students has signified a change in the student demographics, thus recognizing the differences in students’ learning styles, & indicating that a more flexible approach is needed for learner content delivery. Research has suggested that students from different cultures have varying...
compatibility with different learning environments. With tertiary institutions now expanding towards the online forum for delivery of units, these compatibilities of students are even more evident. Hence, in order to ensure that all students are able to participate in this domain, preparations are needed to accommodate all cultural types. Therefore, with the emphasis on creating flexible learning environments for all students, the blended learning approach has been suggested as a solution.

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<tbody>
<tr>
<td>Linda Creanor, Steve Walker</td>
<td>Trade Union Use of ICT to Support Learning</td>
<td>2005</td>
<td><a href="http://www.elearningeuropa.info">www.elearningeuropa.info</a></td>
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<tr>
<td>Mark Stubbs, Ian Martin, Lewis Endlar</td>
<td>The structuration of blended learning: putting holistic design principles into practice</td>
<td>2006</td>
<td>British Journal of Educational Technology</td>
<td>37 163-</td>
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Six case studies were conducted between June and October 2004 along with an online survey. There are five national case studies from Italy (Confederazione Italiana Sindacati Lavoratori), Germany (Deutscher Gewerkschaftsbund (DGB) Bildungswerk), the Netherlands (Federatie Nederlandse Vakbewegingen), Sweden (Landsorganisationen i Sverige) and the British (Trades Union Congress) and one transnational case study from the European Trade Union College (ETUCO). These cases illustrate some of the diverse ways in which trade unions are approaching the use of ICT to support formal and informal learning, vocational and trade union training, blended learning, organisational and self-paced learning; and national and transnational learning. The case studies reveal a range of approaches towards the use of ICT in trade union learning which reflect a variety of organisational priorities and responses in particular national contexts. Differing industrial relations environments, union cultures, national government policies and initial experiences with ICT in learning are among the factors contributing to this diversity.

This paper considers the challenges faced by those seeking to design effective blended learning. Using a 2-year case study involving cohorts of approximately 200 students, it demonstrates how Anthony Giddens’ structuration theory can provide a metaframework for assisting educational designers in creating coherent blended learning experiences that reinforce intended learning outcomes. It calls for educational de-
signers to be sensitive to both their audience and the unintended and unanticipated consequences of their actions and shows how a holistic annual review framework can reinforce or suppress emergent behaviour through unit development.

<table>
<thead>
<tr>
<th>Mason, Robin</th>
<th>Guest Editorial Blended Learning</th>
<th>2005</th>
<th>Education, Communication &amp; Information,</th>
<th>5</th>
<th>217-220</th>
</tr>
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<tbody>
<tr>
<td>McCafferty, Linda R; Desaulniers, Jennifer E</td>
<td>The revolution of blended training - The distributed instructor</td>
<td>2004</td>
<td>The Interservice/Industry Training, Simulation and Education Conference (I/ITSEC); Simulation and Training: Transforming 21st Century Operations</td>
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What exactly is blended in blended learning? Is it the technologies? The teaching methods? The learning experiences for the students? The locations of the learning events? In fact, any and all of these can be found in articles about blended learning. However, the most common understanding still seems to be the original notion, namely, that blended learning blends different delivery modes and, in particular, online and face-to-face teaching. There is no doubt that blended learning is an amorphous term which can in theory be applied to almost any learning situation. Perhaps it is useful to consider blended learning primarily as an approach to the design of learning interventions. These interventions will be a mix of learning media and methods with the aim of achieving specific learning outcomes.
expectations are high; they desire interactivity, immediate feedback, and lasting learning. The new breed of instructors who must apply distributed training techniques need to adapt to this new environment. Most instructors do not have the knowledge and skills required to create a blended training experience that meets the expectations of distributed learners. The purpose of this paper is to provide the results of an extensive literature review and best practices research. It will define the responsibilities and provide recommendations for instructing a distributed course that blends the use of video teletraining, interactive multimedia instruction, also known as computer-based training, and web-based training media. A qualitative analysis of the available information on blended training was undertaken to determine recurring themes, or best practices, using each of the three media delivery techniques. From this study the following five tasks emerged: prepare to deliver training, present content, facilitate interaction, provide feedback, and perform administrative functions. This paper will provide direction and guidance on the skills, knowledge, training, and resources needed for an instructor in academia, industry, or the military to effectively deliver blended distributed training.

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Author of the article sets two lingering questions on the minds of those responsible for human performance: With all these training delivery methodologies at our disposal, how do we combine them effectively? How can we ensure that our investments in our training programs further our organizations success on an ongoing basis? Author suggests to consider background of the training, available resources, characteristics of the audience and characteristics of the content as the key-factors of the effective planning bof the BL. As the obstacles for
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<th>Journal</th>
<th>Page Numbers</th>
<th>Abstract</th>
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<tr>
<td>Michael McGinnis</td>
<td>Building a Successful Blended Learning Strategy</td>
<td>2005</td>
<td><a href="http://www.ltimagazine.com/ltimagazine/article/articleDetail.jsp?id=167425">http://www.ltimagazine.com/ltimagazine/article/articleDetail.jsp?id=167425</a></td>
<td></td>
<td>Author says: “There seems to be reluctance in transitioning instructor-led training (ILT) to a blended learning format. This may be due to resistance on the part of the organization or training department to change existing classroom session formats. Another reason I believe is more prevalent is not knowing how.” The article consists of a case study of how company’s training department made a very successful transition prior to knowing what blended learning meant. Article describes the procedure of developing a BL course.</td>
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<tr>
<td>Mihye Harker, Dmitra Koutsantoni</td>
<td>Can it be as effective? Distance versus blended learning in a web-based EAP programme</td>
<td>2005</td>
<td>ReCALL</td>
<td>17 197-216</td>
<td>This paper discusses the effectiveness of a web-based learning programme of English for Academic Purposes (EAP) for British students from ethnic minority backgrounds. Original web-based materials for English for Academic Purposes (EAP) were developed and 43 student volunteers participated in two different modes of learning during the 9-week long programme: through blended learning and at a distance. The study attempts to investigate which mode of delivery is more effective in terms of student retention, achievement levels and satisfaction with the programme. The study found that the blended learning mode was much more effective in student retention in this non-credit bearing programme, whilst students achievement levels were similar in both groups. In addition, formative and summative feedback from the students suggests that most students in both</td>
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groups. In addition, formative and summative feedback from the students suggests that most students in both groups were satisfied with this web-based EAP programme.

Motteram, Gary
“Blended” education and the transformation of teachers: a long-term case study in postgraduate UK Higher Education.
2006 British Journal of Educational Technology vol 37 17-30 This paper discusses the role of blended learning in teacher education on a Master’s programme at Manchester University. Blended learning is the bringing together of traditional physical classes with elements of virtual education. The paper focuses on one particular module of the degree and attempts to capture students’ experiences of using a number of online tools. As our students are primarily in-service teachers, this experience is particularly relevant and equips them to make use of educational technology in the language classroom. Some comparisons are also made with a cohort of teachers studying the programme at a distance. The paper explores a range of issues that currently feature in the adult education literature, namely, deep and surface learning, communities of practice, and the importance of educational dialogue. The paper illustrates how important the blended nature of this module is for the teachers to get a balanced programme that upgrades skills and knowledge, but which also enables them to reflect on past and future practice. A transformative education scale is used to show that teachers can be transformed. The paper is a case study that makes use of data that explore the student perspective on a series of research questions.

Nuckles, Matthias; Schwonke, Rolf; Berthold, Kirsten; Renkl, Alexander
The Use of Public Learning Diaries in Blended Learning
2004 Journal of Educational Media 29 49-66 Learning diaries--as we employ them--are students’ written reflections of their learning experiences and outcomes over the course of university seminars. The writing of such diaries is ‘tutored’ by a computer program: eHELP supports the writing of sophisticated learning diaries through a modelling and scaffolding of the phases of planning, production and revision. In addition, the learning diaries get published--by
uploading them in a cooperation platform - so that the learners can read and discuss their peers’ diaries. The main function of such public learning diaries is to enrich traditional university courses (Blended Learning) with additional elaborative, organisational, critical reasoning, and metacognitive activities in order to foster a deeper processing and better retention of the contents to be learnt. Authors present the educational rationale of our approach and report the findings of corresponding empirical studies.

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<tr>
<th>Oliver, Martin and Keith Trigwell</th>
<th>Can Blended Learning Be Redeemed?</th>
<th>2005</th>
<th>E-Learning</th>
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<td>Osguthorpe, Russell T; Graham, Charles R</td>
<td>Blended Learning Environments: Definitions and Directions.</td>
<td>2003</td>
<td>ELearning Quarterly Review of Distance Education</td>
<td>4</td>
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<tr>
<td>Peter, David M</td>
<td>Blended Learning--Best Educational Web Uses.</td>
<td>2002</td>
<td>ERIC, Resources in Education</td>
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<td>Petra Neumeier</td>
<td>A closer look at blended learning - parameters for designing a blended learning environment for language teaching and learning.</td>
<td>2005</td>
<td>17</td>
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tion of BL and a framework of parameters for designing a BL environment. In order to achieve a better understanding of the factors that shape the practice and the experience of BL, the main parameters which form a BL environment will be listed and specified. These parameters evolved from the experience of designing Jobline LMU (www.jobline.lmu.de) and will hopefully prove to be helpful for the process of designing other BL environments. If applied successfully, the idea of BL could serve as a bridge between the broader community of language teachers and learners and CALL experts and practitioners. BL offers the potential of broadening the scope and influence of CALL and of (re-)establishing it as an innovative component of general language teaching.

| Poole, Judith | E-learning and learning styles: students' reactions to web-based Language and Style course at Blackpool and The Fylde College | 2006 | Language and Literature | 15 | 307-320 |

The issue of learning styles and how they affect students’ attitudes to pursuing online courses is a key issue for the development of web-based teaching. The focus of this article is how learning styles seem to have affected students’ attitudes to undertaking the web-based Language and Style course at Blackpool and The Fylde College in 2004-5. The course was delivered in a blended format, incorporating both web-based and traditional teaching. The students’ learning styles were assessed both at the onset and the end of the course. In this article I discuss students’ reactions to the course and how these might be linked to the learning styles they exhibited at the time of the assessments. As a result of the investigation reported here, I suggest that an initial assessment of learning styles can be useful in predicting the kinds of web-based activities likely to prove valuable to the individual student. Potentially, this has consequences for the development of web-based and other learning materials in other subject areas.
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<td>prof. dr. Betty Collis</td>
<td>Current Conditions... in work and in organisations</td>
<td>2002</td>
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<td>Betty Collis is a Shell Professor of Networked Learning University of Twente. This power point lists blended learning as one of three new ways of working and learning. The other two is: Reusable learning objects and Knowledge Sharing instead of Knowledge Management. Blended learning blends: 1) Different places and times where learning activities take place. 2) classroom and non-classroom process co-ordinated via a Web-based learning-support system. 3) the guidance and management of a capable instructor.</td>
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<td>Purnima Valiathan</td>
<td>Blended Learning Models</td>
<td>2002</td>
<td></td>
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<td>The term blended learning is used to describe a solution that combines several different delivery methods, such as collaboration software, Web-based courses, EPSS, and knowledge management practices. Blended learning also is used to describe learning that mixes various event-based activities, including face-to-face classrooms, live e-learning, and self-paced learning. Unfortunately, there’s no single formula that guarantees learning, but here are some guidelines from NIIT on how to order your learning activities. The author describes different models of BL (1)skill-driven learning, which combines self-paced learning with instructor or facilitator support to develop specific knowledge and skills, 2) attitude-driven learning, which mixes various events and delivery media to develop specific behaviors; and 3) competency-driven learning, which blends performance support tools with knowledge management resources and mentoring to develop workplace competencies.</td>
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<td>R. A. Ellis, P. Goodyear, M. Prosser &amp; A. O’Hara</td>
<td>How and what university students learn through online and face-to-face discussion: conceptions, intentions and approaches</td>
<td>2006</td>
<td>Journal of Computer Assisted Learning</td>
<td>22/244-</td>
<td>This paper reports a phenomenographic investigation into students’ experiences of learning through discussion both online and face to face (F2F). The study context was a second-year undergraduate course in psychology for social work in which the teacher had designed discussion tasks to begin in F2F mode and to con-</td>
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A combination of open-ended questionnaires and semi-structured interviews was used to investigate students’ conceptions of what they were learning, their intentions and their approaches to learning through discussion. Analysis of the interview and open-ended questionnaire data identified a number of qualitatively different conceptions, intentions and approaches to learning through discussion. Associations were found between what students thought they were learning through discussions, their approaches to learning through discussion and their course grade. Students with a cohesive conception and students adopting a deep approach (to learning through online discussion) got better course grades. There was no significant difference between deep and surface approaches to F2F discussion and course grade. The outcomes of this study have implications for the design of online and F2F discussion tasks and in particular for helping students adopt richer conceptions of what they stand to gain through discussion.

Considerable claims have been made for the development of e-learning, either as stand-alone programmes or alongside more traditional approaches to teaching and learning, for students across school and tertiary education. National initiatives have improved the position of schools in terms of access to hardware and electronic networking, software and educational resources, and staff development. The potential of e-learning to improve learning and teaching, and in turn, attainment, may be contested by academics but the policy makers are generally positive. Many countries across Europe and North America have adopted information and communication technology (ICT) as a central plank in school improvement and effectiveness planning. At the centre, however, remain the teacher and the learner. The im-
Impact of ICT on the learning experience will depend upon the roles adopted by each, the model of the learner held by the teacher and the pedagogy adopted. This paper considers the ways in which teachers and students responded to the implementation of one particular online programme and considers the approaches adopted and the attitudes to its use. The SCHOLAR programme is designed to complement rather than replace traditional teaching and learning approaches within schools and is aimed at students in the post-compulsory years of secondary school working towards external certification. It has a number of features including course materials, revision exercises, self-assessment facilities and a discussion forum. The independent evaluation of SCHOLAR looked at the impact that its use made on learning and teaching in the post-16 classroom and the differing ways in which teachers and students used the various elements of the programme. While it did appear to have a positive impact on attainment, the evidence indicates that this might have been greater had the teachers modified their practice, blending learning through SCHOLAR with more traditional methods.

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<td>Rikke Schultz, Lone Guldbrandt Tønnesen</td>
<td>How can blended learning help to the integration of ICT in adult education?</td>
<td>2006</td>
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The paper discusses a blended learning concept for a university teacher training course for prospective teachers of English. The concept aims at purposeful learning using different methods and activities, various traditional and electronic media, learning spaces covering contact and distance learning, and task-based learning modules that begin with multimedia-based case stories. The learning concept is based on theories of situated learning in multimedia-enhanced learning environments. The activities discussed include classroom recordings and multimedia-based case stories, an electronic interview with an expert who is an experienced grammar school teacher, and mini-practices, which implement micro teaching in a classroom setting. Case stories used as a didactic tool in teacher education are supposed to contribute to a closer and more reflective relationship between theory-driven and practically-oriented aspects of teacher education. The multimedia-based case stories are hypertexts designed as essential components of computer-based learning modules that support various ways and styles of learning. Students worked with the case story material either in guided or in self-regulated scenarios several times during the course. Three types of learners could be distinguished: students who mainly create and apply experiences, students who mainly study the theoretical resources, and students who create with focused selection of resources. The e-interview promotes an exchange between theory and practical teaching and experience with this format of e-learning at the same time. The mini-practice offers guided insights into analyzing teaching materials, hands-on experiences with lesson planning and the experience of acting as a teacher in an authentic teaching context. Furthermore, the mini-practice is meant to help the students broaden their per-
It is a very interesting time to be involved in higher education. Two trends are very apparent to all of us involved in the learning process. First, the vast increase over recent years in the use of web-based materials to support courses. Where these materials supplement existing lectures and tutorials, the term ‘blended learning’ has recently come into fashion. Where the materials stand alone, so that they are sufficient to enable external students to learn efficiently, the course may truly be termed online. Second, the increased realization amongst many educators that interaction is a key component of the learning process for many learners. Equating the amount of interaction with the amount of learning is overly simplistic, however - it is clear from many examples that there can be plenty of interaction without learning, and vice versa. Nevertheless, there would seem to be a strong correlation between interaction and learning. These two trends are viewed with concern by some, since at first appearances they may seem to be antipathetic. However, the field of computer-supported collaborative learning (or CSCL) attempts to bridge the gap between the two, and stands as a paradigm of learning that seems likely to become pre-eminent in the twenty-first century.

