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QUALITY TEACHING IN WEB-BASED ENVIRONMENTS
HANDBOOK FOR UNIVERSITY TEACHERS

ERIKA LÖFSTRÖM, KAISA KANERVA,
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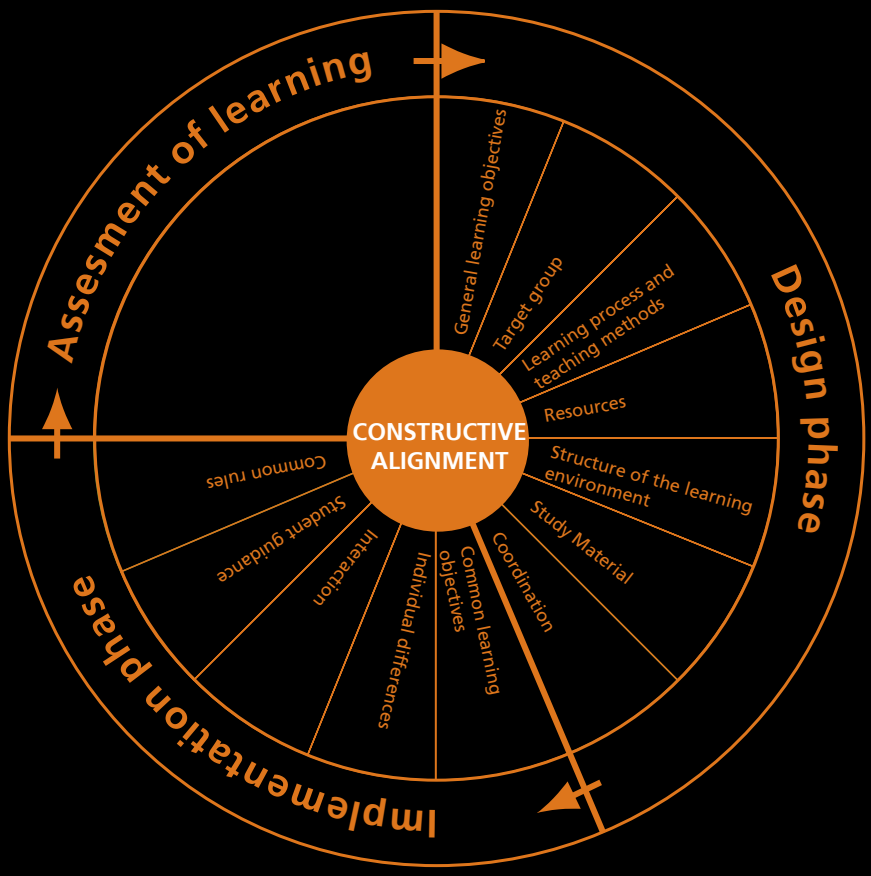

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QUALITY TEACHING IN WEB-BASED ENVIRONMENTS:

Handbook for University Teachers

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High quality learning at the university means that students acquire a deep-level understanding of their discipline and the ability to apply this knowledge. Teaching and learning in web-based environments impose new opportunities and challenges as well. The teacher can facilitate learning by planning and implementing teaching according to the principles of constructive alignment, keeping in mind the factors that affect the meaningfulness of learning and by making an effort to keep the load on human information processing low.

The aim of the handbook is to provide teachers ideas and tools for the planning, assessment and development of web-based courses. The handbook can be used as a work book. Its content is based on research results and offers practical examples of teaching solutions for use in web-based learning environments.

Key words:
web-based teaching, higher education, development of teaching, quality of web-based teaching

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Preface

The use of web-based learning environments has become an essential part of teaching at the University of Helsinki. Many of our teachers have actively participated in the development of and acted as pioneers in the field.

The University's programme for the development of teaching and studies states that the quality of teaching is based on extensive, first-rate research and outstanding teachers. Skilled teachers and content based on advanced research are also needed in teaching in web-based environments.

High-quality online teaching requires teachers to make versatile and educationally meaningful use of the possibilities provided by web-based learning environments. The teachers' own educational philosophy and understanding of the nature and possibilities of web-based learning environments are crucial elements. Teachers need information about the educational principles of online teaching and the ways in which they promote the quality of students' learning. They also need practical examples and guidelines in order to apply tried and tested educational models to their own web-based courses. University teachers also value educational development based on teaching and related research.

Quality Teaching in Web-Based Environments: Handbook for University Teachers is designed to serve university teachers in their goal to enhance teaching, especially in the field of web-based teaching. Its content is based on research results and offers practical examples of teaching solutions that are suitable for online use.

It is my wish that this handbook reaches the university's teachers and that they find it useful in the development of their teaching inspiring new viewpoints on the possibilities and applications of online teaching.

Hannele Niemi
Vice Rector

To the reader

This handbook for web-based teaching is designed to support university teachers in the planning and implementation of high-quality teaching utilising web-based learning environments. The goal is to provide teachers with ideas and tools for successful design of online courses based on research information and good practices. The handbook focuses on educational issues related to online teaching since university teachers have found that pedagogical knowledge is necessary when teaching in web-based enviornments.

The Finnish Virtual University strategy has resulted in a growing popularity of ICT at university departments, and the number of courses utilising web-based learning environments has increased considerably since 2000. The international evaluation of the quality of education and degree programmes carried out at the University of Helsinki has raised the question of developing the quality of online teaching. Although both teachers and students are becoming more experienced in web-based teaching and learning, this has not decreased the need to create and communicate good practices in the field.

This handbook is the final publication of the project on quality in web-based teaching carried out at the University of Helsinki in 2003–2006. The project focused on developing and assessing quality management in web-based teaching. Its objectives were to increase the quality awareness of teachers and other staff involved in web-based teaching at the University of Helsinki, to identify and analyse first-rate practices in online teaching using research methods, as well as to produce material based on research results to support teachers. Previous project publications include a collection of articles dealing with quality in university web-based teaching. The collection (in Finnish) is available online: http://www.helsinki.fi/ktl/julkaisut/lv/laadukkaastiverkossa.pdf (Nevgi, Löfström & Evälä, 2005). The project received virtual university funding and was jointly carried out by the Centre for Research and Development of Higher Education (Department of Education) and the Department of Psychology at the University of Helsinki, Finland. This handbook is primarily intended for teaching staff at the University of Helsinki, but many of the ideas presented may be utilised by teachers and researchers in other higher education institutions as well. Because of the target group of the handbook, many of the web sites provided are in the Finnish language only.

The content of this handbook is based on research data reported in the article collection, research in web-based teaching and learning, the authors' experiences of web-based teaching and the Programme for the Development of Teaching and Studies 2007-2009 at the University of Helsinki. Comments and opinions were also gathered through interviews with six teachers at the University of Helsinki, who used the handbook to design and implement courses in autumn 2006.

We wish to express our warm appreciation to the people who contributed to this handbook by commenting on the material, sharing their practical experiences and participating in fruitful discussions. This work involved the project steering group, chaired by director Kauko Hämäläinen (up to 31 August 2006) and Anne Nevgi (as of 1 September 2006). In addition to the steering group members, we wish to thank the teachers who used the handbook to design their courses, took part in the initial and final interviews and provided important comments and tips. These activities involved university lecturers Lis Auvinen, Mia Säkkinen and Kirsi Wallinheimo, planning officer (online teaching) Jaana-Piia Mäkiniemi and researchers Eerika Finell and Inari Mattsson. We wish to thank Päivi Pakkanen, head of development, Academic Affairs, for her continued support and encouragement during the project and the opportunity to publish this handbook as part of the Academic Affairs publication series. Thanks for good cooperation during the project also go to Sari Koski-Kotiranta, head of the Educational Centre for ICT, Pauliina Kupila, educational technology specialist, Annika Evälä, planning officer, Educational Centre for ICT, and Petra Nyman, psychologist. We also extend our sincere thanks to all those who have provided us with valuable comments and observations based on practical experiences and theoretical knowledge of online teaching. They include professors Jari Lavonen and Sari Lindblom-Ylänne, university lecturer Kalle Romanov, department coordinator Tuomo Aalto, planning officer Minna Vänskä, educational technology specialist Sanna-Marja Heinimo and researchers Jiri Lallimo and Päivi Virtanen. They have shared their expertise, offering deeper understanding of the phenomenon and bringing up different views.

Introduction

Web-based learning environments offer new and inspiring possibilities in teaching. Online discussions, information distribution via web-based learning environments and the opportunity for students to learn from one another through exercises and thought-sharing open up innovative ways for both teachers and learners to jointly treat the topics to be learned, evaluate information and learn new things. Encouraging students to actively deal with new topics helps to make the learning experience deeper and more versatile. Information and communication technology (ICT) in itself does not ensure high-quality teaching nor does it alone help students to learn. Promoting learning by providing support to the learning process is essential to teaching. Teaching in web-based learning environments emphasises study guidance more than ever: teachers and students may not meet in the course of the learning process, and students are expected to work more independently. Interaction in web-based learning environments differs from that in contact teaching, presenting challenges to the teacher in charge of guidance. Well-designed teaching and educational solutions that help to achieve the learning objectives enable ICT to be used successfully to support learning and teaching. This handbook aims to provide tools to successfully utilise ICT in teaching and deal with the new educational challenges presented by online activities. In this handbook the term 'web-based teaching' is used broadly to refer to teaching that uses different forms of ICT for a variety of purposes. In practice, 'web-based teaching' is often used to refer to a combination of face-to-face and online learning.

The theoretical framework of this handbook is based on the constructive alignment model (Biggs, 1996), meaningful learning model (Ausubel, 1968; Jonassen 1995; Ruokamo and Pohjolainen, 1999; Nevgi & Tirri 2003) and the cognitive theory of multimedia learning (Mayer, 1997; Sweller, van Merriënboer & Paas, 1998), all of which are also used to define high-quality teaching and learning. The constructive alignment and meaningful learning models apply to teaching arranged in other learning environments as well. Although the handbook focuses on the use of ICT in teaching, many of its topics also apply to other learning environments. In addition, the handbook offers a collection of key factors affecting the quality of teaching and learning.

The contents of this handbook are linked to the Programme for the Development of Teaching and Studies 2007-2009 at the University of Helsinki. The focal points of the programme, especially their bearing on web-based teaching, are taken into consideration in the guidelines presented in this handbook. The objective of studies at the University of Helsinki is a student-oriented, thorough education. The programme for development of teaching and studies focuses on the quality of learning, academic guidance and international learning environments. In terms of the quality of learning and academic advising, the programme em-

phasises, among other things, the need to provide guidance for the students' learning process and to develop the methods used to assess learning. Web-based teaching enables the utilisation of versatile teaching methods that support different types of learners.

According to the programme for development of teaching and studies at the University of Helsinki, high-quality teaching is based on research, makes use of international contacts and interacts with business and working life. The link with research can be seen in the subjects taught, as well as in the teaching methods used, which are suitable for the intended purpose and draw on research in higher education. ICT offers networking tools for students, teachers, researchers and people in working life. The main programme areas can be taken into consideration in the overall planning of teaching at department level, as well as in the design of individual (web-based) courses.