Examine the development of a class at Brigham Young University (Utah) that blends distance and face-to-face students in a synchronous class. This case study focuses on how this blended learning environment was experienced by the distance and face-to-face students, as well as by the instructor.
The authors provide an introduction to e-learning and its role in medical education by outlining key terms, the components of e-learning, the evidence for its effectiveness, faculty development needs for implementation, evaluation strategies for e-learning and its technology, and how e-learning might be considered evidence of academic scholarship. E-learning is the use of Internet technologies to enhance knowledge and performance. E-learning technologies offer learners control over content, learning sequence, pace of learning, time, and often media, allowing them to tailor their experiences to meet their personal learning objectives. In diverse medical education contexts, e-learning appears to be at least as effective as traditional instructor-led methods such as lectures. Students do not see e-learning as replacing traditional instructor-led training but as a complement to it, forming part of a blended-learning strategy. A developing infrastructure to support e-learning within medical education includes repositories, or digital libraries, to manage access to e-learning materials, consensus on technical standardization, and methods for peer review of these resources. E-learning presents numerous research opportunities for faculty, along with continuing challenges for documenting scholarship. Innovations in e-learning technologies point toward a revolution in education, allowing learning to be individualized (adaptive learning), enhancing learners’ interactions with others (collaborative learning), and transforming the role of the teacher. The integration of e-learning into medical education can catalyze the shift toward applying adult learning theory, where educators will no longer serve mainly as the distributors of content, but will become more involved as facilitators of learning and assessors of competency.
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<tr>
<td>Shaffer, Kitt; Small, Juan E</td>
<td>Blended learning in medical education: use of an integrated approach with web-based small group modules and didactic instruction for teaching radiologic anatomy.</td>
<td>2004</td>
<td>Academic radiology</td>
<td>11</td>
<td>1059-1070</td>
<td>To describe the development of and assess student satisfaction with a blended learning method for teaching radiologic anatomy that integrates web-based instruction with small group and didactic teaching. MATERIALS AND METHODS: In 2002 the teaching of radiologic anatomy to first-year medical students was changed from group learning (20-30 students with a preceptor and films at a viewbox) to a blended learning model that included a brief didactic introduction followed by small group (7-8 students) web-based structured learning modules with rotating lab instructors. In 2003 the modules were changed to include self-study cases prior to the lab, follow-up cases, and twice-weekly optional review sessions. Students and lab instructors were surveyed for their response to the content and design of the sessions. RESULTS: Course surveys in 2001, with a response rate of 84%, showed 58 negative comments regarding inconsistency between various instructors. Individual response rates for 2002 for radiologic anatomy teaching sessions (RadLab) surveys ranged from 56%-81%, dropping as the course progressed. All RadLabs were rated “very useful” or “useful,” except the cardiovascular lab, which was not designed as an interactive module. In 2003, after redesign of the cardiovascular lab in the same format as the other labs, all RadLabs were rated 2.4 or better (useful). CONCLUSION: An integration of computers with small and large group didactic instruction allow optimal use of faculty, conform to accepted theories of adult learning, and are well-accepted by students.</td>
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<tr>
<td>Singh, Harvey</td>
<td>Building Effective Blended Learning Programs.</td>
<td>2003</td>
<td>Educational Technology</td>
<td>43</td>
<td>51-54</td>
<td>Discussion of electronic learning and Web-based learning focuses on blended learning programs which can include offline and online learning; self-paced and live, collaborative learning; structured and unstructured learning; and custom content and off-the-shelf content.</td>
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<td>Steve Semler</td>
<td>Use Blended Learning to Increase Learner Engagement and Reduce Training Costs</td>
<td>2001</td>
<td>Learning Safari Newsletter. <a href="http://www.learningsim.com/content/lsnews/blended_learning1.html">http://www.learningsim.com/content/lsnews/blended_learning1.html</a></td>
<td>Describes different possibilities for interpreting the “blending”. Argues that via using blended learning universities can optimize the costs, extend the reach (number and region of students). Describes a model, called Khan’s Octagonal Framework, which can be used to create the appropriate blend (institutional, pedagogical, technological, interface design, evaluation, management, resource support and ethical dimensions need to be addressed in order to get the best blend).</td>
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<td>Tallman, Julie, Fitzgerald, Mary Ann</td>
<td>Blending Online and Classroom Learning Environments: Reflections on Experiences and Points to Consider.</td>
<td>2005</td>
<td>Knowledge Quest</td>
<td>Presents information on how the authors established a blended online and classroom program. Consideration of the learning needs and technology skills of students; Need for a face-to-face orientation session prior to each term; Reference to the factors that are crucial for all levels of online education; Effectiveness of the program during its first four cohorts.</td>
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<td>Taradi, Suneana Kukolja, Taradi, Milan, Radie, Kreimir, Nikia Pokrajac</td>
<td>Blending problem-based learning with Web technology positively impacts student learning outcomes in acid-base physiology</td>
<td>2005</td>
<td>Advances in Physiology Education</td>
<td>29</td>
<td>World Wide Web (Web)-based learning (WBL), problem-based learning (PBL), and collaborative learning are at present the most powerful educational options in higher education. A blended (hybrid) course combines traditional face-to-face and WBL approaches in an educational environment that is nonspecific as to time and place. To provide educational services for an undergraduate second-year elective course in acid-base physiology, a rich, student-centered educational Web-environment designed to support PBL was created by using Web Course Tools courseware. The course is designed to require students to work in small collaborative groups using problem solving activities to develop topic understanding. The aim of the study was to identify the impact of the blended WBL-PBL-collaborative learning environment on student learning outcomes. Student test scores and satisfaction survey results from a blended WBL-PBL-based test group (n = 37) were compared with a control group whose instructional opportunities were from a traditional in-class PBL model (n = 84). WBL students scored significantly (t = 3.3952; P = 0.0009) better on the final acid-base physiology examination and expressed a positive attitude to the new learning environment in the satisfaction survey. Expressed in terms of a difference effect, the mean of the treated group (WBL) is at the 76th percentile of the untreated (face-to-face) group, which stands for a medium effect size. Thus student progress in the blended WBL-PBL collaborative environment was positively affected by the use of technology.</td>
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<td>Thorne, Kaye</td>
<td>Blended learning: how to integrate online &amp; traditional learning</td>
<td>2003</td>
<td>London Ans Sterling. Kogan Page</td>
<td></td>
<td>The main purpose of the book is to show how useful blended learning is in the learning process due to the theory of peoples differences in which method to use when learning how they prefer to learn. Blended makes the possibility...</td>
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<td>Tim Scholze</td>
<td>The Role of e-Learning for Training in Institutions of The Third Sector</td>
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<td><a href="http://www.elearningeuropa.com">www.elearningeuropa.com</a></td>
<td></td>
<td></td>
<td>Number of projects are being developed to help face the structural change and the introduction of new technologies in the European Health and Social Sector (3rd sector). From April 02 May 04 the project ITs Social! developed new training and education approaches for third sector organisations. By introducing the ICT as training and communication instruments, the initiatives seek to promote innovative ways of training and to facilitate the access to lifelong learning for disadvantaged people normally being kept out of traditional learning schemes.</td>
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<td>Troha, F.</td>
<td>Bulletproof Instructional Design: A Model for Blended Learning.</td>
<td>2002</td>
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<td>Van Eijl, Pierre J., Albert Pilot, Peter De Voogd</td>
<td>Effects of Collaborative and Individual Learning in a Blended Learning Environment</td>
<td>2005</td>
<td>Education and Information Technologies</td>
<td>10</td>
<td>49-63</td>
<td>In courses using a virtual learning environment (VLE), some students like to work together, and some do not. If we give students the opportunity to choose either teamwork or individual study, how does this affect their marks and their appraisal and assessment of the course? This question has been investigated in the context of an English Literature course at the University of Utrecht. In this course, students work intensively with a VLE, and attend lectures: a blended learning environment. Previous research has shown that the pedagogical design used provides a powerful learning environment. This time, students had the choice of working on the course assignments in small teams (2-4 students), or individually. Both groups were compared based on their study results, and the answers to a questionnaire. Students valued the choice. Mainly those students with high marks for a previous course, which had a similar pe-</td>
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<td>Waddoups, Gregory L; Hatch, Gary L; Butterworth, Samantha</td>
<td>Case 5: Blended Teaching and Learning in a First-Year Composition Course.</td>
<td>2003</td>
<td>Quarterly Review of Distance Education</td>
<td>4</td>
<td>271-278</td>
<td>Analyzes the blended learning environment in an introductory first-year writing course at Brigham Young University (Utah). The success of this course is compared with the traditional version of the course. The paper describes the process and outcomes associated with teaching and learning within a blended learning environment.</td>
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| Welker, Jan; Berardino, Lisa | Blended Learning: Understanding the Middle Ground between Traditional Classroom and Fully Online Instruction | 2005 | Journal of Educational Technology Systems | 34 | 33-55 | This article is about how two researchers are trying to comfortably and logically place blended learning somewhere in the middle of two extremes—traditional classroom at one end and fully online distance learning at the other end. Twenty-two faculty and 38 students at the State University of New York Institute of Technology (SUNYIT) responded to a survey on perceptions held about blended learning. Responses from faculty revealed enrollment as a major factor in the increased use of this course design; quality of assignments and course grades that are as good or better; and courses that are producing improved writing and discussions. While the design is easy to use, faculty reported more work on their part and some loss of traditional classroom dynamics. Students reported flexibility, convenience, and independence as advantages, along with confusion, reduced social interaction, and more work as disadvantages. However, there appears to be a net economic gain for students as tuition and financial aid remain unchanged while expenditure in time and travel are reduced. Course management technology and course design recommendations are provided for faculty consideration. The boundaries between traditional classroom instruction and fully online distance learning are blurring. As course design moves more toward a fully online look-alike, expectations for
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<td>Willem, Cilia, Martin Aiello, Antoni Bartolom</td>
<td>Self-Regulated Learning and New Literacies: an experience at the University of Barcelona.</td>
<td>2006</td>
<td>European Journal of Education</td>
<td>41</td>
<td>p437-452</td>
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<td>Yeh, Dowming; Lee, Chun-Hsiung; Sun, Pei-Chen</td>
<td>The Analysis of Learning Records and Learning Effect in Blended e-Learning</td>
<td>2005</td>
<td>Journal of Information Science and Engineering</td>
<td>21</td>
<td>973-984</td>
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This article summarises the findings from an evaluation of a Media Literacy course at the University of Barcelona. It focuses on some aspects of Self-Regulation and on the learning environment used by students. The students learning processes were embedded in an eLearning project, in which students analysed the representation of immigrants and ethnic minorities in the media. Key findings are the usefulness of this particular Technology-Enhanced Learning Environment (TELE), and its specific settings regarding Self-Regulated Learning (SRL). Students self-regulated their learning processes, in that they were working in a blended learning environment. However, their acquired media literacy skills seem to be fostered by the TELE rather than by the self-regulation mechanisms. Throughout the article, special attention is paid to the conceptual framework of digital and media literacy, and the specific competences related to them.

Some teachers adopt a blended learning model that combines traditional classroom teaching and an e-learning system. In this model, a teacher may teach the first few sessions in a classroom. After the students have established a general idea of the course, they can then proceed to online learning and interaction. This study aimed to discover the relationship between learning records and the learning effect in a blended e-learning environment through multiple regression analysis. The learning records considered included the grades for online assignments, reading time, the total number of login times, and the total number of online discussions. The learning effect was defined as the total grade for two monthly exams and one final exam. To collect learning record data, an e-learning system was designed that integrates the data collection functionality of learning.
activities with a teaching material managing module so that the learning records of all the learners are recorded automatically. With this system, an experiment was conducted on a program design course in a local high school. The results differed from those obtained in a 'pure' e-learning setting, and the online homework performance was the only item that significantly accounted for the learning effect, which is a natural result of learning procedural knowledge.
‘Blended Learning’ Cases

Introduction

‘BLENDED LEARNING’ CASES

The aim of this part of the handbook is to introduce several examples on how the Blended Learning approach is used in higher education in different countries. The cases are actual courses, modules and programs, where Blended Learning has successfully been integrated into the ordinary traditional curriculum. The cases cover examples not only from technological sciences, but also from humanities, educational and social sciences and life sciences.

The 14 case descriptions provide basic information about the topic, pedagogical aspects, use of technology, blending methods and evaluation of the outcomes for each case. There is also a link to additional information and contact details. Some of the cases are also described in more detailed way in the EPPS.

SELECTION OF CASES

The selection process for cases has been based on the “best practice” principle, so that each partner country has sent good examples of how traditional university courses and ICT have been integrated into higher education. As it can be seen in the theoretical part of this handbook, the definition of blended learning is not clear, and the practice is even more complex and multidimensional. Therefore, a more flexible and open approach was adopted in the case hunting, so that no strict rules and narrow definitions were used when defining what blended learning was and what something else was. The basic single characteristic common to all cases is that they all introduce a university level course or training module, where traditional face-to-face teaching, seminars and lectures are somehow integrated into the use of information and communication
technologies (ICT).

There were two obvious problems when hunting for the cases. First of all, blended learning is not a term commonly used in higher education settings, and in many places university teachers and professor actually use BL without knowing it. There is also a long history of distance education, especially at Open Universities, and even though DE is not the same as BL, the borderline between these modes of delivery is vague. Secondly, because BL is more or less a business life related term, universities are not really forerunners in blended learning applications, and therefore many of the innovations and good models which have been available in other fields of education for several years, have not yet reached the higher education.

OPEN MIND

The main purpose of these case studies is to encourage individual teachers, professors and faculties to experiment with ICT in an innovative way, so that also higher education organisations can benefit from the obvious advantages the new technology provides for teaching and learning. The first step can be as simple as adding an e-mail discussion list to traditional series of lectures, so that there will be more interaction between the lecturer and the students, as well as between the students. An ultimate, totally blended innovation could be for example a course where video conferencing, wikis, digital camera, mobile phones etc. are used to facilitate face-to-face research seminars where the students can be present either in person or virtually. Technology exists, and is also often already available at many universities, and at low cost (if not free).

The only obstacle – or excuse – for not using the modern learning technologies is usually the lack of imagination which is often disguised as lack of time, or lack of skills. The latter can often be easily corrected by asking help and support from the university learning technology unit (yes, there must be one at your university as well). And in the long run, a successful blending will give the teacher more time to focus on relevant parts of the teaching processes.
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Blended Learning Cases

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‘Blended Learning’ Cases
Best practices showcase
Data Analysis II (Finland)

Name of the case: Data Analysis II

University, department & country: University of Helsinki, Faculty of Social Sciences, Department of Mathematics and Statistics, Finland

Study context (level of studies, topic): Undergraduate; applied statistics

Target group: Undergraduate second/third year students in Social or Behavioural sciences

Description: The aim of the data analysis methodology course is to learn how to (1) analyse empirical data and to formulate, estimate and evaluate statistical models as data analysis tools, and (2) present research problems and results clearly using graphical methods and other statistical presentation tools. Course requirements include 60 hours small group instruction, part of which is lectures and guided practical exercises on computers. Students also prepare presentations of their exercises and write a report on the course assignment. The course gives 10 ECTS.

Pedagogical approach: The course is mainly based on constructive learning approach, more closely on cognitive constructivism. Detailed planning of teaching and learning activities is emphasised (Biggs 2003), and the active construction of information is the main process. Teacher's role can be defined as a pedagogical guide. Teaching is based on discussions and on questions raised by the students, on active solving of exercises, on shared workspace and on “traces” the students leave/present when they work on their exercises. The basic idea is to learn from others’ solutions and presentations, and to share the learning process.

Use of technology: Course website and BSCW – learning environment. All course materials are available on the website, including the students’ presentations and exercises, discussion groups.

Blending method: BSCW is integrated into the course very closely; main teaching method is still small group “lectures” which are based on discussions and questions, but BSCW include all materials, including data and presentations for student presentations. Therefore, the web is usually used as part of the f-t-f learning sessions as well (lectures, presentations), not only as an additional or separate tool. The estimated distribution of the use of different methods is: 30% of web based learning, 30% of f-t-f and 30% of individual work.