This handbook is divided into three main sections. The first one deals with theoretical models and views, which serve as background information to support the design of web-based teaching. The main objective of high-quality web-based teaching is to implement the theoretical principles laid out in the first section. The second section provides tools for the concrete design of web-based courses in line with the principles presented in the first section. It prompts the reader to consider how to set learning objectives for a course, how to select teaching methods that support the achievement of these objectives and how to assess the achievement of learning objectives. The section includes practices that are related to teaching of good educational quality and can provide help and support to teachers. These practices are designed to serve as guidelines and generate new ideas during the design process. The third section discusses the evaluation of the teaching in a web-based environment as part of a course. Course evaluation prompts the development of teaching in general and oneself as a teacher. A selection of research findings (Current research indicates…), practical examples (Newsflash) and links (Look it up!) are presented in Chapters Two and Three. The reader will find appended to the handbook two course assessment tools; one for the teacher and the other for the students. These may help the teacher to identify targets for development in teaching. A planning model for web-based teaching guides the reader throughout the handbook.

How can you use this handbook? All of the sections include questions that aim to stimulate thought and help to recall previous experiences related to teaching and the design of web-based teaching, as well as to guide you to consider how to make use of the practices in your own teaching. Writing down your answers and comments will make the handbook into a concrete design tool, which you can return to when planning other courses.

The handbook can be used as a workbook. Actively thinking about the topics and writing down your thoughts will help you to introduce new and innovative methods into your teaching, which will help to develop it. Before reading the actual handbook, define two to three web-based teaching-related targets of development that you would like to emphasise in your teaching and for which you hope to get ideas from this handbook. These may include, for example, enhancing guidance to distance learners or keeping to the course schedule. Browse through the table of contents for more ideas.

Targets of development:

1._____

2._____

3._____

Return to these targets during the course evaluation.

Start with small steps. There is no need to do everything at once but you can always learn from inspiring ideas!

1. Aiming at aligned teaching and meaningful learning

Teaching objectives are influenced by the aspiration for high-quality teaching and learning, the curricula, as well as university strategies and the ensuing development programmes for teaching and studies. Before you begin to design web-based teaching it is a good idea to get acquainted with the general principles governing its design and implementation. This chapter introduces some theoretical models and views that will help university teachers plan their teaching. The theoretical framework of this handbook is built on the constructive alignment model, the meaningful teaching model, and research on cognitive processes.

The constructive alignment model (1.1) provides a tool that teachers can use to create teaching that supports profound learning. The model for meaningful teaching (1.2) describes issues that affect the learning result, many of which can be influenced by both the teacher and students. When using ICT and web-based learning environments in teaching, one must also take into consideration the possibilities and restrictions that the environment presents in terms of cognitive processes, such as the memory system (1.3). New media and technologies enable the use of versatile teaching methods and materials. However, they may also cause a cognitive load on the user and thus hinder learning. In other words, when planning and implementing web-based teaching, the overall design, the activities of the teacher and students, as well as cognitive processes must be taken into consideration as a whole.

1.1 What is in line in aligned teaching?

Studies aim to provide students with a profound understanding of the topics discussed. Teachers can best support the learning process by focusing on three fields: the setting of learning objectives, the selection of teaching methods and the evaluation of learning. It is important that all of these support the objective, that is, the achievement of profound understanding. This chapter focuses on these fields, studying them through the model of constructive alignment.

What kind of personal experiences do you have of good teaching? Recall a course that you found to be particularly successful. What made the course good? How did you know that students had learned the topics? What kind of teaching and assessment methods were used, and how do you think they supported learning?

Good teaching leads to a profound understanding of the topics. This is supported by well-aligned teaching in which the goals for learning, contents of teaching, teaching methods and student assessment all pave the way to achieving the target. Web-based teaching shall consider different ways in which the online environment can be used to support topic presentation. It shall also consider the methods that can be used in the online environment to encourage, for example, collaborative learning. Assessment focuses on profound insight into the content instead of superficial rote learning. To promote profound learning and mastery of the topics, the teacher might select a method that supports collaborative learning and encourages students to treat the topics in online discussions. Assessment must also support joint collaborative learning. A group exam is an example of such an assessment method, which also enables the development of group work to be evaluated.

The constructive alignment model is based on a constructivist view of learning. It is essential that students make information meaningful to themselves by creating and editing it through active information selection and construction both alone and in groups (Biggs, 1996, 2003). In other words, individuals and societies develop their understanding of the world while also influencing the way in which it is viewed and experienced. Instead of being passive acquisition, learning involves active cognitive operations on the student's part. Students interpret their observations and new information based on their previous knowledge and experiences (Tynjälä, 1999). Their assumptions, motives, intentions and previous knowledge all have an impact on what and how they learn (Biggs, 1996).

Good teaching and assessment support activities that guide students towards the deep learning approach (Biggs, 1996, 2003). 'Approaches to learning and studying' mean the ways in which students experience and interpret the learning task (Marton & Säljö, 1997). The approach may involve deep learning or surface learning (Entwistle & Ramsden, 1983; Bowden & Marton, 1998). Deep learners try to understand the subject matter, relate new and old information, study underlying principles, find links between conclusions and review arguments critically. Surface learners do not pay attention to meaning and strategies, they experience the course content as unconnected bits of information and rely on rote learning. It is also possible to distinguish a strategic approach, which is a combination of deep and surface learning. Students with a strategic approach find out the exact assessment criteria and focus on the matters they believe the teacher will emphasise. This approach often aims to achieve the highest grade with as systematic a study method as possible.

Studies indicate that the deep approach leads to higher quality learning than the surface approach (Entwistle & Ramsden, 1983; Bowden & Marton, 1998; Lindblom-Ylänne, 1999). Teachers can influence students' approaches to learning by setting learning goals, selecting

the appropriate teaching methods and planning assessment of learning. The students' activities and thinking also have a bearing on the approach they adopt, and even deep learners may resort to surface learning depending on the circumstances. The focus of teaching should always be kept on the student and on how and what the student is learning (Biggs, 1996, 2003). Assessment methods that encourage rote learning of unconnected information do not guide the student to search for entities and interconnections.

The design, implementation and assessment of teaching consist of interconnected fields (see Figure 1). Information and communication technology enables new ideas and possibilities, which are discussed in more detail below. Ideas for introducing constructive alignment into web-based teaching are presented in chapter two.

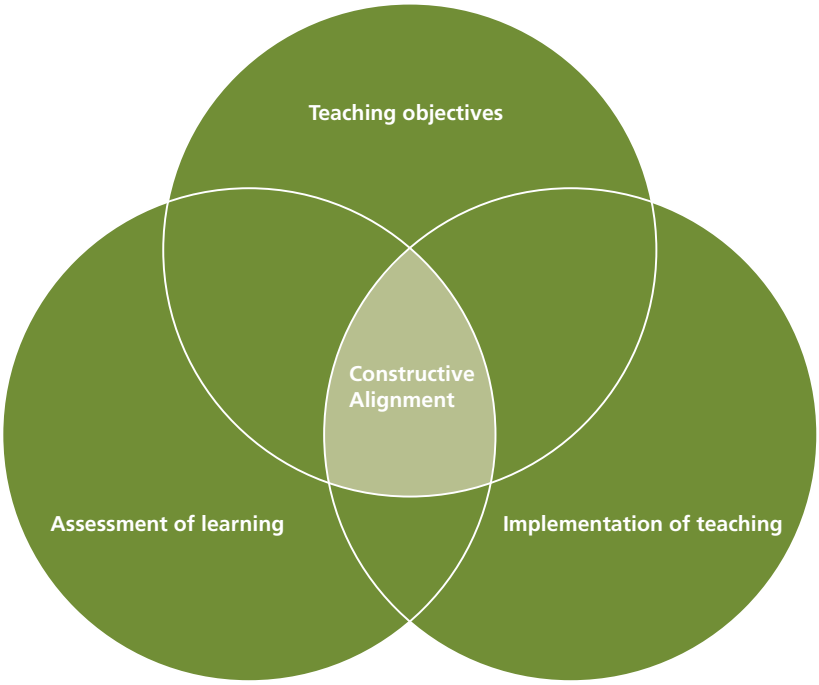


Figure 1: Constructive alignment facilitates deep learning

Teaching objectives

The design of teaching activities starts with the setting of learning objectives. These are based on degree goals and the curricula. The teacher determines what the students must learn, as well as the skills and knowledge that are essential to the content. The core content consists of key theories, models and principles, which are divided into complementary and essential knowledge (Nevgi and Lindblom-Ylänne, 2003). The more concrete the goals, the easier it is for students to understand them. To encourage the students' commitment to learning, they can be involved in the setting of objectives. This also makes the process *learning-oriented*, which is important in deep learning. It means taking into consideration the students' point of view and their way of making sense of the subject.

Implementation of teaching

The selection of teaching methods can contribute to deep learning. Well selected methods support the achievement of learning objectives, that is, they are aligned with the objectives. When selecting methods, consider whether they support learning-oriented or content-oriented studies. Web-based learning environments provide a framework for the learning-oriented approach, among other things, because students can proceed at their own pace within the given period of time. However, the teacher must arrange sufficient support for students in the form of guidance and tutoring, as well as by encouraging students to exchange information and give feedback and support. The student group can thus also act as a teaching resource and promote learning. In web-based learning environments, constructive alignment sets certain demands on the learning platform and materials, learning task design, periodisation of the learning process and design of studies that activate students.

Assessment of learning

By selecting assessment methods that are aligned with the objectives, the learning process can be supported from beginning to end. Assessment gives the teacher information about the student's progress and the student information about his or her skills. The form and target of assessment have a significant guiding impact on learning. The student's attention and interest focus on the skills and knowledge that will be assessed. After the teacher has determined the objectives for learning and decided on the teaching methods, the assessment methods are selected so that they truly evaluate the achievement of the objectives. An assessment that is not aligned with the objectives and methods leads to a hidden curriculum: students learn that which will be assessed.

The learning process is often described as a series of phases involving teaching, studying, learning, assessment. According to this line of thinking, teaching affects studying, and studying leads to learning, which is then assessed. In practice, good teaching involves continuous assessment that supports learning. Assessment can be of a formative or summative na-

ture. *Formative* assessment focuses on the learning process. Determining the students' prior knowledge of the topic and possible gaps in it enables teaching to be designed on the basis of the students' starting level. This also creates a framework for teaching that takes the students' needs into consideration. Assessment promotes and guides learning. *Summative* assessment, in turn, focuses on the results of learning. It gives students feedback on their skills, while the teacher gets information about the success of teaching and the achievement of learning objectives. Both approaches are needed, seeing that they complement one another (Brown, Bull & Pendlebury, 1997). Assessment may also target qualitative or quantitative factors. *Quantitative assessment* deals with, for example the number of correct answers, which can be graded and evaluated. *Qualitative assessment* focuses on the student's degree of development. It evaluates the way in which the student has constructed knowledge, not the amount of knowledge (Lindblom-Ylänne & Nevgi, 2002).