Outcomes and evaluation results: The use of web based learning environment has increased the students’ collaborative work and sharing of information and ideas. The learning outcomes are better than in the earlier non-blended format. The feedback from the students is good, and the use of the web has also reduced the work load of the teacher (more collective feedback on assignments, management, and change of role from
from teacher to one of the discussants).


**Links to additional information and references:**


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Information management and information systems development (Finland)

**Name of the case:**
Information management and information systems development

**University, department & Country:**
University of Jyväskylä, Department of Information Sciences, Finland

**Study context (level of studies, topic):**
Undergraduate; Information management and information systems development

**Target group:**
Undergraduate students in Information Sciences

**Description:**
The themes of the course Information management and information systems development are (1) administrative view to information resources management, (2) technological view to information resources management, (3) building information systems, and (4) organizational applications. The course was inspired by a textbook, Information Technology for Management: Transforming Business in the Digital Economy (Turban et al., 2002). The course usually lasts for seven weeks including lectures (36 hours), coursework (feasibility study) as well as the final exam. The blended course offered in fall 2005 also lasted this length of time and included the above-mentioned activities. In addition, there was material and activities on the WWW to support the lectures. The key idea is the learning of the basic concepts of information systems science by utilizing a problem-based seminar on the web. The idea is that students themselves find all the concepts and issues in the lecture material that they find unclear or not well-defined.

**Pedagogical approach:**
Constructivist, combining both cognitive and social constructivism as well as problem-based learning.

**Use of technology:**
Internet search engines, word processors, and the Optima learning environment

**Blending method:**
Optional problem-based seminar and support materials on the web, parallel to face-to-face lectures. Web-based learning environment (approximately 25%) supports the lectures (15%) and individual study (60%).

**Outcomes and evaluation results:**
The solution supports learning in various ways in the spirit of both cognitive and social constructivism. First, the students compose a coursework report focusing on the self-defined problems of the subject area. This is carried out by using search engines on the web as well as by publishing the report on the web. Secondly, in the web-based seminar students can familiarize themselves with other students' coursework reports.

Links to additional information and references:
http://www.cc.jyu.fi/~pmakkone/tjta111/

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University of Jyvaskyla FINLAND
Learning theories (Norway)

Name of the case:
Learning theories

University, department & Country:
Stord/Haugesund University College, Department of Teacher Education, Norway

Study context (level of studies, topic):
10 credits of the Master Degree course “ICT in learning”

Target group:
Teachers, teacher training students, developers & tutors of e-learning

Description:
In this module the students learn theories and methods related to the use of digital tools in learning. The central goal is the use and integration of ICT into education

Content:
• Main guidelines related to learning
• Memory
• Meta cognition
• Transfer of learning/knowledge
• Social learning

The different theories shall be related to practical situations and experiences.

Pedagogical approach:
The courses in the study program use:
• Local teaching and tutoring
• Net-based guidance
• Video transmission

Pedagogical approaches:
• Collaborative learning and constructivist learning
• Problem-based learning
• Project-based learning

All theories are related and adapted to teaching and guiding of both on-campus and off-campus students.
Use of technology:
The course is organised for both on-campus and off-campus students. To give an adequate study program to these groups, the study uses the Internet and Learning Management Systems to a great extent. Tasks that are carried out with these tools are:

- Distribution of material
- Broadcast of live and on-demand video
- Teacher-student and student-student interaction
  - Synchronous communication
  - Asynchronous communication
  - Guidance

Cooperation and collaboration

Blending method:
Classroom lecturing is a relatively small part of the course. This is broadcasted as live and on demand videos. Guidance is given related to the location of the students. On campus students are given guidance face-to-face, and off campus students are given guidance through email, learning management systems, synchronous communication like MSN and asynchronous communication like discussion forums. In practice it is seen that the on campus students also use the same tools as the off campus students to a great extent. Communication between students, in a group composed of on campus and off campus students, is also much based on synchronous and asynchronous communication tools.

Outcomes and evaluation results:
40 master students have completed the course, with a very low drop-out rate. The students have given overall, positive feedback to the teachers.

Links to additional information and references:
http://stud.hsh.no/lu/inf/master/ (in Norwegian)
http://www.hsh.no/english/ICT_in_Learning.pdf (in English)

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Global Environment and Development Studies – Development Management (Norway)

Name of the case:
Global Environment and Development Studies – Development Management

University, department & Country:
Agder University College, Faculty of Economics and Social Sciences, Institute for development studies, Norway

Study context (level of studies, topic):
Master of Science, Environmental Studies, Topic: Global environment issues

Target group:
African and Norwegian students with a relevant Bachelor degree, academic knowledge of English, interest for sustainable development

Description:
The objective of the study is to familiarize students with theories and findings concerning development, but also to offer managerial tools to practical problems. Solutions to problems are sought from a variety of disciplines, including economics and the functional areas of management, political science, sociology, anthropology, and geography. A wide variety of institutional contexts are considered, including local and international private business, non-government organizations, central and local governments, international and national regulatory and donor institutions. The students meet physically one or two times during the study program period of two years.

Pedagogical approach:
Mainly social constructivist approach

Use of technology:
Internet, Management Learning System, Video, CD-ROM

Blended method:
In the course of the two-year full-time study program, the students, professors and tutors meet twice, over a length of six weeks. In the two first weeks they meet to socialize; to have hands on training in using the LMS and to be guided into the social constructivist pedagogy used in virtual classrooms.

In the second period of four weeks the students, professors and tutors meet in South Africa. The first two weeks they have hands on training in the use of GIS. The rest of the period is used for field training interview techniques and research methods. The rest of the two years is collaborative online study. The so called system of quality assured study sites is used in the program. This means that 3-4 students in each country are offered their own computer rooms with computers and infrastructure at their ‘home’ campus. The students thus have opportunities to discuss the assignment informally before they enter the virtual classroom on the Internet.
**Outcomes and evaluation results:**
On completion of the course the participants should have the ability to:

- Present different views relating to the concept of development and current development issues
- Discuss the relationship between governance, aid and globalisation
- Describe and discuss critically problems relating to urban growth, small town development and the impact on rural areas.
- Give an overview of global population trends and discuss whether we have a population problem
- Discuss whether the concept of sustainable development has more relevance for the situation in poor or rich countries

The participant will gain / improve skills in:
- Collaborative work online and face-to-face with peers by sharing ideas; analysing problems; negotiate meanings; and finding solutions;

Exam results from the first year: Above average.

**Links to additional information and references:**
http://www.hia.no/oksam/english/mdevm/index.php3
http://www.gvu.unu.edu/prog.cfm

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**ICT in Learning (Norway)**

**Name of the case:**  
ICT in Learning (master's programme, 120 cr)

**University, department & Country:**  
Stord/Haugesund University College, Department of Teacher Education, Norway

**Study context (level of studies, topic):**  
Master's Degree Course, integration and application of ICT in learning

**Target group:**  
Teacher training students, teachers and developers of ICT based learning environments

**Description:**  
The central goal of the course is the use and integration of ICT in education. It is not a course in technology and in learning theories as separate disciplines. The study is based on ideas from similar studies for ICT and learning in other countries. It has its roots in teacher education and composes the fourth and fifth year of a five-year complete course leading up to a teacher certificate and a Master’s degree in ICT in learning.

**Pedagogical approach:**  
The courses in the study program use:
- Local teaching and tutoring
- Net-based guidance
- Mandatory seminars in which all the students meet physically at the university college (may be arranged as virtual (video) seminars)

Different courses in the master study are based on pedagogical approaches relevant for the course content. Applied theories and models are:
- Collaborative learning and constructivist learning
- Problem-based learning
- Project-based learning

All the theories are related and adapted to teaching and guiding of both on campus and off campus students.

**Use of technology:**  
The course is organised for both on-campus and off-campus students. To give an adequate study program to the groups, the study uses the Internet and a Learning Management System to a great extent. Tasks that are carried out with these tools are:
- Distribution of material
- Broadcast of live and on-demand video
- Teacher-student
• Synchronous communication
• Asynchronous communication
• Guidance
• Cooperation and collaboration

**Blending method:**
Teaching in auditorium or classroom is a relatively small part of the course. This is for some of the courses broadcasted as live and on demand videos.
Guidance is given related to the location of the students. On campus students are given guidance face-to-face - as well as via the Internet, and off campus students are given guidance through email, learning management systems, synchronous communication like MSN and asynchronous communication like discussion forums. In practice it is seen that the on campus students also use the same tools as the off campus students to a great extent.
Communications between students, in a group composed by on campus and off campus students, are also much based on synchronous and asynchronous communication tools.

**Outcomes and evaluation results:**
20 students have graduated so far, with good results

The results of the online evaluation questionnaires to students at the end of individual courses are generally positive, but the revision of content, methods and technology is required. A revised version of the master program will start in August 2007.

**Links to additional information and references:**
http://stud.hsh.no/lu/inf/master/ (in Norwegian)
http://www.hsh.no/english/ICT_in_Learning.pdf (in English)

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**Internet Publishing (Norway)**

**Name of the case:**
Internet Publishing

**University, department & Country:**
Sør-Trøndelag University College, Department of Informatics and e-Learning, Norway, teacher: Svend Andreas Horgen

**Study context (level of studies, topic):**
Preliminary studies in Internet technology, a course teaching HTML and JavaScript, and overview over Internet technologies in general.

**Target group:**
First year students studying Informatics/Economics

**Description:**
I have been using e-learning techniques to enhance student activity in class. Instead of using lectures in an auditorium, I have been using a PC-lab. This has enabled switching between theory and practical exercises. I have also been using a LMS system in order to further enhance the blended learning experience. Here is a short list of the activities/outlines used:

- Evaluation forms with questions to be filled in by the students before the theory is taught. Benefit: Student enters learning mode and will likely learn more and be more active during the theory lesson to come.
- Theoretical walkthrough, 15-20 minutes
- Multiple choice questions or some other practical exercise, also using the LMS this time.
- Another lesson with theory, 15-20 minutes
- A 20 minutes' long break.
- First, another evaluation asking them to answer with free text some things that were lectured on some minutes before. This provides helpful information for me as a teacher (while the students enjoy their break) to gain information about the students misconceptions or knowledge gaps.
- And so on...

I have also tried another interesting thing: Per Borgesen (my colleague) and myself have had a dual-lecture – where we both spoke on different things (alternating) and we felt free to interrupt each other and comment on each other. In this way, the lecture was not so staccato, and it was easier to maintain a dialogue with the students. The downside, of course, is that we both needed to be present. Even through we used twice the time compared to a single teacher lecture, the students got extra motivated when we both lectured simultaneously. It should be noted that we only did this exercise in the first and in the last lecture each semester (in this course), so it is not too time exhausting!

I have also tried the use of podcasts – that is: downloading podcasts from IT-news or other relevant material, and then typically:

- playing the podcast for 5-10 minutes
- discussing the podcast in small groups for 5-10 minutes – what this was about and how it is related to the theory.
- Summary from me/the students in plenary for 5-10 minutes.
Pedagogical approach:
Described in detail above.

Use of technology:
LMS-system, PCs for each student, speakers (for podcast-usage)

Blending method:
I think I have already described this above in as much detail as necessary.

Outcomes and evaluation results:
Informal evaluation indicates that the students welcome this form of education. It is also good because those who cannot join the lecture can gain access to all the digital material from the LMS. They only miss the lecture and my “speaking”.

Links to additional information and references:
In Norwegian:
http://www.aitel.hist.no/~svendah/FoU/PPT/horgen-blended-learning-steinkjer-oktober-2006.ppt

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Mathematical Programming (Lithuania)

Name of the case: Mathematical Programming

University, department & Country: Vytautas Magnus University, Department of Applied Informatics, Kaunas, Lithuania

Study context (level of studies, topic): Program of undergraduate studies (fourth year of studies). Mathematical Programming

Target group:
The students of departments of Informatics, Economics, Engineering and Applied Mathematics are meant to be the primary users of the course.

Description:
The course combines theoretical and practical spheres, but is more oriented to practical task solution in purpose so that the student would learn to formulate practical optimization tasks which are based on mathematical terminology, would be able to establish the chosen model’s suitability and complexity would be able to choose a suitable algorithm appropriate for practical and mathematical formulated task solution, would be able to understand the optimization’s results, would be able to advise others on questions connected with optimization methods and software.


While designing the course a lot of attention was paid to accumulative experience in science analysis in the optimization sphere teaching of similar disciplines was also used as an example.

Pedagogical approach:
The course was prepared under the strong influence of methodology of Project Based Learning (PBL). While developing the course many similar courses of different universities were analysed and discussed with the colleagues. Required courses in manufacturing systems and simulation build upon these skills and provide engineering design experiences.

Traditional teaching is combined with problem based, project based and discussion based learning.

Students study the theoretical part independently and sometimes attend lectures, they can also take online lessons (there they can find records of the lessons). During the discussions they must discuss the topic suggested by the professor during the lesson or which is uploaded onto the webpage.

All the assignments are compulsory and the deadlines of the projects (it is on the electronic calendar) and assignments can be found on the same webpage. Here is also available the schedule of the lessons and the consultation time with the assistant or the professor.

Use of technology:
1. The instructions of practical work are presented on the WWW home page of the course. Some illustrative materials and
examples of problem solutions, prepared by students, are also available on the home page as well as advanced theoretical material (e.g. lectures by Prof. J.Clausen) and references to software.

2. An electronic dictionary is also available with links for wider information.
3. Discussions forums
4. E-mail for contacting the professor
5. Videoconferencing for online lessons
6. Virtual learning environment (FirstClass)

**Blending method:**
Blended Learning: combining both - traditional lectures (face-to-face) (15 lessons, each of the lesson takes two hours) and seminars plus distance collaboration with the students (discussions’ forums, online questionnaires, videoconference meetings online, students can find all the material in the virtual environment, they also put their projects, laboratory, other homework in the virtual environment under their passwords) (52 hours are given for an individual assignment and the students have 15 lessons in the laboratory class, each of it takes two hours), and they use technologies to communicate and to exchange information, assignments and assessments.

**Outcomes and evaluation results:**

**Links to additional information and references:**
Suggested books in electronic format:
1. Antanas Žilinskas, Matematinis programavimas (pdf and html formats, in Lithuanian);
2. Benny Yakir, Nonlinear optimization (pdf format);
3. Jonas Mockus, Global and discrete optimization (html format);

Website for taking and putting information for studies:
http://fcim.vdu.lt/Conferences/F00017C98/F00052D02/?WasRead=1

The dictionary of the main concepts with the links to wider manuals:
http://mathworld.wolfram.com/

Also additional material for the course:
1. Žilinskas A. Matematinis programavimas. VDU, 1999.

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Requirements specification (Lithuania)

Name of the case:
Requirements specification

University, department & Country:
Kaunas University of Technology, Department of Software Engineering, Kaunas, Lithuania

Study context (level of studies, topic):
Study Area of Technological Sciences. Study module ‘Requirements specification’ is for Master students who study Software Systems Engineering and it is one of four research modules. Further modules of the program are ‘Analysis of Software Systems architecture’, ‘Information technologies in project management’, ‘Software implementation investigation’.

Target group:
Master students from the Faculty of Informatics.

Description:
The main attention is paid to requirements analysis and specification (modules ‘Software Requirements Analysis’ and ‘Simulation and Validation of Systems’). In such a way Master students already study methods and tools of the requirement analysis at the beginning of the study program and afterwards they can use the acquired knowledge to form the requirements specification of the objective area under computerization according to the Master thesis. Two courses that generalize software engineering area – ‘Software Engineering Process’ and ‘Software Engineering Management’ – are delivered together with the above mentioned courses; these courses are aimed at expanding and deepening knowledge acquired during Bachelor studies. During project development students familiarize with the standards, prepare proposals, plan and requirement specifications of the project. Main topics are: Software requirements document; Requirements evolution; Problem analysis; System model description; Data modelling; Functional and non-functional requirements; Using of prototypes for requirements specification; Development of software requirements document.

Pedagogical approach:
A combination of theoretical knowledge and practical skills in order that students could design and produce software systems efficiently which fulfil the users' and clients' requirements, teach to evaluate, analyze and simulate software system quality factors in order to ensure a disciplined and controllable development of a software system. E-learning is widely used during the studies. Studies management information is public and available on the Internet. The main principle of the study system is the wholeness of science and studies and design skills training, based on the student’s systematic and autonomous work. The importance of practical design is especially highlighted. In other words, the main principle is teaching by designing. So, from the viewpoint of pedagogical approach it is project-based and problem-based learning.

Use of technology:
1. Website (http://soften.ktu.lt/~virga/mag_atmintine). Project themes, document templates, examples, standards, requirements for deliverables, schedules, requirements for skills, project and software quality requirements are uploaded there, as well as assignments’ deadlines and material needed for the course and preparing the assignments.
2. Information system created by each student individually at the beginning of the course, where it is mandatory to store all the required documents and assignments that the student does. Such information management systems are private; they can be accessed only by means of passwords as this is required by the majority project customers.

3. E-mail, seminars are used for the communication with the professor.

4. Master studies’ problems are discussed in the online forum http://proin.ktu.lt

**Blending method:**
Traditional lectures and seminars plus distance collaboration with the students, also usage of technologies to communicate and to exchange information, assignments and assessments.

**Outcomes and evaluation results:**
The aims of the evaluation are: to recognize those strategies and techniques which proved effective during the course of the project so that their use may be reinforced or expanded; and to identify areas in the process and product that need to be improved in the next project.
The benefit of evaluating a software project is greater understanding of the software project organization, software development organization and people that are involved. This understanding is essential for the ability to perform software process improvements.

After finishing four modules:

- The average grade for the project quality stated by Master project tutors is 9.72;
- Master students evaluated their projects on an average of 8.33;
- The average grade for the Master project tutors’ consultations stated by the students is 8.28;
- The average grade for Master project design process arrangement stated by the students is 7.71;
- 43% of students referred the number of Master project deliverables as too large, 57% - as sufficient and no student referred this number as too small.
- The average grade for the Master students’ work in the enterprises stated by practice tutors is very high – 9.93;
- Only 76% of students consider the practice as useful for their skills development;
- The practice place corresponded to the Master project topic for 62% of students.

**Links to additional information and references:**
Methodical material for “Project Management”: http://proin.ktu.lt/~kestas/Proj_vald/Kepure.html (in Lithuanian)
Software Engineering Standards: http://soften.ktu.lt/~virga/mag_atmintine/1sem/standartai.htm
Other literature: http://soften.ktu.lt/~virga/mag_atmintine/interneteka.html

Also there are many examples and advice how to do practical works.

Further literature in English:
1. I.Sommerville. Software Engineering. Addison-Wesley, 4,5, 6 editions

etc.

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Name of the case: Organic chemistry

University, department & Country: Tallinn University, Department of Natural Science, Estonia

Study context (level of studies, topic): Bachelor-level introductory course in organic chemistry

Target group: Second-year students specialising in biology and having chemistry as minor specialisation subject

Description: The aim of this course is to introduce the basic principles of organic chemistry and give an overview of the most important organic compounds. The practical section introduces the principle techniques used in analysis, purification and synthesis of organic compounds. The knowledge of organic chemistry is required for studies of bioorganic chemistry, biochemistry and environmental chemistry.

Pedagogical approach: Because of the high level of abstraction of the subject matter it is difficult to implement active learning methods (like discussions, role plays and online collaboration) in this course. This is why the course is mainly based on individual assignments. As an E-learning environment, the IVA forum is used for discussions about the practicum experiments. The students have an opportunity to compare their results and discuss why some experiments were successful and others were not. The students must write a written term paper that will be peer-reviewed by the fellow students. Every review must have a different approach.

Use of technology: Most of the functionalities of IVA LMS are used in the course: blog, discussion forum, individual and group portfolios, quizzes, wikis. Computers were also necessary for presentations and getting literature. In order to pass the course successfully, the students had to use the free molecular modelling software, MDL Isis Draw which was possible to download from e-learning environment IVA. Text-, video- and software installation files are provided on CD-Rom for each student who does not have fast access to the Internet. The students had a possibility to ask the instructor for technical help, the IVA user manual was also helpful.

Blending method: The organic chemistry course is partly Web-based, a significant amount of learning activities takes place in IVA Learning Management System. It is suitable for the students who study at university, but also for people whose work is connected with this subject and they need some extra knowledge. Participation in the course requires knowing a lot of facts and it is also important to have abstract thinking and a good memory.
The course is a combined course, there are one and a half hour lectures (introductory, materials were in learning management environment IVA), three hour seminars (presentations and other students’ reviewing) and practicums of 34 hours (in chemistry it is not possible to do chemistry practicums in a Web-based format).
The learning resources are mainly in .pdf format or presentations. A lot of colourful illustrations, schemes, diagrams were used – it makes printing difficult for students. Students receive a CD-Rom with videomaterials.

Outcomes and evaluation results:
The course has been offered twice so far and both times it was quite successful. Last year there were 26 registered students and 24 of them passed. In order to get marks, the students must take two short Web-based tests (10%), one short term paper (10%), and they must prepare a presentation (10%). In addition students must defend their laboratory protocols (15%) and to do a written test about the laboratory protocols (15%) and finally must do a school-based written test (40%). Active learning in the IVA environment might have a good influence on the students’ grades.

Links to additional information and references:
http://iva.thu.ee/IVA
user: DEMO
password: DEMO

Contact person (name, email, telephone):
Rando Tuvikene
Tallinna Ülikool
Narva mnt 25, 10120 Tallinn
rantuv@tlu.ee
6 409 405
Fax: 6 409 418
GSM: 555 88 222
Ethno music (Estonia)

Name of the case:
Ethnomusic

University, department & Country:
Tallinn University, Department of Arts, Chair of Music, Estonia

Study context (level of studies, topic):
Master studies in musical education

Target group:
Students of MA program “Musical education” (joint groups for distance- and on-campus students). Course can be taken (and quite often, is taken) by students of other faculties as an elective course.

Description:
The Ethnomusic course is about the culture of the near-neighbours’ (Latvia’s, Lithuania’s, Ukraine’s, Finland’s, Sweden’s, Norway’s, Asian and American nations’) music, especially folk music and -culture focusing not only on music, but also on the text, images and videos. The rich collection of online digital learning resources is useful for the students, because they are always accessible and can be re-used by learners during their professional practice. The course serves as an example for music teachers, by demonstrating how the ethnomusic topics can be taught in more interactive and reflective ways in primary schools. The aim is that the students become able to analyse didactical aspects of teaching folk music traditions and then use them in work with children. The students will also know the character of the neighbours’ folklore and can identify the peculiarities of folk music of different nations through the analysis of musical actions. The students can use computer as a learning, communication, authoring and presentation tool.

Pedagogical approach:
Comparative approach to cultural studies is combined with social-constructivist pedagogy.

Use of technology:
Most of the functionalities of the virtual learning environment IVA (except wikis) are used in the course: forums, blogs, access to digital learning materials, submission and grading of assignments. Computers are also necessary for presentations and getting literature.

Blending method:
In individual tasks the students must work through the literature and the material of the lectures. They also must prepare a presentation about one nation’s music (it must be in IVA learning environment or in the form of .ppt /reported speech/ portfolio) and solve some web-based tasks (crosswords and fill-in texts) and participate in discussions. The course ends with two tests. (e.g. in Latvian and Lithuanian music) 75% of the course is web-based and work takes place in IVA learning environment.
Outcomes and evaluation results:
All the 12 students who started the course last year finished the course. For getting a mark, the students must be present at least 50% of the theoretical classes, practical lessons must be done later in practicum, individual studies must be done, and it is also important to participate in discussions.

Links to additional information and references:
Course was chosen e-course of the year 2004 for using the multi-media (http://www.e-uni.ee/index.php?main=148)
Learning resources are in learning environment IVA (http://iva.htk.tpu.ee)

Contact person (name, email, telephone):
Tiina Selke
tiina.selke@mail.ee
Name of the case: Educational Technology

University, department & Country: Tallinn University, Department of Educational Sciences, Estonia

Study context (level of studies, topic): It is an introductory course about educational technology for Master students.

Target group: The group consists of at least 10 students, most of them come from Educational Science and Educational Management MA programs. The course has entry requirements: the students must do the introductory computer literature course.

Description: The course belongs to the domain of didactics, focusing on the aims and methods of information technology in the educational process. The objective of the course is to develop competence in development of digital learning materials and uploading them on the Internet, learning and teaching in a Web-based environment, development of multimedia presentations and Web-pages etc. The course covers the following theoretical topics: basic concepts in educational technology, computers in Estonian schools – history and present status, ICT in educational policy, didactics of using ICT in learning, an overview of educational technology research carried out in Estonia, ICT and media competency standards in the national curriculum, methods for using computers and the Internet in subjects, integrated learning projects based on ICT.

Pedagogical approach: The course is based on constructivist approach, students learn by creating (knowledge) artifacts by themselves (both individual and group tasks), but also by reflecting on their experience and reviewing the work of fellow students.

Use of technology: All face-to-face activities are carried out in a computer lab, each student is provided with a computer. Only open-source software is used for assignments: OpenOffice, Audacity, Wink, Mozilla Composer. Learning Management System IVA is actively in use, most of the discussions and reflections are carried out with the help of blog and wiki tools in IVA environment.

Blending method: The course is worth 3 credits, and the course has 32 hours of face-to-face activities instead of 48 which would be typical for a normal course. Blending e-learning with traditional forms and methods is performed in two ways on this course: most of the face-to-face activities are carried out in a computer lab in a form of frontal, synchronous e-learning and another important part of the learning activities are carried out in the virtual learning environment IVA.

Outcomes and evaluation results: Only one student out of 15 did not finish the course last year. In order to get a grade, it was required to write an essay (15% of grade), to complete the final quiz (15%), to prepare an ICT strategy for the student’s own school (30%), to plan an integrated e-learning
project, to develop a set of digital learning resources, to make a presentation of a personal e-portfolio (20%). Students, who did not prepare and present their e-portfolios, were not able to get a higher grade than D. Portfolio development was important because it was not done only for one course, students were supposed to keep developing it further during their school practice and so the facilitator could have an opportunity to see what the students do, what they learn, when the course is over.

**Links to additional information and references:**
http://iva.tlu.ee/IVA
user DEMO
password DEMO

**Contact person (name, email, telephone):**
Sirje Klaos
sirje.klaos@tlu.ee
Project planning and management (Estonia)

Name of the case:
Project planning and management

University, department & Country:
Tallinn University, Department of Social Science, Estonia

Study context (level of studies, topic):
The course is designed for MA studies in public administration, but it has been very popular also among the students of other faculties, as project management has become one of the most popular minor subject at the university.

Target group:
The course is mostly meant for Master-students, but usually Bachelor students can join the course as well. The secondary (and quite large) target group consists of the clients of the Open University, who can just take this course for their professional development purposes. The course can be (and have been) provided also by some companies in the form of internal training for their employees.
The group is large, the last group consisted of 50 distance students and 75 on-campus students. There were 15 students in the pilot course.

Description:
The course provides an overview of the specific topics of project work, participants gain practical experience in planning and managing projects by implementing the methods of project work and compiling a project plan. The aim of the course is to develop the students’ skills to independently prepare, plan and implement projects, and thereby to improve their competitiveness in the labour market.
Covered topics: The concept of project, types and history. The structure of project organisation. The phases, inputs and outputs of a project. Identification phase: problem analysis, development ideas. Preliminary study: market-research, risk analyses, swot-matrix. Formulation of project objectives. Project proposal, competition. Planning phase and compiling the plan: developing the activity schedule, the budget, planning the human resources and the quality management system. Planning communication, information and co-ordination systems, leaderships strategy and management tactics. Implementation phase. Evaluation phase: analysis, evaluation, compiling the final report. Project management software.
Time management is the main focus of the course. The students must create GANTT and Pert diagrams using MS Project.

Pedagogical approach:
The course is heavily based on collaborative learning. LMS IVA enables to evaluate group work assignments and individual contributions. Group tasks are not important only for collaborative knowledge building purposes, but because of the nature of project work in general – projects are almost always collaborative and that is why, the practical experience of collaborative working is important. Feedback shows that this course offered the only possibility for the students to do collaborative assignments during their studies because most of the (e-learning) courses rely on individual work.
The groups consist of 4-6 students and they use group portfolios in IVA LMS. They have a shared folder for presenting their assignments for the teacher to evaluate. Wikis, text memos and upload files in IVA are used by the students.
Informal group communication, that others cannot see, takes place through emails or MSN conversations or in IVA forum. Unfortunately, there is no chat room in IVA.

Use of technology:
Most of the face-to-face activities are carried out in a computer lab, learners are expected to use computers at home in order to contribute to online collaboration of their project group using IVA LMS. There is an evaluation copy of the project management software to download from IVA LMS, the students must use it for their assignments. Online collection of digital learning resources contains mainly diagrams and examples created by MS Project software. The interactive tutorial of MS Project software is also available.

Blending method:
There are five contact days during a semester, it is obligatory for every student to participate in at least three contact days. Every student must read the online textbook of project management and also one book chosen by herself/himself.

Outcomes and evaluation results:
All the collaborative and individual assignments are presented publicly, so the students can learn from each-other (benchmarking method). Once-twice the students were supposed to evaluate other groups’ work, using the evaluation sheets of European Commission, which gives them evaluating experience and is good for writing the project proposal. As the course has a practical value, there are no tests. Also in IVA, participating in the forum is not evaluated. 70% of the grade is ready project plan. 5% of the grade is homework and group work and about 20% of the grade is activity. Theoretical knowledge is checked in an oral presentation of the project plan. Almost all registered students have passed the course with good results

Links to additional information and references:
http://iva.htk.tlu.ee/organizer_index
user AastaKursus05
password AastaKursus05

Contact person (name, email, telephone):
Sigrid Salla
sigrid.salla@tlu.ee
Study Aids in Vocational Education (Estonia)

Name of the case:
Study Aids in Vocational Education

University, department & Country:
Tallinn University, Educational Sciences Department, Estonia

Study context (level of studies, topic):
Aim of the course is to provide an overview of teaching aids and their role in the process of study. It is a main course for Bachelor students.

Target group:
The target group of this course is the second-year Bachelor students in vocational pedagogy. Actually, the course is provided separately for two different target groups: for the regular BA students and for the distance education students. The latter group usually consists of experienced vocational education teachers who need a teacher’s qualification. The number of students depends on the student intake and drop-out, but usually the average group size is about 25-30 students. The course is compulsory for all the BA students specialising in vocational pedagogy. The students from other faculties and departments can choose this course as well, but until now it has not happened.

Description:

Pedagogical approach:
Although there is no clearly defined pedagogical approach for the course, the course setup and the activities follow the pattern similar to experiential learning – the students are expected to experiment with different tools and tasks, then to reflect on their actions.

Use of technology:
During the course, mainly open source and free software is used:
- Acrobat Reader
- HotPotatoes
- Audacity
- eFormular
- Web-based learning environment IVA

Blending method:
About 50% of time spent by the students on learning activities is allocated for distance learning activities in virtual learning environment IVA. About 25% of the study time is spent on face-to-face activities, which are equally distributed between lectures,
individual and collaborative tasks in a computer lab.

**Outcomes and evaluation results:**
The completion rate of the course has always been high; most of the students become deeply engaged in learning activities. As some of the students have said, they were very pleased with the course, because they had the possibility to learn to use the software and technical equipment which are difficult to learn on their own. Students also mentioned the possibility of having contact with the lecturer that made it easier to do the course.

**Links to additional information and references:**
http://www.tlu.ee/~heidi/HotPot  
http://www.tlu.ee/~heidi/Audacity  

**Contact person (name, email, telephone):**
Heidi Paju  
heidi.paju@tlu.ee
Physics of Dynamical Systems - (Portugal)

Name of the case:
Physics of Dynamical Systems.

University, department & Country:
University of Porto, Faculty of Engineering, Portugal.

Study context (level of studies, topic):
Undergraduate; physics, mathematics.

Target group:
This is a main course for undergraduate students of second-year informatics and computing engineering.

Description:
Number of students: 120
Number of teachers: 2  Jaime Villate and João Carvalho
Number of tutors (+tutors tasks during the course delivery): 0
- Second-year students in Informatics and Computing Engineering
- 2 lectures and a 2-hour practical session per week
- Contemporary physics topics: non-linear dynamics, chaos and fractals.
- Hands-on approach using Personal Computers
- Learning Management System (LMS): Moodle
- Computer Algebra System (CAS): Maxima

Pedagogical approach:
Active learning with hands-on tutorial sessions in a computer lab.
The Web interface with the Moodle LMS is the course page. It contains some menus and blocks. The content and activities specific for the course are arranged by sections into the main content block.