Example: Alignment of teaching

Irene teaches a basic course in applied quantitative methods at the university. The course objective is to show students how basic statistics can be applied in their own field. This also calls for mastery and understanding of the basic concepts.

The course is arranged partly as contact teaching, partly as web-based teaching. Contact teaching includes lectures and exercises held by the teacher. The lectures deal with concepts and their mathematical foundations, while exercises focus on solving basic statistical problems that call for the application of knowledge. Students also maintain learning diaries, which are published on the course site. In their diaries, students describe different ways of using fundamental statistics in problems related to their field or hobbies. Each student also comments on at least two other diaries. To ensure that all participants get peer feedback, Irene has decided that the first comments must be made to a student who has not yet received any feedback. When commenting on the second diary, students should try to ensure that as many students as possible get feedback from two people. Students have also edited their diaries after receiving feedback.

The learning diary can also be created in groups but in this case its scope must be in line with the group size. Irene also encourages students to turn to her during office hours especially in questions about diary content.

Students enjoy online discussions and appreciate getting feedback although they find the learning diary to involve a considerable amount of work. Topics learned at lectures and from exercises can be used in the diaries. Students believe they have learned the topics and many of them change their notion of the usefulness of statistics. Even Irene is surprised by the students knowing how to apply what they have learned to practical matters. If any problems arise, students use the feedback they have received online and in class and add material to their learning diary.

For the final exam, the students study the course textbook. Topics handled at lectures and in exercises are also part of the exam. In two of the exam questions students are asked to prove a few simple theorems related to fundamental statistics. The two other questions involve providing formulae for a number of basic concepts.

Irene notices that the quality of exam answers is, generally speaking, relatively low. The students' final grade is determined by the exam result (75%) and the final learning diary (25%). The teacher and students are disappointed with the exam results and grades.

Irene wonders how she could develop teaching next time. Which field of the constructive alignment model do you think Irene should focus on? Is there anything she could change?

1.2 What makes learning meaningful?

The meaningfulness of learning arises from the student's own active and goal-oriented input into his or her learning. The teacher can act in such a way as to support the student in creating a meaningful learning experience. Activity can be enhanced by making it possible for the student to focus learning activities according to his or her own interests. Learning also benefits from the student being able to link the learned material to existing knowledge structures and a relevant context. As a result of using web-based learning environments, the student may learn not only the course content, but also other skills, such as metacognitive abilities (learning to learn).

What kind of thoughts do the notions of meaningful and significant learning bring to your mind? Think back on the course that you found to be successful. How did students work in it? How did your own activities and teaching support students?

Meaningful learning **(see Ausubel 1968, Jonassen 1995, Ruokamo & Pohjolainen 1999; Nevgi & Tirri 2003)** ***is affected by the activity, intentionality and reflection of students, constructivity of teaching, collaborative and interactive nature of learning methods, as well as the contextuality and transfer effect of the material learned*** (Table 1). When designing the content of learning tasks the teacher should keep the goal of meaningful learning in mind. Online discussions, for example, can promote collaboration, interaction and activity, while a learning diary can be used to enhance reflection, activity and intentionality. All of these support the assimilation of new content.

Table 1. Supporting meaningful learning in a web-based learning environment (Nevgi & Tirri, 2003, 36-37).

Criterion	Support provided by the web-based environment	Manifested as…
Activity Independent acquisition and processing of information	Interaction The environment contains elements that students can use to analyse information and to record their notes and texts online.	Independence Students produce new material in the web-based environment for other students to read and comment on.
Intentionality Setting goals for one's own learning and monitoring their achievement	Design and assessment tools The learning environment provides tools that both individual students and groups can use to design, monitor and assess their own learning.	Goal-oriented activities Students identify and clarify their learning objectives, record them in the learning diary or calendar and draw up a personal study plan. Students monitor and assess their achievement of objectives using the learning diary.
Reflection Identification of and reflection on one's own learning and approaches to learning	*Metacognitive tools* The learning environment contains tools for assessing one's own learning, such as a learning diary, independent tests or drawing applications for the creation of mind maps and models depicting one's own thinking.	*Review of own learning* Students try to get a picture of their own learning by analysing the learning journal, examining their own ideas and organising material into conceptual entities.
Contextuality Use of authentic materials and situations in studies and learning	*Virtual reality* Contextuality can be increased, for example, with video clips or DVDs if no more developed online simulations are available. The easiest way to support contextuality is to use hyperlinks and stimulus material for problem-based learning.	*Problem-solving* Students try to find alternative solutions to real-life problems.
Transfer effect Applying the material learned to new and different situations	*Virtual spaces* The learning environment contains hypertext, data banks and problem-solving or design tasks.	*Practice, application* Students practise the application of skills and knowledge, for example, by formulating realistic problems based on information related to existing companies or institutions found on the Internet. Students also aim to solve these problems.
Constructivity Relating old and new information, assessing the meaningfulness of information	*Structure* The learning environment contains previously learned information in a hypertext structure, as well as learning tasks that are based on or reflect previous knowledge.	*Combination, comparison* Students compare various sources of information and relate them to their own knowledge or previous and current understanding.

Collaboration Participation in joint learning through one's own active work input	*Shared work areas* The learning environment features common work and discussion areas, such as chat areas, blogs and spaces for sharing and jointly processing files.	*Joint studies* Students participate in interaction by contributing their knowledge to joint discussions and work, for example, through process writing carried out in groups.
Interaction Participation in the joint learning process through thought exchange and dialogue	*Discussion areas* The learning environment has common discussion areas, and email is available to the students.	*Criticism, openness* Students can share their thoughts, give and get feedback, for example, in asynchronous discussion forums or synchronous chat discussions, where brainstorming is used to present and justify views and to search for new ideas.

Student *activity* can be encouraged through pair or group work, which makes students aware of their responsibility for their own learning and possibly that of the whole group. The result will be either deep or surface learning depending on the learning strategies adopted. The most highly developed strategies lead to a conceptual change in the learner's way of thinking. Strategies used by students may include, for example, revision of content, note-taking, creation of examples or formulation of conceptual maps. Activity can be encouraged by using the students' own examples and cases, and linking the course content to them. Student activity leaves traces in the web-based environment, making it possible to return to previously produced material and examining how one's own activities have influenced development.

Intentionality, that is, goal-oriented studies, can be supported by having students set the objectives for their own learning, as suggested in the constructive alignment model. To emphasise learner orientation, students should be encouraged to identify their own learning objectives within the scope of the curriculum and the subjects taught. Web-based environments offer planning and assessment tools, such as learning diaries and an electronic personal study plan, which support goal-oriented learning. The teacher can use the learning diary to give students feedback or present questions for further research and discussion. Students must also assess their own learning. The teacher's feedback and questions may work as stimuli in this task. Students are not left alone to write the learning journal; the teacher or tutor must also support the students' individual learning processes.

Learning diaries and personal study plans develop *reflection*, which involves studying one's own ideas, as well as identifying and consciously developing one's learning habits. The analysis of learning is part of the learning process. Controlling and adjusting one's learning is a metacognitive activity. In the early phases of learning, metacognitive activities include the design of learning, the setting of personal goals and the selection of strategies to achieve

the goals. These strategies can be modified during the learning process if they do not lead to the target. Evaluating one's own learning and strategies throughout the learning process is an element of *self-directed learning* (Tynjälä, 2003).

Linking subjects through examples to students' everyday lives adds to the *contextuality* of teaching. Learning can be enhanced by linking the subject matter to as authentic situations as possible or by using real examples and materials. Real-life problems can be simulated using games, videos, video clips, documents, case examples found on the Internet or stimulus material used in problem-based learning. The goal is to enable the student to use and apply the material learned in different settings later on. Data banks and hypertext offer virtual spaces for applying the lessons learned. Practising and applying new information in different kinds of real or simulated situations enhances the *transfer effect*.

Surveying students' previous knowledge and taking it into consideration in teaching supports the principle of *constructivity*. New information adds to existing knowledge, leading to increasingly structured and developed information structures. Students relate new information to previously acquired knowledge, then compare and evaluate it to decide on its meaningfulness. It is essential that students learn to detect and understand connections between subjects to create meaningful clusters of information. The teacher can look into the students' previous knowledge and interests and use this information to devise learning tasks that require the students to use their prior knowledge about the content. Previously handled material can be saved as hypertext in web-based learning environments. This enables students to return to past thinking patterns and analyse their own development.

Group work is *collaborative*. Students take part in the learning activities of their group, contributing with their skills and knowledge. Collaborative learning aims to solve problems by making use of the experiences and ideas of others in an atmosphere of positive dependence. The strength of the group is best exhibited in problem-solving cases where group members find it difficult to solve problems on their own in a satisfactory way but where the group members' different skills and experiences can be combined to reach good results. Further support to collaborative learning comes from the group being able to choose problems based on the members' interests. Discussion areas, as well as shared spaces and tools for file management and processing, such as the FLE and BSCW learning platforms, support this type of activity in the web-based learning environment. They enable process work, which is an ideal support for collaborative learning. *Interaction* is a key element in collaborative work. Learning is a dialogue-like process between the teacher and students and among students, which leads to new viewpoints and ideas through the exchange of thoughts. Feedback is an essential part of dialogue, functioning as an element that promotes students' own thinking. To promote interaction, web-based environments feature chat areas, where participants can engage in thought exchange and develop both critical and open approaches to discussion. Email is one of the easiest ways to enhance interaction.

Example: Meaningful learning

Oliver teaches a basic course in social psychology that aims to introduce students to theories and models of group interaction. Another goal is to discuss how and in what situations group interaction studies can be applied. Oliver uses both web-based and contact teaching for the course. The purpose of online activities is to support joint knowledge creation and generate discussion that could not take place within the limitations of lecture hours.

Oliver has decided to adopt the model of progressive inquiry learning (Hakkarainen, Lonka & Lipponen, 2004). He is also familiar with the models of constructive alignment and meaningful learning. Each student group works on a topic that is related to the course content and which the group itself has selected. The web-based environment offers a discussion area that groups can use for joint knowledge creation, as well as areas in which each group can work on their own document. Students decide whether they want to work on their group task face to face in their free time. Lectures will be used to discuss the phases and progress of group work. They are also the place where students get feedback from other students and the teacher, as is customary in research seminars. Oliver also plans to give some traditional lectures on topics he considers to be important.

The course begins by creating a context for learning. Students carry out discussions – first online and later at lectures – on their existing skills and knowledge that the course objectives defined by the teacher relate to. The students then pick a problem. Each group's topic is closely related to issues and challenges that come up in everyday interaction. The groups discuss the selection of their topic online or face to face. Each group's problem-setting is also discussed and refined during lectures. Nearly every group settles on a problem that has arisen during online discussions on phenomena related to group interaction. The students then begin to formulate hypotheses (explanation-oriented learning) and test them (critical assessment) by acquiring information about the topic (acquisition of new information). In line with the model of progressive inquiry learning, one of the course objectives is to share expertise, making everyone responsible for joint knowledge creation. Students are also instructed to indicate in the heading of their writings whether they are submitting a problem definition, an explanation of the topic in light of their current understanding, a critical assessment or a new proposal. The goal is to encourage students to analyse the kind of information they are giving to the group and the phase at which they find themselves. Students' problems form the core for learning.

Oliver is satisfied with the amount of work that students put into their group work and the high academic quality of their jointly produced material. However, he wonders why students found it difficult to describe different kinds of situations in which theoretical knowledge could be applied even though their work was based on problems that arose from real-life situations.

Oliver is also considering ways to change the course the following year. He would like students to be able to pay more attention to situations in which the theories and models could be applied and ways in which this could be done. On the other hand, he fears that exerting too strong a control over practical activities will weaken the academic quality of group work and that the results will then be based on the students' own experience of ways to influence interaction. What advice would you give to Oliver?

1.3 Does technology put a load on learning?

Deep learning can be promoted using constructive alignment and the principles of meaningful learning. Technology enables whole new formats for course material as well as new learning environments. This chapter centres on the resulting challenges and possibilities for the learning process.

Before continuing, think about different information formats in relation to learning. How do you learn best? By listening or reading? From pictures or text? What topics in your own field could benefit from the use of pictures or animations in teaching? Have you ever used Internet pages or learning environments that have seemed particularly tedious or complicated?

The design of web-based learning environments and study materials must take into consideration how different information formats can either help or hinder learning. By emphasising the design of the learning environment and focusing on the selection of media solutions, the teacher can help students to benefit more from the course material and, consequently, raise the quality of learning results and improve the motivation of students.

The teacher can influence learning through the design of teaching methods but also through the selection of the web-based learning environment, study material and media used for teaching. The structure of the learning environment must be kept in mind while preparing and giving the course to ensure that it is clear and easy to use. In this way the teacher can promote learning and improve the students' study motivation (Kanerva et. al., 2006).

Web-based learning environments, data networks and multimedia materials create a new context for learning in terms of human information processing. Technological tools enable information to be presented in a variety of new formats. For example, the interactive nature of the learning environment, the use of pictures, animations and audio clips in study materials, as well as the application of hypertext structures introduce cognitively challenging and learning-promoting elements into the learning process that traditional learning environments have not offered (e.g., Tardieau & Gyselinck, 2003). Learning calls for active participation from students, who must process information, perform assessments, as well as analyse and combine information from various sources. When supported by the teacher, web-based teaching and multimedia materials can ideally enhance the thinking patterns and knowledge building abilities of learners. However, the requirements that teaching in web-based environments puts on the cognitive activities of learners must be kept in mind at all times. The teacher can promote learning and study motivation by emphasising cognitive factors in the design and implementation of web-based courses.

Cognitive theory of multimedia learning

Human cognitive activities include, for example, memory, thought and deduction processes present in all learning situations. These processes influence the memorising of facts, deep-level understanding and interactive construction of information. Web-based teaching can support all of these learning-related cognitive processes (Mayer, 1997).

The human memory system (see Figure 2) plays an essential role in learning situations. The working memory processes and maintains information that the learner is working on and is thus crucial to the learning and understanding of information (Baddeley, 1986). After being processed in the working memory, information is stored in long-term memory. For example, links available in the web-based learning environment remain active in the working memory while the learner looks for information in the environment. Some of the links, especially those that are used frequently or carry special importance, are learned, meaning that information about their location and content is stored in long-term memory.

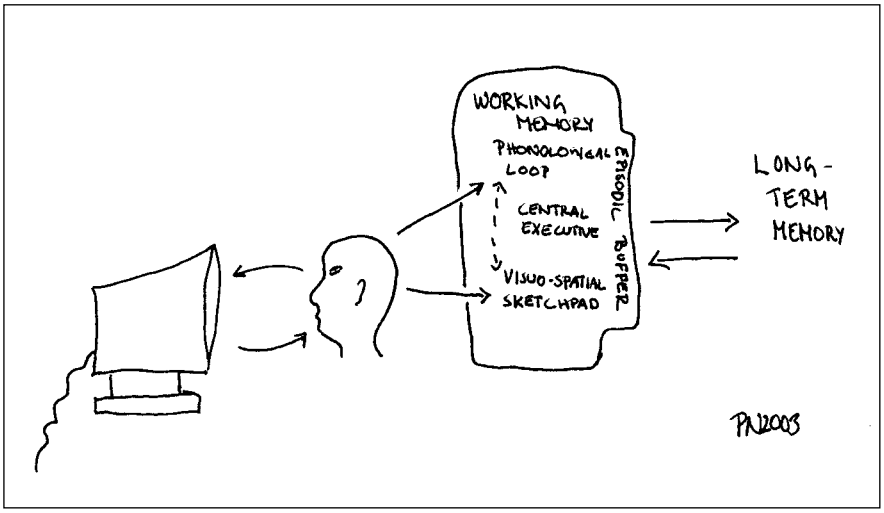


Figure 2: The content to be learned is processed in the subsystems of the working memory after which it is integrated with knowledge representations in the long-term memory (adapted from Baddeley 1986, 2000, cf. Nyman & Kanerva, 2005, 96).

The working memory has limited capacity and can only hold a particular amount of information at any given time (Baddeley, 1986; Cowan, 2000). It processes verbal and visual information in separate subsystems, the phonological loop and the visuo-spatial sketchpad, which are controlled by the central executive (Baddeley, 1986). Working memory stores and processes have limited capacity, but the material processed in one subsystem does not load other subsystems. Visual and verbal information is integrated in the working memory to form a coherent representation of the information learned. For meaningful learning to take place and mental links between different types of information to be made, the learner must be able to simultaneously maintain multiple representations of information in the working memory (e.g., Mayer, 2003).

The comprehension of academic text can be improved by using visual material, such as pictures and animation (e.g., Mayer, 1997). Studies show that students do better in solving applied problems that require an understanding of cause-effect relations if the study material includes illustrative pictures in addition to text (Mayer, 1989). Furthermore, presenting the text and the corresponding picture close to one another rather than separately leads to better learning results (Mayer, 1989). In web-based learning environments this means placing related text and visual information in the same place so that learners do not have to click several links to access the visual information related to the text.

Cognitive load and learning in web-based environments

Working memory loading related to online learning has been explained with the cognitive load theory (Sweller, van Merriënboer & Paas, 1998; van Merriënboer & Sweller, 2005). The theory is based on the notions of a working memory with limited capacity, and a long-term memory where information is stored in the form of schemata after processing in the working memory. Learning leads to schemata becoming automatic. An item that would have called for considerable working memory capacity when presented as new information needs much less capacity once it has become automatic.

The load on the working memory in a learning situation consists of intrinsic and extraneous load elements (Sweller & Chandler, 1994; Sweller, van Merriënboer & Paas, 1998). Intrinsic load is related to the complexity of the study material. A complex task, such as understanding and internalising a theory, implies a bigger intrinsic load than a simple task, such as learning a list of foreign words.

Extraneous load is related to the presentation of study material. It has a key role in online learning. Extraneous cognitive load is often greater in web-based environments than in traditional learning environments because the learner has to combine information from various displays and keep in mind where each piece of information was found to be able to return to the right place if needed. For example, a task that requires the learner to combine information which is presented in a hypertext structure consisting of multiple sections involves a bigger extraneous load than a task in which the same topics are presented in a single document.

Intrinsic and extraneous load are related to each other. Whether extraneous load causes problems for learning is linked to the amount of intrinsic load (van Merriënboer & Sweller, 2005). If the intrinsic load is considerable, attention must be paid to extraneous load (i.e., the presentation of information) in order to reduce it so that the overall load does not exceed the limitations of working memory. In other words, the more complex and demanding the subject taught, and the less familiar the learner is with the web-based environment and the topic, the clearer and user-friendlier the web-based learning environment must be. Reducing the load on working memory caused by the learning environment enables cognitive resources to be focused on learning.

The use of web-based learning environments and technology can promote learning since they enable topics to be presented in a number of illustrative ways that enhance the construction of information. However, linking information from many different sources can also cause a load on learning, which must be taken into consideration when designing learning environments and study materials.

Example: Cognitive load

Steven teaches a partly web-based course on plant anatomy and physiology. The main objective is to understand the metabolism of plants. Steven has chosen a web-based learning environment that he is already familiar with. The environment is also familiar to the students since it is used in many of the faculty's courses.

Steven decides to use a calendar, a discussion area and an area for students to store both group and individual work completed during the course. The learning platform also has a space where the teacher and students can store articles and other useful material related to the course topics. Steven is very knowledgeable about the subject taught and can offer many articles and useful links related to the course content. He compiles a list of the links, which ends up to be very long. Steven dedicates one slot to pictures of plants so that students can easily compare the anatomical structures of different plants. For the sake of clarity, he stores information about the functions of anatomical structures under the section reserved for articles. Since the course schedule is tight, Steven tells his students not to worry about learning all of the material provided but rather to get acquainted with the material and links that they find to be important.

The course also includes face-to-face meetings for group work and laboratory exercises in which students are expected to apply the information provided online. Students store their group work in the web-based learning environment. Steven believes that discussion could be useful for the students' work, and decides that work can be discussed and commented on in a dedicated discussion area. During the course Steven comes to think that students might also benefit from commenting the articles so he sets up a new discussion for this purpose.

Steven follows the activities in the learning environment as the course progresses. He is surprised that students do not use information from a variety of sources but rather seem to base their comments on a single article or link. He also gets the impression that students do not use the additional information provided by the pictures of plants. Steven finds this frustrating since he has gone to a lot of trouble to store the pictures in the learning environment. He also wonders why the discussion area for articles shows no activity.

Steven wants his students to formulate a comprehensive picture of the topics taught. Course assessment is therefore based on an exam, which covers the textbook, as well as the topics in the web-based learning environment as complementary material. When grading the exam, Steven notices that many students are familiar with the textbook content but otherwise have a fragmentary understanding of the factors related to the phenomenon discussed, that is, the metabolism of plants. In their course feedback students express their frustration with the workload and not knowing what material was important in terms of the course content. Steven is surprised by the comments on workload since he had beforehand estimated it to correspond to that of a lecture course.

How would you help Steven to plan and construct the learning environment for his next plant anatomy and physiology course so that students could fully benefit from the extensive material and create a comprehensive picture of the topics discussed? What changes would you make to the organisation of study material so that essential material, such as pictures, could be of more use to students?

2. From idea to reality

The first section of this handbook dealt with general principles and objectives that are useful for the design of teaching. The theoretical framework consists of the constructive alignment model, the meaningful learning model and the cognitive theory of multimedia learning. In the following chapter, the implementation of these theoretical models and objectives in planning and actual teaching is discussed. This section follows the constructive alignment model (see Figure 3). The chapter first deals with issues that need to be taken into consideration during the design phase, then turns to matters that emerge during actual teaching and finally discusses the assessment of teaching.