Use of technology:
LMS Moodle, in particular usage of
- Forums,
- Chat,
- assignments,
- quizzes,
- glossaries
and CAS software (Computer Algebra System Maxima) to support lecture parallel activities and hands-on sessions in computer lab.
Blending method:
Twelve weekly hands-on sessions are held in rooms with 12 computers, with 2 students working on each computer. The students will find the summary and proposed problems for each session in a section of the Moodle course page. They will use Maxima to solve the proposed problems, and by the end of the session they will submit their results in Moodle. Teachers will find the files sent by each group of two students, and will enter some comments which are then e-mailed to the students and archived in the Moodle server where the students can find them later on.

Outcomes and evaluation results:
Grades improved considerably, with respect to the traditional course on Classical Mechanics (on 2001/02), the number of enrolled students that did not attend the course (Absent) decreased from 34% to 14%, the number of students who passed increased from 43% to 94% and the number of students who attended the course but failed decreased from 47% to 13%.
The number of enrolled students who decided to attend the course also increased significantly, reflecting a better motivation of the students.
The development of the blended-learning components for this course was awarded by the University of Porto with the first edition of the E-Learning Excellence Award.

Links to additional information and references:
Course website (LMS Moodle):

Course website (Information System SiFEUP):

Articles and other references:
http://www.fe.up.pt/si_uk/PUBLS_PESQUISA.FORMVIEW?p_id=11634&p_tipo=Relat

Course literature:

Contact person (name, email, telephone):
Jaime Villate
villate@fe.up.pt
Long case descriptions
COURSE DESCRIPTION

Name of the course: 
Internet Publishing

University, Department, Country: 
Sør-Trøndelag University College, Department of Informatics and e-Learning, Norway, teacher: Svend Andreas Horgen

No of ECTS: 
(Norwegian study points = ECTS)

Language: 
Norwegian

Area of science: 
Informatics

Level of studies: 
introductory, bachelor first year.

Course type: 
lecture + laboratory

Course description: 
Preliminary studies in Internet technology, a course teaching HTML and JavaScript, and overview over Internet technologies in general.

Course literature: 
lesson, internet resources (optional use of book: Sams teach yourself HTML in 24 hours)

Additional materials: 
multiple choice tests, exercises

Course website: 
User: svendhorg
Password: Blearn123
Course name: Publisering på Internett 07V.

Number of students: 
30
Number of teachers: 2
Number of tutors: 0

PEDAGOGY

Learning objectives:
Be able to make Internet Pages, and understand basic underlying technologies.

Pedagogical approach:
Mostly individual learning, traditional teaching and practical exercises. The blended learning approach means some elements of collaborative learning, but traditionally this course has been a “teacher holds a 2 hour lecture, and you as a student solve a programmatic exercise (with assistance available if needed)”. My new variation, is now a 3-3.5 hour lecture with strong involvement of student activities, using blended learning as described in this document.

Innovative elements:
Use of podcast, blended learning (LMS real-time) to increase student activity, and motivation, and some lectures with dual-teaching (two teachers collaborating “on stage”, holding the lecture together).

Main pedagogical references:
N/A

TECNOLOGY

Use of technology:
LMS (it’s learning)

Description of how technology is used:
described later. Speakers to enable the students to listen to podcasts, and every student needs a PC available.

Justification of technology use:

Innovative elements:
Enhances learning since the digital resources opens new possibilities for me as a teacher to communicate with students. It is easier to ask a (good) question if you can think for 1 minute, then to write it down in an LMS survey, and submit to the teacher, which immediately can answer the questions. I think this is innovative, and does not necessarily create a distance between students and student-teacher. Podcast usage is also innovative, but if I read loud from some webbased article, it could yield the same effect. However, it is important that the students can get to know the many good news-sources (especially podcasts) out there. It will maybe inspire them to listen to quality podcasts on the bus, instead of just music.
**BLENDING METHOD**

**Detailed description:**
I have been using e-learning techniques to enhance student activity in class. Instead of using lectures in an auditorium, I have been using a PC-lab. This has enabled switching between theory and practical exercises.

I also used an LMS-system in order to further enhance the blended learning experience. Here is a short list of one of the activities/ outlines I have been using:

- Evaluation forms where the student should answer questions before the theory was presented. Benefit: Student enters learning mode and is likely to learn more and be more active during the theory lesson to come
- Theoretical walkthrough, 15-20 minutes
- Multiple choice questions or some other practical exercise, also using the LMS this time.
- Another lesson with theory, 15-20 minutes
- Then there will be a 20 minutes long break.
- First, another evaluation asking them to answer in free text some topics that have been lectured some minutes ago. This provides helpful information for me as a teacher (while the students enjoy their break) to gain information about students misconceptions or knowledge gaps
- And so on...

I have also tried another interesting thing: Per Borgesen (my colleague) and I have had a dual-lecture – where we both speak alternating, and we feel free to interrupt each other and comment on each other. In this way, the lecture is not so staccato, and it is easier to maintain a dialogue with the students. The downside, of course, is that we both need to be present. Even tough we use twice the time compared to a 1-teacher lecture, the students are extra motivated when we both lecture simultaneously. It should be noted that we do this exercise only the first and last lecture in each semester (in this course), so it is not too time consuming!

I have also tried the use of podcasts – that is: downloading podcasts from IT-news or other relevant material, and then typically:
- 5-10 minutes playing the podcast
- 5-10 minutes discussing the podcast in small groups – what was this about and how is it related to the theory?
- 5-10 minutes summary from me/the students in plenary.

Please also describe,...
1. How is the Content presented. If possible, estimate also the proportions in percentages.
   - Face to face lectures .....%  
   - PowerPoint presentations ......%  
   - Electronic materials in web, LMS, full text or slides......%  
   - Video streaming, archived video lectures, video conferences......%  
   - Audio streaming, archived audio lectures......%  
   - Animations......%  
   - Graphs, illustrative figures and images......%  
   - Integrated solutions (slides in combination with audio or video) .....%  
   - CDs, DVDs......%  
   - more: Podcast content, multiple choice tests
2. Which of the following sections of the course are managed web-based:

- Communication
- Group Study
- Study guide presentation
- Content presentation
- Feedback, technical support, course assistance
- Administrative information (contacts, requirements, expected learning results, etc)
- Assignments
- Assessment
- Tests
- Self-tests
- Self-evaluation
- Additional materials

**DESCRIPTION OF STUDY PROCESS**

Please list the learning activities (methods) and their order/arrangement during the course delivery:
Please describe 2-3 main learning activities in detail. *Suggested frame for learning activity (method) description*

I have already described this in the “detailed introduction” box, but can add the following picture to illustrate:

![Learning Activity Description](image)

**Figure:** A typical “blended session” lesson. First the students get to read a large text (some days in advance) and then they get a teaser – motivation for the theory of today. This is a link to a web-article of relevance. A note, “Dette sier Jakob” also has some text (here: Jakob Nielsen’s views on a study that indicates that people use 50 ms to evaluate a new web-page). After that, a Powerpoint can be downloaded. In the Powerpoint, some information is stripped. I as a teacher open the (inactive) last element (bottom). It is a Powerpoint with all information. Hence – students can fill in the missing information. During the Powerpoint show, I as a teacher also come up with examples, tasks, jokes etc, possibly a podcast. Finally, they can evaluate their own efforts today. This is a typical excerpt, but the structure varies from time to time.
Desired outcomes: Increased student reflection, activity, learning and communication. Instructions: None needed except that I tell them what to do next.

**Assessment** of learners, forming of final score (indicate the percentage):

- Active participation in course (both web-based and face-to-face) .....%
- Participation in forums......%
- Participation in seminars......%
- Submission of individual assignments......%
- Participation in group assignments......%
- Submission of tests......%
- Participation in contact days......%
- Exam/ final assignment.....%

**OUTCOMES AND EVALUATION**

**Outcomes and results:**
Informal evaluation indicates that the students welcomes this form of education. It is also good because those that cannot join the lecture, can gain access to all the digital material from the LMS. They only miss the lecture and my “speaking”.

Evaluation results (describe evaluation results, if a proper evaluation of course quality and outcomes have been done)

General evaluation of the course (write a general evaluation of the case)

**CONTACT INFORMATION**

**Links to additional information**
In Norwegian:
http://www.aitel.hist.no/~svendah/FoU/PPT/horgen-blended-learning-steinkjer-oktober-2006.ppt

**Contact person (name, email, telephone):**
Svend Andreas Horgen, svend.horgen@hist.no, http://aitel.hist.no/~svendah and http://gjemmesiden.blogspot.com
COURSE DESCRIPTION

Name of the course:
ICT in Learning (master's programme)

University, Department, Country:
Stord/Haugesund University College, Department of Teacher Education, Norway

No of ECTS:
120

Language:
Norwegian

Area of science:
Education and ICT

Level of studies:
Master

Course type:
On-line and auditorium lectures, practical ICT-lab work, projects

Study context:
Master Degree Study, integration and application of ICT in learning

Target group:
Teacher students, teachers and developers of ICT based learning environments

Course description:
The central goal of this study is the use and integration of ICT in education. It is not a series of courses course in technology and in learning theories as separate disciplines. The whole study is based on ideas from similar studies for ICT and learning in other countries. It has its roots in teacher education and composes the forth and fifth year of a 5 year complete study programme leading up to a teacher certificate and a Master degree in ICT in learning.

The study consists (2006) of 8 courses over 2 years
• Learning material (existing, general) (10 cr)
• E-learning (20 cr)
• Development (of material) (20 cr)
• Learning theories (10 cr)
• Research methods (10 cr)
• Data collection, storage, retrieval (10 cr)
• Didactic research (10 cr)
• Master thesis (30 cr)

(to be revised in 2007):  

Course literature:

Additional materials:  
Learning material distributed via Internet
Course website:
http://stud.hsh.no/lu/inf/master/
General access to the chosen LMS (Fronter) is necessary for learning activities

Number of students:
40

Number of teachers:
7

Number of tutors:
6

PEDAGOGY

Learning objectives:
The students shall learn theories, technology and methods related to use of digital tools in learning. The use and integration of ICT in education is a central learning objective

Pedagogical approach:
Different courses in the master study are based on pedagogical approaches relevant for the course content. Applied theories and models are:
- Collaborative learning and constructivist learning
- Problem based learning
- Project based learning
The courses in the study program uses:
- Local teaching and tutoring
- Net based guidance
- Mandatory seminars where all students meet physically at the university college (may be arranged as virtual (video) seminars)
All approaches are applied and adapted to teaching and guiding of both on-campus and off-campus students.

Innovative elements:
Developing methods for teaching and guidance of on campus and off campus students in the same course and leaning environment, and the integration of synchronous and on-demand streaming video.
Extensive use of socioconstructivist learning methods is still innovative for mature students.

Main pedagogical references:
N/A
TECNOLOGY

Use of technology:
The master study is organised for both on-campus and off-campus students. To give an adequate study program to these groups, the study uses the Internet and a Learning Management Systems to a great extant. Tasks that are carried out with these tools are:
  • Distribution of material
  • Broadcast of live and on-demand video
  • Interaction teacher-student and student-student
    • Synchronous communication
    • A synchronous communication
  • Guidance
  Cooperation and collaboration

Description of how technology is used:
The technology is especially justified to make an integrated learning environment for both on campus and off campus students.

Innovative elements:
Live and on demand broadcast of video makes the course available related to the students needs.
Use of technology for cooperation between students, especially on different tasks in the study.

BLENDING METHOD

Detailed description:
Detailed description of what makes the course a “Blended Learning” course; how face-to-face and other learning activities are combined with technology based learning.

Teaching in auditorium or classroom is a relatively small part of the course. This is for some of the courses broadcasted as live and on demand videos.
Guidance is given related to the location of the students. On campus students are given guidance face-to-face - as well as via the Internet, and off campus students are given guidance through email, learning management systems, synchronous communication like MSN and asynchronous communication like discussion forums. In practice we see that also the on campus students to a great extent uses the same tools as the off campus students.
Communications between students, in a group composed by on campus and off campus students, are also much based on synchronous and asynchronous communication tools.

Please also describe,...
1. How is the Content presented. If possible, estimate also the proportions in percentages
   ☐ Face to face lectures ......% 
   ☐ PowerPoint presentations ......% 
   ☐ Electronic materials in web, LMS, full text or slides......%
Video streaming, archived video lectures, video conferences......%
Audio streaming, archived audio lectures......%
Animations......%
Graphs, illustrative figures and images......%
Integrated solutions (slides in combination with audio or video) ......%
CDs, DVDs......%
more, specify ...........................................

2. Which of the following sections of the course are managed web-based:
Communication
Group Study
Study guide presentation
Content presentation
Feedback, technical support, course assistance
Administrative information (contacts, requirements, expected learning results, etc)
Assignments
Assessment
Tests
Self-tests
Self-evaluation
Additional materials

DESCRIPTION OF STUDY PROCESS
Please list the learning activities:

Starting from teacher training at bachelor level, gradually introducing scientific methods at master level, preparing for research and master thesis.
Practical and theoretical integration of ICT in different learning methods.
Formulation of problem area for the master thesis
Please describe 2-3 main learning activities in detail. Suggested frame for learning activity (method) description:

Construction of learning objects where ICT are used related to different learning theories.
Writing of an scientific essay for formulation of the problem area for the master thesis

The aim of the learning activity
Introduction to the learning activity
The description of the learning activity
description
desired outcomes
instructions for performing the activity
product form and length


submitting information
Criteria for assessment
Conclusions

**Assessment** of learners, forming of final score (indicate the percentage):
X Active participation in course (both web-based and face-to-face) ......%
X Participation in forums......%
X Participation in seminars......%
☐ Submission of individual assignments......%
X Participation in group assignments......%
☐ Submission of tests......%
☐ Participation in contact days......%
☐ Exam/ final assignment......%

**OUTCOMES AND EVALUATION**
20 students graduated as master of ICT in Learning so far; good results
Online evaluation questionnaires to students at end of individual courses are generally positive, but are also correctives for revision of content, methods and technology. A revised version of the master programme will start in August 2007.

**CONTACT INFORMATION**

**Links to additional information**
http://stud.hsh.no/lu/inf/master/ (in Norwegian)
http://www.hsh.no/english/ICT_in_Learning.pdf (in English)

**Contact person (name, email, telephone):**
Jostein Tvedte
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+47 53 49 13 78
COURSE DESCRIPTION

Name of the course:
Global Environment Issues

University, Department, Country:
Agder University College, Faculty of Economics and Social Sciences. Norway

No of ECTS:
7 1/2

Language:
English

Area of science:
Environment

Level of studies:
Master Level

Course type:
Collaborative online learning in community of practice

Course description:
Aims
To get an overview of the global environmental situation, analyse the relationship between environmental factors and development issues seen from an environmental perspective, and to develop an understanding of what is meant by a sustainable development. Focus is on the global perspective. In addition, regional overviews on priority issues are offered. The course will challenge by giving alternative points of view regarding development of values, ethics and personal engagement. Opportunities for reflection on the learning environment and procedures are given, and the student is expected to develop his or her own learning skills.

Objectives
On completion of the GEI course the students should have the ability to:

Describe, discuss and present main global environmental issues such as the greenhouse effect and climate change, biodiversity, freshwater shortage, ozone depletion, persistent pollutants and eutrophication as short lectures to an audience of non-academics.

• Analyse and explain some major regional environmental issues to peers in online discussions and essays

• Discuss and evaluate some environmental assessment processes and present the results to peers using ICT media of communication

• Compare, analyse and assess different view points on interaction between environment and development in the global context,
discuss these viewpoints online with peers and present the results in short lectures and essays.

• Discuss inter-relatedness of the specific elements of the environment and describe main scenarios applying ecological terms and methods.

The students will gain / improve skills in:
• constructive examination of the major environmental outcomes of policies and practices;
• making informed strategic decisions based on development scenarios;
• collaborative work on-line and face-to-face with peers by sharing ideas, analyzing problems and finding solutions;
• Summarizing and evaluating arguments
• balancing and integrating different points of view in a decision making process;
• writing academic deliverables
• environmental information communication;
• reflecting on personal learning processes and improvement of learning skills.

The students should have developed or strengthened attitudes on:
• Environmental and development values and ethics and be able to express this in structured presentations

Module 1: Background.
A shift in focus from picking trash at the roadside to pesticides, global warming, depletion of the ozone layer, biodiversity and GMOs: Development of the environmental process including a recent history of events, policies and practices.

Module 2: The State of the Environment
Overview of the global State of the Environment (SOE), reporting processes and the state of the environment in different regions of the world. Main issues pertaining to environmental assessment, and major environmental changes during the last decades.

Module 3: Vulnerability, risk assessment and adaptation
Human vulnerability to changes in the environment: how people are affected and possible ways of assessing risks, adaptation and vulnerability reduction.

Module 4: Driving forces and scenarios
Introduction to scenario analysis as a means by which to reflect on how decisions, including policy changes, impact the future. Major driving forces behind environment change.

Module 5: Achieving sustainable development?
Tools for strengthening and promoting sustainable environmental development. Policy performance monitoring, international policy framework, the use of trade and technology in sustainable development. Predictions and scenarios.

Course literature:
Study guide.
Geo yearbook: an overview of our changing environment 2004/05 UNEP
Nellemann et al. (2004): The fall of the water. UNEP


On-line and on CD: learning resources library with articles, videos, URL-list etc http://gvu.unu.edu/resources.htm

Additional materials:
CD-ROM with self-instructional course in Climate change and other learning resources

Course website:
Not available

Number of students:
24

Number of teachers:
1

Number of tutors:
1

PEDAGOGY

Learning objectives:
See description above
**Pedagogical approach:**
Mainly social constructivist collaborative learning in communities of practice

**Innovative elements:**
The pedagogy, a mixture of collaborative learning and self-instructional course. Quality assured study site system

**Main pedagogical references:**
http://gvu.unu.edu/prog.cfm?pageid=1037&programid=101&courseid=1024

**TECNOLOGY**

**Use of technology:**
LMS-Fronter, Internet, e-mail

**Description of how technology is used:**
Creation of virtual classroom and group rooms used for online conferencing and building of communities of practice

**Justification of technology used:**
It is a way of create virtual communities of practice where location of students in the world does not matter as long as they have an internet connection

**Innovative elements:**
Create intercontinental virtual communities of practice.

**BLENDING METHOD**

**Detailed description:**
Detailed description of what makes the course a "Blended Learning" course; how face-to-face and other learning activities are combined with technology based learning

**Introduction**
Experience indicate that there are clear advantages starting up an online course with a face-to-face-session (F2F). Distance studies are associated with high drop-out rates. More than 50% drop-out rates in a degree-giving study programme is quite usual (Simpson,2002,p.9). Studying at a distance is an isolating experience, and “is probably the most important factor in drop out; students who fail to establish support networks are more likely to withdraw” (Simpson,2002,p.10). This is probably true whether the student studies at a distance or on campus, as education to a large extent can be seen as a process of dialogue (Simpson,2002,p.10).
A face-to-face introduction period to a two-year study will, appropriately planned and implemented, knit the group of students and tutors together in a network of personal relations strong enough to keep up motivation, enhance and facilitate online collaboration, and make the learning environment in the virtual classroom open, empathic and approachable. These are crucial factors for student retention.
The GEDS students

The GEDS students will mainly come from Northern Europe and from some African countries. Maybe there will also be students from Asia. Advantaged students, like most Norwegians, will have free tuition, and easy access to the internet. Most of them will have some prior experience of collaborative learning, and they will most likely have some experience with the chosen LMS: the Classfronter. Some of them will even, as on-campus students, have direct access to subject professors. These students might face some problems to struggle with, starting studying in a virtual classroom with an unfamiliar pedagogical approach. However, their African peers, will have a much more challenging workday. Their access to the internet will often be poor, they might have to pay extra for it, and they will probably not have the supportive infrastructure around them as a Norwegian on-campus student will have. Nevertheless, African and Northern European students will have to collaborate in mandatory group work during much of the study programme. The collaboration will face the challenge of unequal access, different cultural backgrounds, varying language skills, although having in common that English will be second or third language to all or almost all, and different experience in pedagogical approaches. It is therefore important to ensure that all the students start out on the same platform: a two-weeks face-to-face introduction to the study programme in Norway. It is of equal importance that the tutors get to know the students.

Aims of the F2F session

a. Save time learning the technology. The students will get hands-on guidance in the use of different computing software such as power point, a web-editor and software for photo and graphics editing. They will get extensive hands-on guidance in the use of the LMS Classfronter, learning asynchronous computer mediated conferencing (CMC) such as “brainstorming”, threaded discussions, synchronous “chat”, making folders, upload files. The two first GEDS courses will start, and the first online activities in the virtual classroom will take place with tutors present. The students will make their personal online introductions, and take part in developing the virtual classroom. Tutors will be present at all times to guide and assist.

b. All participants (students and teachers) get to know each other personally. This facilitates learning, in particular the important informal communication enhancing the learning processes.

c. Participants will familiarize themselves in practice with the GEDS approach to learning: learner-centred, collaborative studies in communities of practice.

d. Participants will get a good start on the two first courses, and an introduction to the two following.

e. Participants will get an overview of the student support system and how to use it

Participants will develop a sense of participating in a global environment in a UN spirit, and a sense of belonging to the UN family.

Face-to-face sessions for socialisation, interaction, social presence and tutor support

In order to interact and collaborate well, people need to know each other. A F2F session at the beginning of a learning period, allows the participants to make personal ties. Professor Mary Thorpe defines learner support in ODL as a system capable of responding to a known learner or group of learners. The key issue is “interactivity between individuals known to each other” …it involves interpersonal interaction between people where each knows the identity of the others and each has a specific role with regard to the other”(Thorpe,p.48).

“It has often been found that adult learners can work at a distance for months, geographically isolated from each other and from a tutor, if they have had at least one effective face-to-face meeting to begin the process. Groups set up for Computer Mediated Communication (CMC) have similarly often worked better when the learners have met and talked together, even if only briefly”(Thorpe, p. 64).
Many distance students complain about their sense of isolation, and that they have little opportunity of discussing difficult issues in their studies informally with peers. This is probably a main reason for high dropout rates in traditional DL. Experience indicates that “tutorial support for learners prevents drop-out from study” (Thorpe, p.50). In my own experience as an online tutor as well as an online student, I have no doubt that tutor support is crucial for a good learning environment. “Many practitioners and learners believe that such support is vital for effective learning. Interactivity between learners and their supporters is essential for high-quality learners...the potential for interaction enabled by CMC is driving the development of support-led rather than package-led forms of Open and Distance Learning (ODL)” (Thorpe, p. 48). Package-led forms of education is associated with “2nd generation” DL, where in its extreme, the student received a package with books and a multimedia CD-ROM guiding him through the course with online lectures, quizzes and other type of student-machine interaction. In principle, no contact between the student and the university would be necessary before the exam. In contrast, support-led, “3rd generation” DL is associated with various support structures assisting the student in the studies. Such support is given by tutors, administration and many-to-many communication in virtual classrooms through an LMS. Students may be offered tutoring, guidance, counselling and mentoring; helping the student develop cognitive as well as organisational and affective skills (Simpson, 2002, pp.9-15).

A F2F session allows tutors to get personally acquainted with their students. This is particularly important with a very heterogeneous student group coming from different countries, or even continents and with very different cultural backgrounds. The tutor will be able to help the individual better when having at least some idea how the novice student approaches learning. “An appreciation of learner characteristics acts as a framework for helping to understand possible reactions, patterns of response, predictable needs and so on” (Thorpe, p. 54). Feedback from many of my own online students strongly indicates that without my tutor support when they were struggling with technology or subject content, they would have dropped out. According to Thorpe (p.56), “the stimulus and responsiveness of a person in the role of guide or tutor are for most people essential catalysts that activate and sustain their involvement in the learning process”.

“A successful online collaborative learning community is an organization where community members engage intellectually, mentally, socio-culturally, and interactively in various structured and unstructured activities to achieve their common learning goals via electronic communication technologies” (Tu&Corry, p.53). The better the participants know each other, students and tutors included, the easier it will be to create a good learning environment.

“One of the most useful concepts that CMC has generated is the idea of “social presence”: the communication of personality and the sense of “voice” through text onscreen in the context of email and conferencing. Where moderators and tutors have acquired this skill, learners report a more conducive context for interaction and a sense of group belonging” (Thorpe, p.63.)

What kind of support do learners need?
This depends to some extent on at what stage of the course the student is. In the beginning, when the student struggles with technology, the feeling of alienation in an unknown learning environment in a virtual classroom, new curriculum and new terminology, reassurance and counselling are obviously important. The student must get the feeling that it is possible to get through this strange jungle of new and to some extent very different way of doing things.
This kind of support is probably easier to achieve in a F2F session, with hands-on training together with an instructor to step over the technology threshold into the virtual classroom relatively easy. Counselling is also easier face-to-face.

In the F2F session I suggest the following objectives:
1. Socialisation between the students and the tutors and the students. They should have established personal relations to the extent that they are able to give “warm affirmations”, “empathic comprehension” and “open disclosure” (Zimmer, 2004, p.136.
extent that they are able to give “warm affirmations”, “empathic comprehension” and “open disclosure” (Zimmer, 2004, p.141-144) in order to obtain open and successful communication in online conferencing. They need to reassure each other that they can manage the course together, that they will support each other, and that they can trust each other.

2. The technological obstacles should be overcome in the F2F session. All participants should be able to log in to the virtual classroom, find their way in the classroom and the various tools, upload and download documents, participate in online brainstorming, synchronous conferences (chat) and asynchronous conferences such as a threaded asynchronous discussion on completion of the F2F session. They should know how to make a ppt presentation and publish articles, graphics and pictures on the web as well. The students should get to know the person they can contact when they have technical problems with Classfronter.

3. The pedagogical issues should be discussed and practiced. Many students have no or little experience in constructivist pedagogy and collaborative learning. The concepts of “surface learning”, deep learning” and “strategic learning” should be introduced and discussed. It is probably easier and quicker to initiate beginners to a collaborative learning environment at a F2F session than doing this strictly online. “The foundation of an effective interactive online collaborative learning community is communication. Instructors should initiate the course with a definition of an online collaborative learning community and explain its purposes and expectations to motivate learners to sustain online learning collaboration throughout the course”(Tu&Corry, p.54) “The main purpose of collaborative learning is to enrich learners’ critical thinking, information exchange, and knowledge-generating processes and to attain rich interactive learning experiences. If learners do not see the value of collaborative learning, they will focus only on achievement and will not engage effectively in collaborative activities. The perception acquired by learners involved in collaborative learning is very critical and success depends upon a clear understanding of its purposes and values. The instructor must assist students in developing this positive perception before any collaborative learning activities can occur”(Ibid, p.57).

4. The students should be introduced to the various courses, get an overview of the contents and what is expected of the students. They must also get a clear picture of what they can expect from the GVU and the GEDS study programme.

5. The students must be introduced to and explained in detail the way they will be assessed. Assessment guidelines and criteria must be presented.

6. The students will be introduced to study guides with detailed tasks and activities.

7. The students will get a calendar that paces the course in time frames and deadlines. They must learn that within these time frames they are themselves responsible for learning what they are supposed to learn, take advantage of the possibility to learn together with their peers and tutors, and together build an optimal learning environment for all. They must also learn that the study guides can be negotiable to some extent, and if the workload peaks in one course, it should be possible to reduce workload at that time period in a parallel course.

8. The students should get acquainted with a university library and what services it may provide. If the students could visit the physical library that they will later contact online, this would probably facilitate the student’s use of this service.

9. The tutors will be introduced to the students, professors, the online course classrooms and the communication media they will use. A learner-centred tutor is committed “to enabling learners to make use of education and training systems, by using language that non-specialists understand”...”social presence is particularly important as an underpinning skill or ca-
10. The F2F will in addition to the above mentioned points be a strong motivating factor if the session succeeds in removing initial doubts and obstacles, installs a sense of social belonging, and initiates a supporting community of peers and tutors. When the tutors through personal relationships are able to provide effective communication and just-in-time feedback of the right type, this will also be a strong motivating factor. When there is a personal relation, it is also much easier to make a phone call to the tutor and ask for assistance in times when the many-to-many dialogue in the virtual classroom is inadequate.

Handling cultural differences
Cultural differences can be an issue in DL. In a global course as GEDS, differences of opinion should basically be a cause for celebration. After all, people who have in common that they have graduated from a university, have good computer skills, speak English fairly well and can take two years off for studying; belong to a small elite in the world. However, cultural differences will be present, and the participants should be aware of such differences in general. According to Hofstede (1980) there are mainly four dimensions by which cultures vary: power distance, uncertainty avoidance, collectivism-individualism and masculinity-femininity. Power distance describes the extent to which people are willing to accept unequal distribution of power in the society, while uncertainty avoidance describes the degree of willingness to tolerate deviation from the norms of the society. Some cultures think that the collective/tribal/clan interests must prevail over the interests of the individual, while others find that the individual interests are more important than the collective within the frames of formal laws. Some societies have decided that some values and prerogatives are strictly feminine while others are masculine. Other cultures propose equal rights and opportunities regardless of sex. As a global, UNU-associated course, UN values such as the Universal Declaration of Human Rights, equal rights, e.g. equality between the genders must prevail. Nevertheless, GEDS should facilitate interaction between different cultural groups, broaden perspectives and minimize the risk of “cultural tunnel vision”. Culture should therefore be an issue for curiosity and exploration rather than prejudice and judging. Formal education in Africa have inherited much from colonial styles of education, with discipline and rote learning as norm, while students in Northern Europe increasingly have been encouraged to see themselves as independent learners. African students have traditionally been told “to work hard” in a competitive environment, striving to get to the top of the class achievement list by being the best in regurgitating information transmitted by the teachers. In contrast, many young Scandinavians have been educated in a learning system where deep learning and understanding have been in focus (Morgan 2004, pp 55-58). Even if most of the GEDS students will be adults, at times discussions should consider possible communication barriers between Western and African students and how to overcome them “...given the fact that the socio-religious tradition is one of seeing the younger generation as necessarily in a position when they should take orders, listen to elders, their individuality or independent thinking or decision-making is not nurtured. Often these traditions and customs run contrary to the basic expectations required of open learners”...while education means spreading awareness and lifting taboos, it does not mean violation of people’s customs and traditions” (Priyadarshini, 1994, pp.458-462). These issues are probably easier to discuss at a F2F session, than online.

Another important issue to bring into the light is the pedagogical approach. Many students believe that “in operational terms students believe and feel they have been taught only if lectured to” (Shrestha,1997). The GEDS study programme requires that students participate in collaborative learning activities where the students to a large extent take responsibility for their own learning in cooperation with and support from a tutor and peer students. The success of the online studies much depends on the student’s ability to participate in these activities. This student centred learning approach needs to be explained in detail at the F2F session. Metacognitive sessions with ample opportunities for discussing and reflecting on learning styles and learning about how to improve own learning methods must be given appropriate time.
Progression
To ensure a good development of the F2F session while avoiding information overload, it is important to see to that some activities precedes others in time. I suggest that the programme to a large extent follows the objectives set up for the session, starting up with socialisation and the building of personal relations, while avoiding the establishment of “cliques”. Learning the LMS technology is crucial, and must come early. Collaboration in the virtual classroom will come naturally with easy assignments, even when the participants physically are present in the same room. The transition from physical presence to collaborating over distance with virtual presence only, should be made as smooth as possible. The pedagogical approach should be introduced, discussed and implemented in practice when starting up the first study modules.

Facilities and conclusions
On the background described above, I suggest that the tutors should participate on equal terms with the students all or most of the F2F time. Students should be accommodated at a place close to nature, close to the GVU, with good but not luxurious rooms. Good Internet connections are a prerequisite, as are the availability of group rooms as the students should be able to do at least some work in the evenings. The accommodation building should also facilitate bringing the group tightly together socially. The F2F is the most expensive part of the study programme. It is therefore justifiable to make an intense programme, where training in relevant technology, learning methods and procedures, study techniques, support systems, cognitive subject matter, social knitting and exploring the surroundings all get a good share of the timetable.