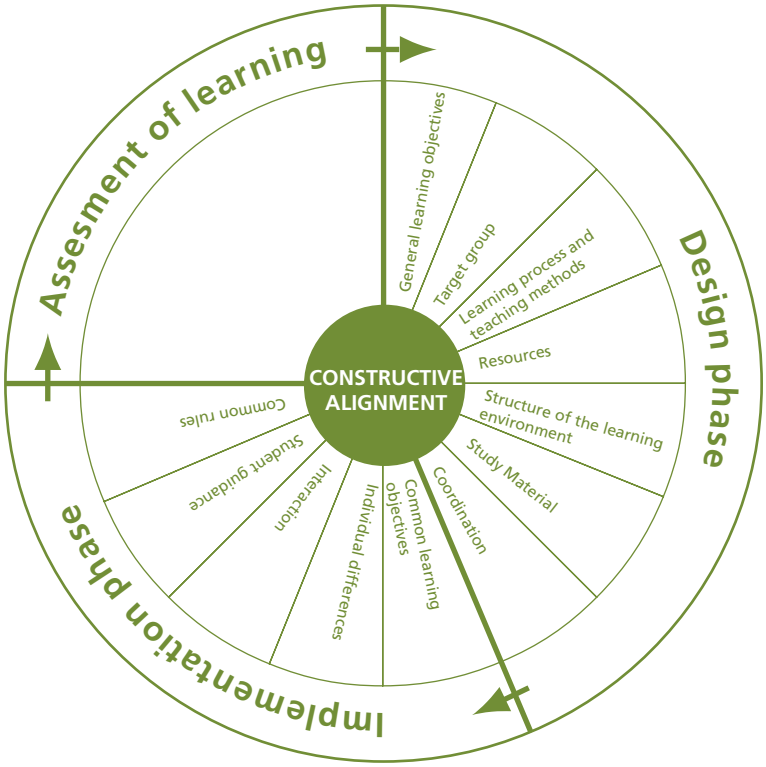


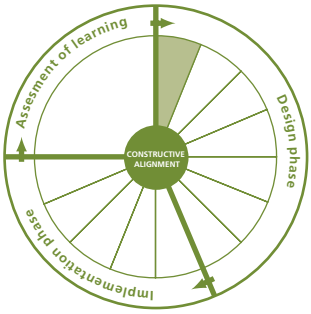
Figure 3: Constructive alignment in teaching: a planning model

2.1 Design phase

This chapter focuses on matters related to the planning of teaching. It provides ideas on how to design the learning process and select methods and procedures that support learning and the achievement of objectives. In the design phase the teacher defines the learning objectives, surveys the target group and designs the learning process to meet the group's needs. This phase also involves the selection of teaching content and methods, as well as study materials. New solutions for teaching can be achieved by using a variety of learning environments. However, the accessibility of technology solutions, as well as time and other resources, may pose certain restrictions.

2.1.1 General learning objectives

As explained in previous chapters, the objectives, implementation and assessment of teaching must support the student in achieving deep learning and understanding. Start the design phase by determining the objectives for teaching. You can define, for example, what you expect the students to learn and what objectives you want teaching to achieve. Setting the objectives for teaching and learning is the first design step in the constructive alignment model.



Take a moment to consider the learning objectives you have planned for the course.

For guidance and support

Course design starts with the setting of learning objectives. Consider the objectives on both a general and concrete level. When setting objectives, think about the course content and related skills and knowledge which the students may find useful later on. Defining the objectives is the main part of the design phase. When defining learning objectives, also think about ways to achieve and assess them.

The selection of teaching content is influenced by the core content of the subjects taught. The curriculum provides the framework for teaching, while core content determines its main topics. Core content includes fundamental theories, models and principles of the subject taught. Further details and expansion of these form complementary and essential knowledge of the subject. (See Chapter 1.1)

The students' own learning objectives and wishes are taken into consideration when setting general learning objectives. High-quality learning results are influenced by the students' own expectations, attitudes, motivation and learning objectives. Students should also be encouraged to analyse their personal goals for learning. The final objectives can then be determined in cooperation with students. All students have their own interests and goals for studies. Helping students to find links between the course topics and their own interests and objectives creates a solid foundation for setting learning objectives that meet both the students' goals and those defined for the course. This makes the course content more relevant to students and promotes their commitment to studying and learning. The learning process as a whole aims at a qualitative change in students' concepts and opinions. In line with this goal, teaching methods must emphasise the students' viewpoints and ways of making sense of the topic.

When selecting the content for teaching, the teacher should examine the latest high-quality national and international research. Course text books are often determined in advance, but web-based environments provide the opportunity to utilise additional material and students may be encouraged to find further materials according to their interests. In this case, the teacher's task is to support and guide students so that they find information and material that is relevant to their objectives and of a sufficiently high quality.

CURRENT RESEARCH INDICATES...

Students' and teachers' experiences of learning goals and contents in web-based courses

Characteristics of a good web-based course include clearly defined learning objectives and interesting content that provides theoretical insight. According to feedback from students and teachers, a good web-based course meets student expectations in terms of content, emphasises facts and provides supplementary material. (Nevgi & Tirri, 2003.)

NEWSFLASH

Core content analysis

Core content analysis can be used to select the material to be taught. It involves an examination of the internal structure of the topics taught and helps the teacher to determine the hierarchical links between the skills in and knowledge of the subject taught.
Further information: Teaching Development Unit, University of Oulu, http://www.oulu.fi/opetkeh/julkaisu/materiaalit/ydinainesanalyysi.html (fi)

LOOK IT UP!

International networks

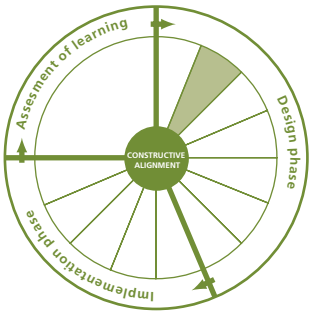
The Finnish Virtual University web site provides information about international online teaching networks.
Further information: Finnish Virtual University,
http://www.virtuaaliyliopisto.fi/?node=vy_networks_disciplines_eng

Food for thought

Review your initial plans for the course learning objectives in light of the material presented in this chapter. Are the objectives you sketched realistic and achievable? Do they take into consideration the students' goals and expectations? Apart from content-related skills, how do you expect students to develop during the course? How are the course objectives related to course implementation and assessment? How will web-based teaching support the achievement of course objectives?

2.1.2 Target group

Identifying the individual characteristics and previously acquired skills and knowledge of course participants forms the starting point for learning-oriented teaching. Determining students' personal objectives, interests, competence and previous experience in online learning will help you to design a course that will offer the best possible support to learning.



Take a minute to consider what the target group of your course is.

For guidance and support

The course is designed to support the target group's learning process. One of the main points in the design phase is to define the general characteristics of the target group. These may include the subjects that the students are majoring in, previously completed courses, technical competence and experience in online learning. When preparing the course, the teacher can design a preliminary survey mapping out prior knowledge for students to complete at the beginning of the course. An initial exam will help to ensure that the students possess basic competence in the course topics. The teacher should allow for some leeway in learning objectives so that they can be modified jointly with the students at the beginning of the course.

The teaching approach is learning-oriented. When designing the course, the teacher should think of ways to support the students' learning objectives, help them to achieve deep learning and encourage them to take responsibility for their own learning. Other things that the teacher should consider are the way in which students work online and what kind of support they need in the web-based learning environment.

NEWSFLASH

Surveying prior knowledge

The University of Helsinki has developed a model that teachers can use to survey students' prior knowledge in the subject taught. The model is based on the notion of competence as a hierarchical and complex phenomenon that starts from the identification of elementary, individual and separate facts and progresses towards more complex information structures and deep understanding. A survey of prior knowledge carried out before or at the beginning of the course provides both the students and the teacher with useful information about the students' skills and knowledge. This helps the teacher design and develop teaching to better meet the needs of the target group, makes teaching more learning-oriented and promotes deep learning. (Hailikari, Nevgi & Lindblom-Ylänne, 2006.)

The model for prior knowledge categorises knowledge into four qualitatively different areas: 1) factual knowledge, 2) conceptual knowledge, 3) relational knowledge and 4) creative knowledge. The teacher can use the model to survey the students' prior knowledge, for example, in the following way:

Survey of factual knowledge

Ask the students to list as many concepts, ideas or topics related to the course content as they can remember. This task will help students to recall previously acquired knowledge related to the new course and to identify gaps in their knowledge.

Survey of conceptual knowledge

Ask the students to define 2–5 core concepts related to the course content. This task will give you an idea of the students' knowledge of the core concepts; it supports the students in recalling previously learned information and helps them to identify their understanding of the concepts.

Survey of relational knowledge

Ask the students to compare and evaluate the relations between the concepts they defined in the previous task and to describe the theoretical views they are based on. This task gives you an idea of the knowledge structures formed by the students and of any mistaken assumptions they have about relations between concepts and topics. This task encourages students to engage in critical and comparative thought and helps them to analyse the subjects they are to study.

Survey of creative knowledge

Give the students a problem to solve in which they need to apply the information they used in the previous tasks. The problem should be possible to solve based on knowledge acquired in previous studies. This task will help you to understand the students' ability to apply their knowledge to solving new problems. It will develop the students' capability to apply their knowledge and will help them to identify any shortcomings in their thinking models. (Hailikari, Nevgi & Lindblom-Ylänne, 2006.)

LOOK IT UP!

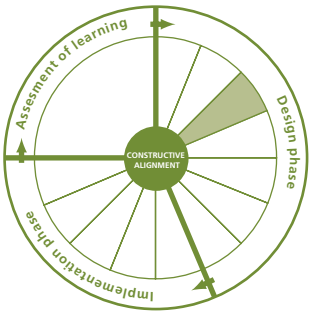
Tools used to survey prior knowledge

- *Student analysis* provides information about students' information and communication technology skills, experience in online learning, learning styles and strategies and expectations of the course. The teacher can use the analysis results, for example, to design teaching methods and emphases.
  Further information: Chydenius Institute – Kokkola University Consortium, http://verkkoluotsi.chydenius.fi/ (fi)
- The E-form is a tool that teachers use to create and maintain different types of forms published in the online environment.
  Further information: Educational Centre for ICT, http://ok.helsinki.fi/elomake (fi)

Food for thought

How much do you know in advance of the students' objectives, prior knowledge about the course topics and technological skills? What kind of information about your target group do you need when planning the course, and how can you get access to this information?

2.1.3 Learning process and teaching methods



After designing the course content, defining the core content and determining the characteristics of the target group you can begin to plan learning processes that support the course objectives and teaching methods that enable the learning objectives to be achieved. When designing learning processes the goal is to ensure that students achieve deep learning rather than remain at the level of surface learning. This chapter deals with the creation of preliminary plans for learning processes and teaching methods, the aim being to get an overall picture of the course. We will discuss teaching methods and ways to support the learning process in chapter 2.2.2, where we treat these issues as part of the implementation of teaching.

What kind of learning do you want to promote in your course? How do you think your students will learn best?

For guidance and support

When designing a course that utilises web-based learning environments, consider how web-based teaching and the use of information and communication technology for teaching purposes can support and activate learning aimed at deep understanding of the course content. Keep in mind that it is the educational solutions that guide the selection of technology and software, not the other way round. The use of information and communication technology is not a goal in itself. What is at issue is the use of ICT to support teaching, studies and learning. When deciding which teaching methods to use, consider how ICT can best support the learning objectives set for the course.

All of the different teaching methods selected for the course shall support the achievement of teaching objectives. Teachers should familiarise themselves with different kinds of educational solutions that can be used to support cognitively high-quality interaction (e.g., activation of students, problem-based learning, progressive inquiry learning). Reflection can be supported through the use of learning diaries, which help students to "learn how to learn".

The selection and design of teaching methods shall make use of the latest research results in education. By following national and international research in online teaching in their own fields, teachers find examples of applications used at other universities and the possibilities they offer for web-based courses. Research orientation can also be achieved if teaching is implemented in the form of research (for example, inquiry learning or problem-based learning) and students produce new knowledge using research methods.

Web-based teaching is designed to support the development of skills needed in working life. Competence can be developed by selecting online teaching methods that support the required skills and knowledge, such as collaborative learning and group work skills.

NEWSFLASH

Activating students

Students can be activated using group and pair work, which call for student input and require students to take responsibility for their own learning (Savery & Duffy, 1995). To boost activity, the teacher can link the course content to examples and cases taken up by students. The teacher can encourage a passive group by asking questions and giving ideas that the group can use as starting points (Berge, 1995; Manninen & Nevgi 2001; Paulsen, 1995). Collaboration among students does not happen automatically in a web-based learning environment. It calls for advance planning of work methods and definition of the roles and responsibilities of group members (Brooks, Nolan & Gallagher, 2001; Haythornwaite, 2002).

NEWSFLASH

Problem-based learning

Web-based environments are ideal for problem-based learning (Jonassen, Howland, Moore & Marra, 2003; Stepien, Senn & Stepien, 2000). Problem-based learning is a method that develops problem-solving skills. Students work in groups to analyse and understand a given problem, such as an actual patient case in medicine, a court case in law studies or a case dealing with learning difficulties in educational studies. The students' aim is to identify theoretical explanatory models underlying the phenomena. The group's support is central to defining the learning task and arriving at a shared understanding of the case. Real-life problems can be recreated with simulations or stimulus material used in problem-based learning. Linking study materials to situations relevant to the student increases the contextuality of teaching. (Savin-Baden, 2000; Savin-Baden & Howell Major, 2004.)

NEWSFLASH

Progressive inquiry learning

Progressive inquiry learning refers to a process involving a problem that cannot be solved based on previously acquired knowledge. Instead, answers are sought collaboratively in a group by systematically looking for meaningful information from various sources. Inquiry learning differs from problem-based learning in that students themselves define the problem they aim to solve. The problems dealt with in inquiry learning are often related to broader or more complex entities. (Hakkarainen, Lonka & Lipponen, 2004.) Among other things, the progressive inquiry learning method develops students' critical thinking abilities as students aim to construct new information following the methods used in scientific communities.

NEWSFLASH

Online mentoring

In online mentoring, the teacher who arranges the web-based course cooperates with a working life representative, known as an 'online mentor', whose involvement enriches the learning process by introducing a concrete link to working life. Online mentoring aims to prevent the subjects studied from remaining purely theoretical. The experiences of the online mentor provide good examples of theory applied to practical life. Good online mentoring improves the quality of web-based teaching and strengthens cooperation with working life, thus enhancing learning. (Field, 2005.)

LOOK IT UP!

Activating methods online

For more information: http://www.virtuaaliyliopisto.fi/tievie/tievie_koulutus_fin/tievie_koulutus_resurssit_fin/tievie_resursseja_opkeh.html (fi)

LOOK IT UP!

Piirtoheitin ('overhead projector') – experiences and good practices

'Piirtoheitin' is an electronic journal that focuses on web-based teaching and publishes university teachers' own experiences of teaching online. Readers can also discuss the articles on the journal's electronic discussion forum. The journal is published by the online teaching team of the Faculty of Social Sciences at the University of Helsinki.
Further information: http://www.valt.helsinki.fi/piirtoheitin/ (fi)

LOOK IT UP!

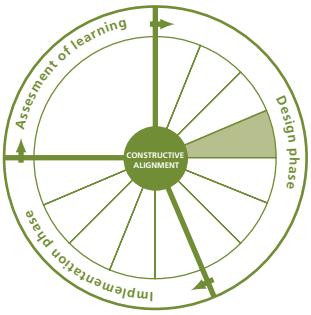
Tools for planning web-based courses

- The online wizard design tool introduces you to online course planning and editing.
  Further information: Finnish Virtual University,
  http://www.virtuaaliyliopisto.fi/verkkovelho (fi)
- The online pilot tool has been developed to support the design and implementation of web-based courses.
  Further information: Chydenius Institute – Kokkola University Consortium,
  http://verkkoluotsi.chydenius.fi/ (fi)

Food for thought

What kind of ideas did you get from the material presented above concerning the design of learning processes and the selection of teaching methods? What teaching methods do you plan to use in your course, and what is the role of ICT in these methods? Does the method you selected prompt students to copy information and opt for rote learning or does it encourage them to actively look for and construct knowledge in collaboration with others?

2.1.4 Resources



Find out about the available department, faculty and university technical and pedagogical resources at an early stage. This will help you with the practical implementation of the web-based course and with the planning of how to use ICT in teaching.

What kind of resources and support do you need to implement your course?

For guidance and support

Online support services are used in course preparation, design and implementation. When planning the course, find out where to get educational, technical and maintenance assistance and support for designing web-based courses and selecting the appropriate web-based learning environment.

Sufficient competence in the use of information and communication technology for teaching purposes, as well as the ability to support learning in web-based teaching environments are essential to designing and implementing high-quality web-based teaching. The university supports teachers by offering technical and educational training in the use of ICT. The goal is to provide teachers with the required competence in using ICT in teaching and its design, as well as to maintain this competence as technologies and teaching methods develop.

NEWSFLASH

Networking

Teachers arranging web-based courses benefit from networking with other teachers teaching the same subject online. The university's language centre, for example, has a special teacher who acts as the contact person for online teaching and offers support to other teachers. Such contact persons can also provide information about other teachers developing web-based teaching, as well as their experiences and good practices.

LOOK IT UP!

Contact people for online teaching

Support for the design of web-based courses is offered by campus, faculty and departmental online teaching support personnel. They assist teachers in technical and educational questions related to web-based teaching.

Further information: Educational Centre for ICT, http://ok.helsinki.fi/tukihenkilot (fi)

LOOK IT UP!

Web-based learning environments (see also Appendix 1.)

- Moodle offers a selection of online tools used to construct and maintain web-based courses.
  Further information: Educational Centre for ICT, http://ok.helsinki.fi/moodle-en/
- The BSCW cooperative tool can be used to submit and process common material and to discuss or use a shared calendar.
  Further information: Educational Centre for ICT, http://ok.helsinki.fi/bscw-en/

LOOK IT UP!

Publishing tool for study material

The ApuMatti tool helps teachers to publish digital study material online.
Further information: Educational Centre for ICT, http://ok.helsinki.fi/apumatti (fi)
Information in English: http://ok.helsinki.fi/index.php?page=309

LOOK IT UP!

Web-based course design tools

- The online wizard is a design tool for blended learning.
  Further information: Finnish Virtual University,
  http://www.virtuaaliyliopisto.fi/verkkovelho (fi)
- The online pilot tool has been developed to support the design and implementation of web-based courses.
  Further information: Chydenius Institute – Kokkola University Consortium,
  http://verkkoluotsi.chydenius.fi (fi)
- Vopla is a quality management service, which offers support to teachers interested in developing online teaching.
  Further information: http://www.vopla.fi/in_english/

LOOK IT UP!

Tool for electronic forms

The E-form enables teachers, researchers and students to create, use and maintain online forms, for example, for feedback collection. The purpose of the e-form is to facilitate the creation of different kinds of forms published on the Internet and to manage information stored on them.
Further information: Education Centre for ICT, http://ok.helsinki.fi/elomake (fi)

LOOK IT UP!

Resource centre for web-based teaching

eLENE-TT is a European, EU-financed (2005–2006) cooperation project for the development of online teaching. The extensive resource centre created in the project offers support and tools to online teachers, teacher trainers and representatives of administration and educational institutions so that they can make meaningful use of ICT in education. Among other things, the resource centre offers recommendations for its target groups, as well as practical tools related to the design and implementation of online courses, online tutoring, collaborative learning and assessment.
Further information: http://www.elene-tt.net/tt-centre.htm

LOOK IT UP!

Tool for the assessment of ICT skills

OSKAR is a tool that helps the teacher to map out ICT skills. The tool is designed for the teacher in order to facilitate reflection on professional competencies related to the use of information and communication technology in teaching.
Further information: Finnish Virtual University, http://virtuaaliyliopisto.fi/oskar (fi)

LOOK IT UP!

Training

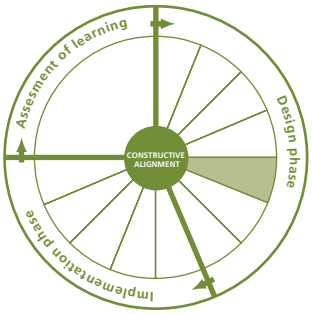
- The Education Centre for ICT offers training in educational ICT to the University of Helsinki staff. Training options include courses of different duration and short courses in application use. The centre also offers self-study material.
  Further information: Education Centre for ICT, http://ok.helsinki.fi/index.php?page=303
- The Helsinki University Centre for Research and Development of Higher Education arranges educational training for the university's teaching staff.
  Further information: http://www.helsinki.fi/ktl/yty/ (fi)

Food for thought

Find out what kinds of concrete resources and support services are available to you for designing and implementing courses. Also, determine what educational and technical skills needed in ICT teaching you already possess.

2.1.5 Structure of the learning environment

You have now thought about the objectives, content and target group of teaching and determined the resources you need. You have also made a preliminary survey of the web-based learning environments offered by your university and the parties that provide information and support for their use. You should now look into practical ways to implement the web-based learning environment so that it supports the whole course and the achievement of its objectives.



How could you design the web-based environment to provide the best possible support for the course and its objectives?

For guidance and support

When designing and constructing the learning environment you must decide how to use online features in the course. The web-based learning environment can be used in a number of ways in teaching: as a distribution and information channel, data storage, interaction channel, or as an area for shared knowledge building where teaching and studies take place. The course can be arranged online in its entirety or only partly. The main point, however, is to make use of the strengths of both online and contact teaching. High-quality online teaching does not necessarily mean the implementation of many different functions but rather the adoption of carefully selected features that support the learning process. If, for example, knowledge building plays an important part in the course, the environment can be selected so as to optimally support discussion. If, on the other hand, the goal is to learn a mathematical language, the learning environment should support mathematical notation. The purpose of face-to-face meetings is to let students and the teacher to get to know each other. Such meetings held at the beginning of the course make course participants feel part of a group and enable the treatment of topics that are difficult or very time-consuming to handle in online discussions.