References


Thorpe, M.: Learner support – planning for people and systems. Block 3 overview essay in H804


Please also describe,...
1. How is the Content presented. If possible, estimate also the proportions in percentages.
   □ Face to face lectures ...12...%
   □ PowerPoint presentations ...2...%
   □ Electronic materials in web, LMS, full text or slides...58...%
   □ Video streaming, archived video lectures, video conferences...1...
   □ Audio streaming, archived audio lectures...12...%
   □ Animations...2...%
   □ Graphs, illustrative figures and images...10...%
   □ Integrated solutions (slides in combination with audio or video) ...2...%
   □ CDs, DVDs...1...
   □ more, specify ...........................................%

2. Which of the following sections of the course are managed web-based:
   □ Communication
   □ Group Study
   □ Study guide presentation
   □ Content presentation
   □ Feedback, technical support, course assistance
   □ Administrative information (contacts, requirements, expected learning results, etc)
   □ Assignments
   □ Assessment
   □ Tests
   □ Self-tests
   □ Self-evaluation
   □ Additional materials

DESCRIPTION OF STUDY PROCESS

Problem based learning, Collaborative activity, some self-instructional courses

The GEI course  Module 1

Module 1: Background. The environment issue: a shift in focus.
A shift in focus from picking trash at the roadside to persistent pollutants, global warming, depletion of the ozone layer, biodiversity and GMOs: Development of the environmental process including a recent history of events, policies and practices.

Time frame, module 1:  24 October – 5 November
Aims, module 1
On completion of this block, the students should have developed an understanding of how awareness of the environment as an issue has changed and become more urgent to many people.
Objectives, module 1

Knowledge:
The students should be able to describe and apply in communication media of their choice:
• the main events in the recent history of environmentalism and its place in the overall historical context of the world
• the development of the major global environmental policies and practices
• the "mainstream" environmental discourse and various differing opinions.

Skills:
The students should be able to participate efficiently in the e-learning environment, take part in distributed collaborative problem-based learning and computer mediated communication techniques

1.1.1 Task 1
Learn about and understand the shift in perception and awareness of the environment during the last five-six decades.

Activity 1 (6 hours)
Read the synthesis part and chapter 1 in GEO-3 (Set book). Browse the interactive “Timeline” with environment related event from the 1960’s until today. Find the “Timeline” in the resource library on your CD, or use the web-link below. Try to pick out early highlights, such as “Limits to growth”, Seveso catastrophe etc.
http://www.gvu.unu.edu/Timeline/index.htm

Activity 2 (12 hours)
a. Make an informal interview with at least one person above the age of 60. Ask about his/her perception of the environment in the early 60’s and compare it to his/her perception today. Does he or she remember any important events related to the environment 30-50 years ago? Why does he or she think the events were important?
b. Write an individual paper (maximum 500 words) on your findings. Compare to the “Timeline”. Place the document in your individual online portfolio.
c. Compare and discuss your findings with your group in the virtual classroom. Select a weaver and prepare a common paper on your findings. (Maximum 1000 words). Place document in group folder.

Activity 3 (4 hours)
Group discussion. Take part in a typical 1980’s discussion:
Topic: ‘Poverty is the worst form of pollution’
Indira Ghandi, Prime Minister of India (1966-77 and 1980-84)

This exercise is used to practice online collaboration and gather arguments that you can use for later essays. Look for information in the set book, in the time-line, in a library or on the Internet. Make reference to your sources. Keep your input short, in “postcard” style! A “thread” can be a definition, an argument or a statement of your personal opinion
1.1.2 Task 2

Learn about the main global environment issues and how these may be connected to development.

Activity 1 (10 hours)
Read the UN Millennium Declaration, General Assembly, September 2000

Activity 2 (20 hours)
a. Search for relevant information and discuss in your group:
“The present three most urgent global environment issues”.
Select a moderator and a weaver. Write a group essay, maximum 3000 words, and place in group folder.
b. Based on your essay, prepare a 20 minutes lecture using power point with the same title for an audience of a Lion’s, Rotary club, or similar. Alternatively: make the presentation on a website. Put presentation in group folder.

Reflection and evaluation: (1 hour)
The feedback obtained from this exercise is mainly meant for the tutors for the students themselves. The evaluation is formative in the sense that it benefits the current learners and teachers, and to some extent those who are to update the course. It is important that the participants reflect on their learning experience and how it can improve.
This exercise should take one hour or less. The answers given are confidential and must not go outside the online group or classroom unless the information is anonymized. The tutors may give relevant anonymized information to the course developers for revision of the course.

Reflection:
1. Repeat the objectives of the module. Did you learn what you were supposed to learn in this module?
2. Was it easier or more difficult than you thought?
3. What was easy, what was difficult? Why?
4. What did you find the most useful/enjoy the most, if any, in the module? Why?
5. What did you find the least useful/least enjoyable, if any, in the module? Why?
6. Would you say that your own confidence in subject understanding has grown?
7. Would you say that you have developed your study skills? If so, in what way?
8. Can you think of any way you can improve your own ways of learning?

Evaluation:
9. Was the time estimate for each activity roughly correct?
10. Do you think that the interaction and discussions with your fellow students and tutor during this module could improve in any way?
11. Do you think that the tutor should have been more or less active, or has s/he found the right balance?
12. Have the tutor’s comments been well-chosen, encouraging and in sufficient quantity?
13. Do you think that the tutor is easily enough approachable and empathic, or do you think there is too much distance?
14. Do you have any proposals for improvements of the module?
Assessment of learners, forming of final score (indicate the percentage):
- Active participation in course (both web-based and face-to-face) ...10...%
- Participation in forums......%
- Participation in seminars......%
- Submission of individual assignments40......%
- Participation in group assignments......%
- Submission of tests......%
- Participation in contact days......%
- Exam/ final assignment...50...%

OUTCOMES AND EVALUATION

Outcomes and results:
Good

Evaluation results:
Above average

General evaluation of the course:
Well received

CONTACT INFORMATION

Links to additional information:
http://gvu.unu.edu

Articles and other references:
http://gvu.unu.edu/linklib.cfm?pageid=1045&categoryid=102

Contact person (name, email, telephone):
Åke Bjørke, bjoerke@grida.no ,+4792047626
http://www.grida.no/Contact.aspx?staffID=6
COURSE DESCRIPTION

Name of the course:
Learning theories

University, Department, Country:
Stord/Haugesund University College Department of Teacher Education Norway

No of ECTS:
10 cr of the Master Degree Study “ICT in learning”

Language:
Norwegian

Area of science:
ICT

Level of studies:
Master

Course type:
Lecture

Course description:
In this module the students shall learn theories and methods related to use of digital tools in learning. A central goal is the use and integration of ICT in education.

Content:
Main guidelines related to learning
Memory
Meta cognition
Transfer of learning/knowledge
Social learning

The different theories shall be related to practical situations and experiences.

Course literature:
Learning material distributed via Internett
Course website:
General access to the chosen LMS (Fronter) is necessary.

Number of students:
30

Number of teachers:
3

Number of tutors:
3

PEDAGOGY

Learning objectives:
The students shall learn theories and methods related to use of digital tools in learning. The use and integration of ICT in education is a central learning objective.

Pedagogical approach:
Pedagogical approaches are:
Collaborative learning and constructivist learning
Problem based learning
Project based learning

All theories are related and adapted to teaching and guiding of both on-campus and off-campus students.

Innovative elements:
Developing methods for teaching and guidance of on campus and off campus students in the same course and learning environment.

TECNOLOGY

Use of technology:
Learning management systems
Email
Chat
Videoconferencing
Video broadcast
Description of how technology is used:
The course is organised for both on-campus and off-campus students. To give an adequate study program to these groups, the study uses the Internet and Learning Management Systems to a great extant. Tasks that are carried out with these tools are:
- Distribution of material
- Broadcast of live and on-demand video
- Interaction teacher-student and student-student
- Synchronous communication
- Asynchronous communication
- Guidance
- Cooperation and collaboration

Justification of technology used:
The technology is especially justified to make a integrated learning environment for both on campus and off campus students.

Innovative elements:
Live and on demand broadcast of video makes the course available related to the students needs.
Use of technology for cooperation between students, especially on different tasks in the study.

BLENDING METHOD

Detailed description:
The lecturing in the classroom is a relatively small part of the course. This is broadcasted as live and on demand videos. Guidance is given related to the location of the students. On campus students are given guidance face-to-face, and off campus students are given guidance through email, learning management systems, synchronous communication like MSN and asynchronous communication like discussion forums. In practice we see that also the on campus students to a grate extent uses the same tools as the off campus students. Communications between students, in a group composed by on campus and off campus students, are also much based on synchronous and asynchronous communication tools.

Please also describe,...
1. How is the Content presented. If possible, estimate also the proportions in percentages.
   - Face to face lectures ......%
   - PowerPoint presentations ......%
   - Electronic materials in web, LMS, full text or slides ......%
   - Video streaming, archived video lectures, video conferences ......%
   - Audio streaming, archived audio lectures ......%
   - Animations ......%
   - Graphs, illustrative figures and images ......%
   - Integrated solutions (slides in combination with audio or video) ......%
   - CDs, DVDs ......%
   - more, specify .............................................%
2. Which of the following sections of the course are managed web-based:
- Communication
- Group Study
- Study guide presentation
- Content presentation
- Feedback, technical support, course assistance
- Administrative information (contacts, requirements, expected learning results, etc)
- Assignments
- Assessment
- Tests
- Self-tests
- Self-evaluation
- Additional materials

**DESCRIPTION OF STUDY PROCESS**

Overview of learning theories.
Integration of ICT in different learning methods.
Formulation of problem area for the master thesis.
Construction of learning objects where ICT are used related to different learning theories.
Writing of an scientific essay for formulation of the problem area for the master thesis.
The aim of the learning activity.
Introduction to the learning activity.
The description of the learning activity
  - description
  - desired outcomes
  - instructions for performing the activity
  - product form and length
  - submitting information
Criteria for assessment
Conclusions

**Assessment** of learners, forming of final score (indicate the percentage):
- Active participation in course (both web-based and face-to-face) ...10...%
- Participation in forums......%
- Participation in seminars......%
- Submission of individual assignments40......%
- Participation in group assignments......%
- Submission of tests......%
- Participation in contact days......%
- Exam/ final assignment...50...%
OUTCOMES AND EVALUATION

**Evaluation results:**
40 master students have completed the course, with a very low drop-out rate. The students have given overall, positive feedback to the teachers.

CONTACT INFORMATION

**Links to additional information:**
http://stud.hsh.no/lu/inf/master/ (in Norwegian)
http://www.hsh.no/english/ICT_in_Learning.pdf (in English)

**Contact person (name, email, telephone):**
Jostein Tvedte
jostein.tvedte@hsh.no
+47 53 49 13 78
COURSE DESCRIPTION

**Name of the course:**
Mathematical Programming

**University, Department, Country:**
Vytautas Magnus University, Department of Applied Informatics, Kaunas, Lithuania

**No of ECTS:**
6

**Language:**
Lithuanian, English

**Area of science:**
Mathematics

**Level of studies:**
Undergraduate studies (fourth year of studies)

**Course type:**
Lectures + laboratories + individual studies + online collaboration and communication + work project

**Course description:**
This course combines theoretical and practical spheres, but is more oriented to practical tasks solutions in purpose that the student would learn to formulate practical optimization tasks which are based on mathematical terminology, would be able to establish chosen model's suitability and complexity, would be able to choose suitable algorithm which will appropriate for practical and mathematical formulated task solution, would be able to understand the optimization’s results, would be able to advice others on questions connected with optimization methods and software.


Creating this course it was paid a lot of attention to the accumulative experience in the science analysis in the optimization sphere also as example was taken teaching in similar disciplines.

**Course literature:**
1) Antanas Žilinskas, Matematinis programavimas (pdf and html formats, in Lithuanian)
2) Benny Yakir, Nonlinear optimization (pdf format)
3) Jonas Mockus, Global and discrete optimization (html format)
4) Article: “Jens Clausen Teaching Duality in Linear Programming - the Multiplier Approach” (pdf format)

Additional materials:
1. Žilinskas A. Matematinis programavimas. VDU, 1999, in Lithuanian.

Course website:
Website for taking and putting information for studies, in Lithuanian (http://fcim.vdu.lt/Conferences/F00017C98/F00052D02/?WasRead=1)
The dictionary of the main concepts with the links to wider manuals (http://mathworld.wolfram.com/)

Number of students:
around 100

Number of teachers:
1 and one assistant

Number of tutors:
1

PEDAGOGY

Learning objectives:
To master theory of optimization and main algorithms, to learn adapt optimization methods for the practical tasks, to learn how to use software which has optimization packages.
During theoretical and practical lessons student learns to formulate practical tasks of optimization using mathematical terminology, to establish chosen model’s suitability and complexity, to choose suitable algorithm which will appropriate for practical and mathematical formulated tasks solution, be able to understand the optimization’s results, be able to advice others on questions connected with optimization methods and software.

Pedagogical approach:
The course was prepared under strong influence of methodology of Project Based Learning (PBL). Required courses in manufacturing systems and simulation build upon these skills and provide engineering design experiences. Traditional teaching is combined with problem based, project based and discussion based teaching. Students study the theoretical part by themselves and sometimes go to the lectures also they can take lessons online (there they can find records of the lessons). During the discussions they have to discuss about the topic which professor suggested during the lesson or which is put in the page. All the assignments they have to do and the deadlines of the projects (it is on the electronic calendar) and works they can find on the same webpage. Also here is the schedule of the lessons and consultation time with the assistant or professor.
Innovative elements:
Problem-Based Learning (PBL) model sets out what you can do to successfully come up with a solution. Student has to check his/her understanding of the scenario and situation by discussing it within a team (virtual environment and communication tools in it let do to that very easily and comfortable). The student should make a list in which it will be visible “What do I know?” on one or other topic and also the team can list everything what team knows about this situation, including, information contained in the scenario. Also the list “What do we need to know?” is valuable. After preparing a list of team questions that need to be answered to solve the problem students can communicate with the lecturer online in the forums or during the lessons (also online lessons). Questions may be in the form of requests for more information. Students divide responsibility for gathering, organizing, analyzing, and interpreting information from many sources. Exchange ideas; think about solutions; weigh alternatives; and consider the pros and cons of possible courses of action. At this point, individual student and team may formulate and test new hypotheses concerning the problem. Some problems may not require hypotheses. Propose a recommended solution or opinion (based on your team’s research data). And then they prepare a report or presentation in which they make recommendations, predictions, inferences, or other appropriate solutions to the problem. Be prepared to support the positions you take. If appropriate, consider a multimedia presentation using images, graphics, or sound.

Main pedagogical references:
Problem Based Learning methodology PBL, http://www.udel.edu/pbl/
The Power of Problem-Based Learning, A Practical “How To” For Teaching Undergraduate Courses in Any Discipline, edited by Barbara Duch, Susan Gron, and Deborah Allen, Stylus Publishing, LLC (2001), 256 page

TECNOLGY

Use of technology:
1) WWW page
2) Also electronic dictionary with the links for wider information
3) Discussions' forum
4) E-mail for contacting with the professor
5) Videoconferencing for online lessons
6) Virtual learning environment (FirstClass)

Description of how technology is used:
The instructions of practical work are presented on the WWW home page of the course. Some illustrative materials and examples of problem solutions, prepared by students, are also available at the home page as well as advanced theoretical material (e.g. lectures by prof. J.Clausen) and references to software.

Justification of technology use:
Creating educational materials allows teachers to incorporate their own teaching philosophy and methods into classroom presentations and multimedia technology allows teachers to compose effective presentations in advance. Time spent developing material is cumulative, since materials may be rearranged and reused with total control. Virtual Learning Environment facilitates teachers work in the management of educational courses for their students, especially by helping teachers and students with course administration. The system can often track the learners’ progress, which can be monitored by both teachers and learners. While often
thought of as primarily tools for distance education, they are most often used to supplement face-to-face classroom.

**BLENDING METHOD**

**Detailed description:**
Blended Learning: combining both - traditional lectures (face-to-face) (15 lessons, each of the lesson takes 2 hours) and seminars plus distant collaboration with the students (discussions’ forums, online questionnaires, videoconference meetings online (6 lectures, each takes 1.5 hours), students can find all the material in the virtual environment, also they put their projects, laboratories, other works in the virtual environment under the password) (for individual work is given 52 hours and students have 15 lessons in the laboratory class, each of it takes 2 hours), and they use technologies to communicate and to exchange information, assignments and assessments.