Various forms of interaction should be taken into consideration when selecting and constructing the learning environment. Interaction can exist between the teacher and an

individual student (for example, when the teacher comments on a student's text), between the teacher and all students (for example, when the teacher takes part in online discussion through comments and questions) or between students and the online structure or material (for example, when students produce a text jointly on the basis of online discussions). It must be taken into account what kind of interaction is to be promoted, as well as how particular choices are expected to promote learning.

The structure and layout of the learning environment guide the students' learning process. The teacher may use his/her expertise by adding links, folders or systems of concepts to the platform in order to guide and support learning.

One of the main advantages of online learning is the flexibility it provides, for example, in terms of the time and location of participation. Web-based courses are flexible alternatives for many students, who, provided that they have the required equipment and network access, can select when and where to study. Therefore, when designing the web-based learning environment you should look for elements that offer flexibility for learning and studies. You should also give thought to what kind of teaching methods require the setting of time limits. Online discussions or exams, for example, need a defined period during which students are to make their contribution. Another important piece of information is the date and time when the teacher will comment on the students' work.

Navigation in the web-based learning environment is fluid. Information in the learning environment must be organised so as to make the environment user-friendly. The environment is clearly structured and the documents are easy to locate. Students can easily determine their location in the web-based learning environment. An environment that is difficult to use loads the students' cognitive processes and captures attention from the topic taught.

CURRENT RESEARCH INDICATES…

Students' and teachers' experiences of learning environments

Web-based courses are expected to offer clarity in structure, learning materials and layout. Other frequently cited characteristics of good web-based courses are an *aesthetic layout* and *good links.* According to students and teachers, an aesthetic web-based course has a pleasing and attractive layout that uses visual components and sound material. Other features mentioned were the adequacy of links, clarity and ease of use. According to experiences, one of the main hindrances to online learning is the *difficulty of understanding the web-based learning environment.* (Nevgi & Tirri, 2003; Mannisenmäki & Manninen, 2004.) Aspects related to the visually pleasing nature and user-friendliness of the learning environment have been found to affect subjective experiences as well as the learning results and the learner's emotional reactions (Kanerva & al. 2006).

CURRENT RESEARCH INDICATES...

Expertise and the structure of the learning environment

Experts have formulated meaningful information representations of the topics discussed (see Bransford, Brown & Cocking, 1999; Saariluoma, 1990), and the web-based learning environment can be used to convey these representations to students. The knowledge of an expert does not consist of unconnected facts related to the field. Instead, the knowledge consists of expansive core concepts that guide the expert's thinking. A novice, unfamiliar with the field, cannot identify the essentials and interrelations between topics as easily as an expert. One way to help learners to acquire knowledge similar to the information representation of experts is to present a structural overview of the relations between topics, for example, on the main page of the learning environment. A visually presented structural overview can also be used to describe the location of study materials in the learning environment, thus making it easier to find them. Trumpower and Goldsmith (2004) have studied the impact that the presentation of structural overview based on expert information representation has on learning outcomes. They found that the learning result was better if students were shown a structural overview created by an expert than if the structural overview was organised randomly or alphabetically. According to their studies, a structural overview created by an expert helps learners to focus their attention on what is essential to learning new topics.

NEWSFLASH

Learning environments (see also Appendix 1.)

Moodle and BSCW offer a number of tools that make studies active, intentional, contextual, constructive, collaborative, interactive and reflecting. However, the BSCW environment is not suitable for interactive online teaching implemented as distance learning, whereas Moodle offers more tools for this purpose. Web-based learning environments also have tools that support the teacher in designing, implementing and assessing teaching according to the constructive alignment model. Appendix 1 includes more information about the teaching platforms commonly used at the University of Helsinki and about the educational strengths and weaknesses of the systems.

LOOK IT UP!

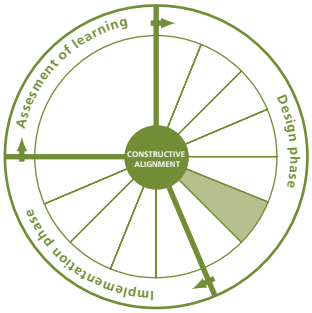
Development tool for online environments

The Arvo tool allows the teacher to systematically assess, analyse and develop the general and educational usability, graphic design and accessibility of the web-based course, as well as the quality of its content.
Further information: Finnish Virtual University, http://www.virtuaaliyliopisto.fi/arvo (fi)

Food for thought

How do you plan to use the web-based learning environment in your course? What kind of a structure have you planned for the learning environment and how have you taken usability aspects into account? What kind of online activities do you think might support the goal of deep learning? How will online learning and contact teaching support the learning processes central to this course?

2.1.6 Study material



Study materials play an important part in learning. This makes their selection and preparation one of the main tasks in course design. There is a wide range of different types of materials available, and as information becomes more accessible, selecting the appropriate type becomes increasingly important. The goal of this chapter is to prepare you to choose between different online materials and use the material you select.

What kind of study material do you plan to use in your course? How will you organise the material in the learning environment to make its structure as clear and user-friendly as possible?

For guidance and support

In addition to pure study material, online teaching also makes use of a variety of multimedia materials. Traditional study materials consist of textbooks, other complementary literature and academic articles. Other types of materials are useful as tools to illustrate complex topics using, for example, images, animations or audio files. If available to students, multimedia and other similar material is ideal for independent studies. Study materials should help learners to understand complex topics and to actively process information, which ultimately leads to information being processed and understood at a deeper level.

The use of multimedia materials in online teaching can either enhance or hinder learning. When used appropriately, online study materials do not divert the student's attention from the subject studied to tool use, but support learning by encouraging active information processing and illustrating the subject through various presentation formats. The materials thus enable the creation of rich information representations of the subject studied.

Online learning material is of a high academic quality. The preparation of online study material follows the principles of academic writing: the conclusions are well justified and the references are presented in a systematic way.

Students are instructed to identify and interpret materials of a high academic quality. This is particularly important in collaborative or cooperative learning where students set their own objectives and obtain material independently.

Online study materials must be visually clear and user-friendly. The design of study materials, such as multimedia, must emphasise usability and functionality in terms of teaching. Material storage and updates must also be planned during the preparation phase.

The management of copyrights and user accounts must be taken into consideration when preparing the course. When preparing and planning a course, find out what copyright laws and user accounts restrict the use of other authors' materials in web-based courses. You should also be aware of copyright legislation that applies to study material produced by teachers themselves.

LOOK IT UP!

Tool for publishing study material

ApuMatti is a useful tool for publishing digital study material in web-based environments.
Further information: Education Centre for ICT, http://ok.helsinki.fi/; IT Department, University of Helsinki, http://ok.helsinki.fi/apumatti (fi)
Information in English: http://ok.helsinki.fi/index.php?page=309

LOOK IT UP!

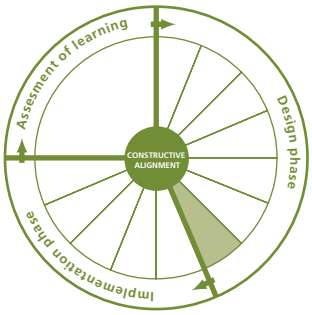
Copyright

Materials produced and used in online teaching are subject to copyright issues.
Further information: Education Centre for ICT, http://kampela.it.helsinki.fi/apumatti/lcms.php?am=8488-8488-1

Food for thought

What kinds of study materials will best support the achievement of course objectives? Do the course content and topics set special requirements on the presentation of the topics taught? Will you use multimedia material in addition to traditional study materials in your course? What advantages does the selected material have over alternative materials? How will you handle copyright issues in your course?

2.1.7 Coordination



You now have an overall picture of the course objectives, content and teaching methods. You should now turn your attention to a few questions concerning practical administration, which are particularly relevant in web-based courses. Functional procedures are an important element of high-quality online teaching. The schedule and task distribution, dealt with when designing the course, must be well thought through and familiar to all parties involved in the design. Remember that there is no need for you to handle all of the design and implementation tasks alone. However, include enough flexibility in the schedule to benefit as much as possible from the support and services available to you.

Make plans for dealing with course-related task distribution, schedules and other administrative matters. What support services can you use? How much time do you need to plan the course?

For guidance and support

Online teaching and learning experts help to create and distribute operating models that support the design and implementation of web-based courses. Online teaching needs expertise related to subject-specific content, pedagogy and technology. It is a good idea to sketch out ways in which experts in different fields can support the teacher in web-based course design and implementation.

The distribution of tasks is determined during course preparations. You need to decide on the organisation of the production team and agree with other team members on course design, implementation, responsibilities and schedules.

The progress of course design and implementation is laid out in a clear and detailed schedule. Planning and drawing up a schedule is an essential part of course preparations. This makes the course progress clear and well-defined. When drawing up a schedule, take into consideration that the time spent on planning and implementation depends on the participants and their task distribution. Certain teaching methods, for instance web discussions or web exams, may require the introduction of time limits, which determine when students are expected to participate. The course schedule should also be realistic, clear and consistent.

Communication and information needs are considered in the planning phase of a web-based course. It is the teacher's responsibility to assure that course administration, including student selection, enrolment, exam results, course presentation, course objectives and current research related to the topic are up-dated and easily accessible in the web-based environment. The web-based environment is utilised for communication purposes. In order to

ensure smooth progress of studies, material on how to study in web-based environments is made available. This material may include manuals, study guides, teaching and task schedules, navigation guides, user support and information on how and where to contact the course leader.

CURRENT RESEARCH INDICATES…

Students' and teachers' experiences of time management in web-based teaching and learning

Both teachers and students recognise time management as a source of problems for teaching in web-based environments. Students find it difficult to flexibly combine online studies with their own life situation and to find time for studies (Nevgi & Tirri, 2003). Web-based courses require time planning skills and the ability to estimate the time taken up by studies. According to students, a course appears well planned if its schedule works well (Nevgi & Rouvinen, 2005). For example, the requirement to complete obligatory assignments by a certain date leaves students with the impression of a good and carefully planned course.

Teachers also consider poor scheduling to be a problem in online teaching. In their experience, the course workload and schedule are difficult to estimate beforehand. The feeling of failure may also result from too tight a schedule and online discussions taking up more time than expected. (Fallshaw & McNaught, 2005; Nevgi & Rouvinen, 2005.)

LOOK IT UP!

Support personnel

Support for the design of teaching in web-based learning environments is offered by campus, faculty, and departmental online teaching support personnel, whose task it is to help teachers in questions related to technology and pedagogy.
Further information: Education Centre for ICT, http://ok.helsinki.fi/tukihenkilot
Information in English: http://ok.helsinki.fi/index.php?page=311

LOOK IT UP!

Information channels for online teaching cooperation networks

The IT-Peda network encompasses Finnish universities and aims to promote the use of ICT in teaching and research. Its task is also to relay information about the use of teaching technology between network members.
Further information: www.uta.fi/itpeda (fi)

LOOK IT UP!

Tool for the time management of online teaching

The planning framework for online teaching is a tool used to plan time management in online teaching. Teachers can use it to design teaching in web-based environments so that students have enough time to internalise the subjects taught.
Further information: http://www.komiti.fi/tiedostot/mitoituskehikko_2006.pdf (fi)

LOOK IT UP!