Please also describe,...
1. How is the Content presented? If possible, estimate also the proportions in percentages
   - X Face to face lectures 28% (percentage is counted from all hours in the course)
   - X PowerPoint presentations 90% (percentage is counted from online and face to face lectures representation)
   - X Electronic materials in web, LMS, full text or slides 100% (everything of that students can find online)
   - X Video streaming, archived video lectures, video conferences 100% (everything of that students can find online)
   - X Audio streaming, archived audio lectures 0%
   - X Animations 0%
   - X Graphs, illustrative figures and images 25% (some kind of material is given in this way)
   - X Integrated solutions (slides in combination with audio or video) 100%
   - X CDs, DVDs 0%
   - X more, specify ..............................................%

2. Which of the following sections of the course are managed web-based:
   - X Communication
   - X Group Study
   - X Study guide presentation
   - X Content presentation
   - X Feedback, technical support, course assistance
   - X Administrative information (contacts, requirements, expected learning results, etc)
   - X Assignments
   - X Assessment
   - X Tests
   - X Self-tests
   - X Self-evaluation
   - X Additional materials
DESCRIPTION OF STUDY PROCESS

1. Lectures  
2. Reading and analysis of theoretical material  
3. Web-mediated Metacognitive discussions  
4. Watching a video lecture  
5. Observation (self tests)  
6. Practice (3 tasks)  
7. 5 laboratory

A. The aim of the discussions: be able to understand, analyze course material and given information

The description of the learning activity
description
After the lesson discuss a problem on chosen topic with the peers and find the solution. Teacher should help students to understand lesson’s content and material; explain parts which were not very clear or difficult for them. After discussion teacher should analyse given learner’s information and to make a feedback.
desired outcomes
To see that the students have understood topic and are able to solve the problems
instructions for performing the activity
The discussion has to take place online and the students’ participation is mandatory.
product form and length
Online forum. Duration of the discussion is one week.
submitting information
Solution of the problem. Logs of the discussion.

Criteria for assessment
Correctness of problem solution. Also, teacher can see logs and how active each student was during the discussion.

Conclusions
Each student after the discussion and theoretical material analysis should be able to understand discussed optimization method very well and be able to do test and to make practical tasks related to that topic.

B. The aim of the 3 task: be able to work out the task of linear programming geometrically.

The description of the learning activity
description
Work out the task of linear programming geometrically.
desired outcomes
Geometrically, the linear constraints define a convex polyhedron, which is called the feasible region. Students should present the convex polyhedron.
**Instructions for performing the activity**
Read the theoretical material and work out the task.

**Product form and length**
Word document. Duration – two weeks.

**Submitting information**
The convex polyhedron as the result of linear programming task.

**Criteria for assessment**
Correctness of convex polyhedron.

**Assessment** of learners, forming of final score (indicate the percentage):
- Active participation in course (both web-based and face-to-face) 0 %
- Participation in forums 0 %
- Participation in seminars 0 %
- Submission of individual assignments 33 %
- Participation in group assignments 0 %
- Submission of tests 17 %
- Participation in contact days 0 %
- Exam/ final assignment 50 %

**Contact information**

**Links to additional information:**
Website for taking and putting information for studies:
http://fcim.vdu.lt/Conferences/F00017C98/F00052D02/?WasRead=1

The dictionary of the main concepts with the links to wider manuals:
http://mathworld.wolfram.com/

**Articles and other references:**
Articles and other references (if available)
1. Žilinskas A. Matematinis programavimas. VDU, 1999, in Lithuanian

**Contact person (name, email, telephone):**
Antanas Žilinskas, e-mail: antanasz@ktl.mii.lt, tel.: +370 37 327900
COURSE DESCRIPTION

Name of the course: Requirements specification

University, Department, Country: Kaunas University of Technology, Department of Software Engineering, Kaunas, Lithuania

No of ECTS: 6

Language: Lithuanian

Area of science: informatics

Level of studies: Master studies. Study Area of Technological Sciences. Study module “Requirements specification” is for Master students who are studying in Software Systems Engineering programme and it is one of 4 research modules. Further modules according this programme are “Analysis of Software Systems architecture”, “Information technologies in project management”, “Software implementation investigation”.

Course type: lectures + individual studies + online collaboration and communication + work project

Course description: The main attention is paid to requirements analysis and specification (modules “Software Requirements Analysis” and “Simulation and Validation of Systems”). In such a way Master students learn methods and tools of the requirement analysis already in the beginning of the study program and afterwards they can use the acquired knowledge to form the requirements specification of the objective area under computerization according to the Master thesis. Two courses that generalize software engineering area – “Software Engineering Process” and “Software Engineering Management” – are delivered together with the above mentioned courses; these courses are purposed for expanding and deepening knowledge acquired in Bachelor’s studies. During project development students familiarize with the standards, prepare proposal, plan and requirement specification of the project. Main topics are: the software requirements document; Requirements evolution; Problem analysis; System model description; Data modelling; Functional and non-functional requirements; Using of prototypes for requirements specification; Developing of software requirements document.

Additional materials:
1. I. Sommerville. Software Engineering. Addison-Wesley, 4, 5, 6 editions
   etc.

Course website:
Website for taking and putting information for studies (http://www.soften.ktu.lt/~virga/mag_atmintine)
Also there are many examples and advice how to do practical works

Number of students:
around 60

Number of teachers:
1

Number of tutors:
1

PEDAGOGY

Learning objectives:
To teach students to understand and to learn methods and tools of the requirement analysis already in the beginning of the study program and afterwards they can use the acquired knowledge to form the requirements specification of the objective area under computerization according to the Master thesis

To combine theoretical knowledge and practical skills in order that students would be able to design and produce efficiently software systems which fulfil users’ and clients’ requirements

To provide students with knowledge and experience in such knowledge areas: Engineering Economy, Software Requirements, Software System Design

To teach to choose tools, methods and design methodology applicable to the development environment
To provide with the experience of organizing individual and team work and with skills of communicating and collaborating professionally

To teach to understand and to be able to improve the software engineering process

To develop the understanding of product quality, price, schedule abidance importance in software system production

To teach to prepare documentation completely and consistently, to present technical concepts in both written documents and verbal presentations

**Pedagogical approach:**
Combination theoretical knowledge and practical skills in order that students would be able to design and produce efficiently software systems which fulfil users’ and clients’ requirements, to teach to evaluate, analyze and simulate software system quality factors in order to ensure a disciplined and controllable development of a software system.

E-learning is widely used in studies. Studies management information is public and available on the Internet.

The main principle of study system is the wholeness of science and studies and design skills training, based on systematic and autonomous work of a student. The importance of practical design is especially highlighted. In other words: the main principle is - teaching by designing. So, from pedagogical approach it is Project based and Problem based learning.

In order that students would apply and deepen theoretical knowledge of general matters in real design, they design a large software system and their individual research schedules and deliverables are coordinated. In each stage of design within the given time, students create products that have to fulfil requirements set in advance

**Innovative elements:**
In this module, the objective to organize a course around a project is similar to a real industrial project. The educational community itself is increasingly moving from lecture-format courses to team projects, problem-solving, direct involvement with actual development, and other formats that require students to exercise the ideas they are learning.

**Main pedagogical references:**
Problem Based Learning methodology PBL, http://www.udel.edu/pbl/
The Power of Problem-Based Learning, A Practical “How To” For Teaching Undergraduate Courses in Any Discipline, edited by Barbara Duch, Susan Gron, and Deborah Allen, Stylus Publishing, LLC (2001), 256 pages

**TECNOLOGY**

**Use of technology:**
1. Website (http://soften.ktu.lt/~virga/mag_atmintine/).
2. Information system created by each student individually (a portfolio)
3. E-mail
4. Forum created in the given address http://proin.ktu.lt

Description of how technology is used:
Website is used for the students in case to find project themes, document templates, examples, standards, requirements for deliverables, schedules, requirements for skills, project and software quality requirements. Assignments’ deadlines and material needed for the course and works preparation are placed there also.
Information system is created by each student individually at the beginning of the course. It is mandatory to put all the required documents and works which student has done in this system. It is like a portfolio. Such information management systems are private; they can be accessed only with passwords as this is required by the majority of project customers.
E-mail is used for the communication with the professor.
Hot Master studies’ problems are discussed in the online forum http://proin.ktu.lt

Justification of technology use:
Website where all the documents are published, is very important if students need to find any information connected with the course, also requirements and other needful information. There they can find news and announcements published by the teacher, also there is the table like a calendar in which it is written all the deadlines of the works, which students have to do.
Information system (a portfolio) is important not only for the student (he/she can safely store their documents and in case something would happen with the PC before exams or documents will be damaged, student will find all the backups in the information system). The teacher can see if all the documents are uploaded on time, if the student is dutiful and makes everything according to the requirements (this module is oriented to requirements specification, so, before the student describes requirements from the project customer, student should know what does it means to keep requirements by his/herself).
E-mails, forums are very important when students want to send needful information to the teacher or to communicate with professor or peers.

Innovative elements:
Students can work by themselves in distance way and also at the same time can easily communicate with the teacher. Student has own portfolio (information system) to store all material related with the project. The information is achieved very easily using given website of the subject.

BLENDING METHOD

Detailed description:
Traditional lectures and seminars plus distant collaboration with the students, also usage of technologies to communicate and to exchange information, assignments and assessments.
Students have traditional lessons (face-to-face) each week but e-learning is widely used in studies. Without e-learning methods and online communication this module will be difficult.

Please also describe,...
1. How is the Content presented? If possible, estimate also the proportions in percentages
X Face to face lectures 20%
PowerPoint presentations 10%
Electronic materials in web, LMS, full text or slides 90%
Video streaming, archived video lectures, video conferences......%
Audio streaming, archived audio lectures......%
Animations......%
Graphs, illustrative figures and images......%
Integrated solutions (slides in combination with audio or video) ......%
CDs, DVDs......%
more, specify .............................................%

2. Which of the following sections of the course are managed web-based:
Communication
Group Study
Study guide presentation
Content presentation
Feedback, technical support, course assistance
Administrative information (contacts, requirements, expected learning results, etc)
Assignments
Assessment
Tests
Self-tests
Self-evaluation
Additional materials

DESCRIPTION OF STUDY PROCESS

During project development students
1. Familiarize with the standards
2. Prepare proposal, plan and requirement specification of the project.
3. Have lectures
4. Reading and analysis of theoretical material
5. Web-mediated discussions
6. Seminars
7. Cumulate an information system (a portfolio)

Please describe 2-3 main learning activities in detail.

A. The aim of the learning activity: to train methodical work skills in a real industrial organization. Improved process maturity results in an increased productivity, better quality and more accurate schedule time. Therefore the "penalties" system is used for the deviation from the project schedule.

The description of the learning activity
description
To prepare proposal for the customer, who could be interested in your product (project), make plan and requirement specification of the project.

desired outcomes
Proposal document, requirement document, works on time.

instructions for performing the activity
Analyze given material, try to find proposals example, make analysis of the systems (analogue), which are founded and similar to your idea, make literature analysis, find real partner who could be interested in your idea, give him/her description of your idea, pick up the requirements from the customer, try to suggest more ideas than he/she can give to you (you are specialist, so you know about project more than your customer)

product form and length
proposal document (about 10 pages), requirement document (about 20 pages)

submitting information
information should be made on time and each student should upload the documents to created individual information system (a portfolio) and send the information to the teacher by e-mail, that the work was done.

Criteria for assessment
documents should be prepared according to the teacher's requirements.

Conclusions
Good proposal and requirements specification is the beginning of successful work for your project!

B. The aim of the learning activity: to be able to present your ideas and be able to demonstrate effective communication skills

The description of the learning activity
description
To prepare the presentation of your project idea.

desired outcomes
Showing personal presentation skills and ability to express your idea.

instructions for performing the activity
Try to find the project idea, which you like than the work will be easier for you. During the presentation to the future customers try to create comfortable atmosphere that the students do not feel confused, frustrated and disappointed. The presentation should be not very long and not very short, but clear to the audience.

product form and length
PowerPoint presentation (at least 10 slides)

submitting information
Presentation (*.ppt), each student should upload the documents to created individual information system (a portfolio) and send the information to the teacher by e-mail, that the work was done. When the teacher will appoint the time for presentation, each student should make a public presentation in front of the commission and audience.

Criteria for assessment
Clear presentation of project idea; skills of oral presentation; technique of using PowerPoint software.
Assessment of learners, forming of final score (indicate the percentage):
- Active participation in course (both web-based and face-to-face) 5%
- Participation in forums .... %
- Participation in seminars 20 %
- Submission of individual assignments 50%
- Participation in group assignments .... %
- Submission of tests .... %
- Participation in contact days .... %
- Exam/ final assignment 25 %

OUTCOMES AND EVALUATION

Outcomes and results:
Evaluation should involve an assessment of the product produced, and an analysis of the effectiveness of the process used to create the product. The aims of evaluation are: to recognize those strategies and techniques which proved effective during the course of the project so that their use may be reinforced or expanded; and to identify areas in the process and product that need to be improved in the next project.

Evaluation results:
The benefit of evaluating a software project is greater understanding of the software project organization, software development organization, and people that are involved. This understanding is essential for the ability to perform software process improvements.

After finishing four modules:
- The average grade for the project quality stated by Master project tutors is 9.72;
- Master students evaluated their projects on the average 8.33;
- The average grade for the Master project tutors' consultations stated by students is 8.28
- The average grade for Master project design process arrangement stated by students is 7.71
- 43% of students referred the number of Master project deliverables as too large, 57% - as sufficient and no student referred this number as too small
- The average grade for the Master students' work in the enterprises stated by practice tutors is very high – 9.93;
- Only 76% of students consider the practice as useful for their skills development;
- The practice place corresponded to the Master project topic for 62% of students

CONTACT INFORMATION

Links to additional information:
Methodical material for "Project Management": http://proin.ktu.lt/~kestas/Proj_vald/Kepure.html (in Lithuanian)
Other literature: http://soften.ktu.lt/~virga/mag_atmintine/interneteka.html
Contact person (name, email, telephone):
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tel.: +370 37 327618, +370 37 454229
Conclusion

This volume provides some insights into the field of blended learning. As it has repeatedly been noted neither the term nor the trend is new. American corporate training has used blended learning applications for quite a long time. However, the European higher education pedagogy is more traditional in its nature and is liable to adopt all kinds of innovations with more scepticism. The realm of blended learning is challenging, especially in the context of changes occurring in the European higher education environment.

The current report provides an overview of blended learning literature and research in the field of blended learning. The research reports describe different opportunities for using blended learning methodology. The issues of ‘How?’ and ‘Why?’ are discussed. The opportunities and benefits, as well as the potential setbacks are described. But first of all – publishing the research reports was intended to give a short but wide-ranging outline the blended learning experience up to now.

The second part of the report describes the instant practices of blended learning from five European countries – Estonia, Finland, Lithuania, Norway and Portugal. These examples – all stemming from everyday practice of higher education institutions – whether best practice or maybe just good experience, brightly illustrate the value of blended learning. Our intention of showing these cases is primarily to encourage teachers at traditional universities to find new innovative ideas to apply and teach in both easy and acceptable ways, and also to show that blended learning is easy, gainful, and fun to the students.

The B-Learn Project has been designed to convey the encouraging message to lecturers in traditional university environments that using blended learning in their everyday pedagogical practices can be easy and practical. The Project partnership hopes that this quick introduction into blended learning models, theories and best practice presented in the current report has given some good ideas to start blending your teaching and learning. Our more optimistic hope is that due to this report there will be many new actors emerging in the playground of European higher education who want to experiment with the new technology and believe in blended learning.
Project and Partners Information
B-Learn - Assisting teachers of traditional universities in designing blended learning
225565-CP-1-2005-1-EE-MINERVA-M
The project is carried out with the financial support of the European Commission (Socrates Minerva programme) and considerable contribution from all the partners

Starting date: October 01, 2005
Duration: 24 months

Project website
http://www.ut.ee/blearn

B-learn Trac-Wiki
http://trac.htk.tlu.ee/blearn

Contact B-Learn team
teadus.blearn.info@lists.ut.ee

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TU - University of Tallinn (Estonia)
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http://www.htk.tlu.ee
Mart Laanpere, martl@tpu.ee

HSH - Stord/Haugesund University College (Norway)
ICT in Education repr. NITOL group (Norway-net with IT for Open Learning)
http://www.hsh.no/nitol
Harald Haugen, harald.haugen@hsh.no
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KTU - Kaunas University of Technology (Lithuania)
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http://distance.ktu.lt/en
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EDEN - European Distance and E-Learning Network (United Kingdom)
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Andras Szucs, secretariat@eden-online.org