Support for students' web-based studies

For more information:
http://tievie.oulu.fi/verkkopedagogiikka/luku_5/verkko-oppimisen_taidot.htm (fi) and
http://opiskelija.edu.fi/page.asp?path=30385,41820 (fi)

Food for thought

In what design and implementation tasks could you benefit from external help? What aspects will you handle on your own? How much time have you allocated to course design and implementation, assessment of teaching and grading of assignments? What information do students need prior to the beginning of the course and how do you plan to inform students? What administrative duties do you plan to take into consideration?

CHECKLIST FOR COURSE PLANNING

	OK	Notes
Common learning objectives are available online.		
The course plan is open in the sense that common objectives can be created jointly with the students		
Students' prior knowledge and studies were determined.		
The course was designed to support interaction.		
The course was designed to support the activity and independence of students.		
The available resources were taken into account when designing the course.		
The use of the learning environment was planned in advance.		
The learning environment was chosen in view of the learning objectives.		
The learning environment was constructed in advance so that students could easily find everything and know where to store their work.		
The online material works well in terms of technology.		
The amount of online material corresponds to the scope of the course.		
Online material is easily accessible.		
Task distribution among teachers is clear.		
The course schedule and due dates are available to students online.		

NOTES

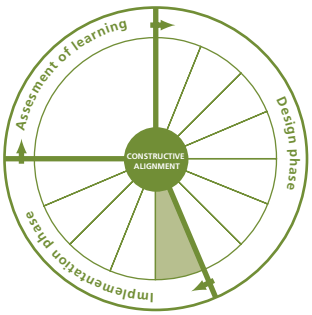
2.2 Implementation phase

You can support student activities in various ways during the course and help students to achieve their learning objectives. This chapter focuses on the supervision of the learning process and on aspects that the teacher should take into consideration when utilising web-based environments in teaching. The web-based environment allows the teacher to use the group as a resource. Learning can be supported, for example, through collaborative and cooperative methods and by noting the needs for support and guidance shown by different students. Learning should be assessed during the course, not afterwards only. Good assessment gives students feedback on their own activities and thus supports learning. Since hard-established practices are yet to be created in online studies, it is important to agree on the rules jointly with the students.

2.2.1 Common learning objectives

Review the course objectives at the beginning of the course (see Chapter 2.1.1) in order to design and implement teaching in a way that best supports the course objectives. The design and implementation of teaching is based on the course objectives.

How can you through your teaching provide practical support to the achievement of course objectives?



For guidance and support

Course implementation is in line with the course objectives. When implementing the course, review the objectives and then select work methods that support the achievement of objectives. Learning objectives influence the work methods and procedures during the course. The restrictions and limits set by resources, pre-defined study materials and available learning platforms must also be taken into consideration.

Students must be informed about course objectives. This helps students to control and adjust their learning process. The objectives should also be discussed with students, as should the bases of assessment. Students must also be made aware of the relationships between objectives and assessment.

Students must be encouraged to reflect on and identify their own objectives for the course. The teacher shall also help the students to work towards their objectives. Taking part in the creation of shared and individual objectives helps students to focus on the course

topics and commit themselves to the objectives. Group work can support the identification of students' own learning objectives. The group's support and joint discussions help students to relate the course material to their personal context and identify their own interests and goals. The teacher designs teaching so that it supports the objectives determined by the core content of the course and gives students the flexibility to determine their learning objectives based on their own interests. Teaching should be made flexible enough for the teacher to be able to react to students' needs.

CURRENT RESEARCH INDICATES…

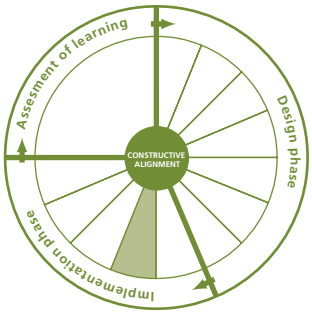
Students experiences of setting learning objectives in web-based courses

According to students, the opportunity to design their own pace of studies and determine their learning objectives enhances self-directedness and active learning (Nevgi & Tirri, 2003). The identification of individual learning objectives helps students to understand the significance of self-assessment and supports the development of reflective skills (Zimmermann, 2000).

Food for thought

Is teaching in line with the learning objectives set for the course? How do you support the achievement of students' own objectives and goals? How and to what extent do you involve students in the definition of common objectives? Are objectives set in groups or individually, in the web-based learning environment or in face-to-face meetings?

2.2.2 Individual differences in the learning process



Supporting the learning process of individuals and taking into account individual differenes of learners are essential elements in learning-oriented teaching. Guidance of the learning process should include an examination of learning from the students' point of view.

Take a moment to consider how students experience the learning process. How can students of different skill levels and the individual nature of the learning process be taken into consideration in the course?

For guidance and support

Teaching should take into consideration the different skill levels of individual students. Students differ in their need for support and guidance and the type of study material they best benefit from. Students can be offered different types of assignments and a variety of ways to complete the course. They should also be allowed to influence their own study methods. Teaching in web-based learning environments enables students to allocate time to task completion in their own way. For example, video lectures allow students to control the pace of their own learning process. They can return to specific parts of the lecture and review topics that were difficult to understand and internalise.

During the course, the teacher should pay attention to accessibility in studies. The teacher must ensure equal access to teaching. Students must be given enough time to complete tasks online, and the return dates must be communicated well in advance so that students can plan their allocation of time. Utilising information and communication technology in teaching also allows students who are physically restricted to participate in face-to-face teaching.

Differences in students' skills levels and prior knowledge must be taken into consideration. The skills level can be determined, for example, by carrying out a preliminary survey at the beginning of the course. The teacher can also hold discussions with students on their expectations and attitudes concerning the course, previous familiarity with the course topics and thoughts about learning (see Chapter 2.1.2).

CURRENT RESEARCH INDICATES…

Different types of learners in web-based environments

Studies show that students' behaviour in web-based learning environments differs from that in face-to-face teaching. Similarly, teachers treat students in a different way compared to that seen in face-to-face meetings. A student who seems quiet and withdrawn in face-to-face teaching may be very lively and active and enthusiastically offer his/her opinions in online discussions. Conversely, a student who is bold and active in face-to-face meetings may turn out to be reserved and cautious in the web-based environment (Salmon, 2000; Nevgi & Tirri, 2003). As shown by experience, some students find it natural to express themselves in writing, while others have a more prudent approach to written communication (Salmon, 2000).

CURRENT RESEARCH INDICATES…

Individual web-based learning environment

One of the main factors that promotes learning in online teaching is the individuality of the learning environment. A good web-based learning environment adapts to the learner's needs. A web-based course also allows students to select individual ways to complete the course (Nevgi & Tirri, 2003).

LOOK IT UP!

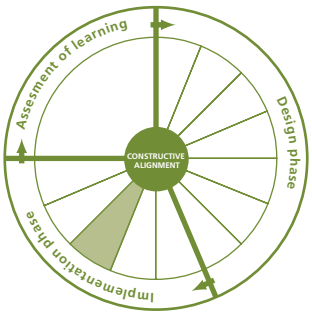
Accessibility online

The 'Unresticted content production' project offers information to teachers who are interested in usability and accessibility of web-based learning contents.
Further information: http://appro.mit.jyu.fi/essikurssi/ (fi)

Food for thought

How does your course take into account any differences in learners' skills? With what kind of teaching methods can you support different types of learners? How do you identify differences in the students' skills levels and previous knowledge of the topics?

2.2.3 Interaction



Interaction supports the individual's learning process, as well as knowledge building carried out in groups. Apart from individual learning processes, other important topics include the creation of new information and the use of group dynamics in the process. Since interaction in itself does not support learning and the creation of new knowledge, pay attention to the kind of interaction that could support these activities.

How do you think that interaction could support learning and joint knowledge building? What kind of group activities have you found to be meaningful and useful learning experiences in your own life? How could these experiences help you to design your own course?

For guidance and support

Teaching attends to the kinds of learning processes supported by different forms of interaction. Interaction can be used in many different ways. Of central importance is the way in which interaction supports the student's individual learning process and the achievement of joint objectives.

Teaching makes use of collaborative and cooperative learning. Students are encouraged to create a shared understanding of the subject to ensure that they do not simply cut up the task and only seemingly work in groups. Students are also encouraged to exchange ideas and materials, as well as to give development proposals and feedback to other students and student groups. In online learning, collaborative learning can be realised, for example, in discussion forums offered by the web-based environment. When selecting discussion topics, ensure that they are relevant to the students and include problem solving.

Group work should be set up to support students' shared knowledge building aimed at achieving a common goal. Joint work benefits from students' knowing that the objectives are more difficult to achieve alone than together with group members and that group work is assessed as part of the overall assessment.

The course applies various collaborative teaching methods to achieve the common goal in the best possible way. Students can, for example, solve given problems in groups (cf. problem-based learning) or focus on a problem brought up by the group in relation to the course objectives (cf. progressive inquiry learning). Students must be familiar with the objectives and work methods so that they can experience group work as a meaningful and justified activity. (See Chapter 2.1.3)

Teaching shall ensure that students take equal responsibility for the group's operations. 'Free riders' may constitute a problem in group work. This refers to one of more group members benefiting unfairly from the work of other students. Such problems can be discussed with students, and students can be asked to assess the input of each group member in the joint results of the group. The teacher can also use individual assessment to discourage 'free riders'.

CURRENT RESEARCH INDICATES…

Students' and teachers' experiences of interaction in web-based courses

Teachers' and students' experiences of successful online teaching are linked to the degree of interaction. *According to students,* support from their peers, as well as joint discussions about the topic studied, enhance group solidarity and help students to examine the topics from different points of view (Nevgi & Tirri, 2003; Fallshaw & McNaught, 2005). When asked about hindrances to web-based studies, students mentioned the feeling of loneliness and isolation (Fallshaw & McNaught, 2005; Nevgi & Juntunen, 2005; Löfström & Nevgi, 2006a). If interaction does not work, students do not acquire joint learning experiences or feel social group pressure for study progress (Mannisenmäki & Manninen, 2004). *According to teachers,* successful interaction hinges on student activity and motivation (Nevgi & Rouvinen, 2005).

Interaction in web-based environments is often felt to be different from that seen in traditional teaching. The anonymity of online work is felt to change the nature of discussions. On the other hand, the network is considered to enable deeper discussion than would be possible, for example, in traditional lectures. Online discussions allow students to think about their own responses and reflect on the comments made by their peers (Mannisenmäki & Manninen, 2004).

NEWSFLASH

Introduction

Each student writes an introduction for a key course topic using relevant literature. The purpose of the introductions is to generate discussion based on scientific data. Students comment on each other's writings online. A good way to initiate discussion is to oblige each student to participate, for example, in three discussions. To prevent discussions from turning into a forum for exchanging personal opinions and experiences, students are required to present justified and reasoned arguments.

NEWSFLASH

Example of online discussion in a language course

Language course participants discuss current topics online. The topics have been chosen in order to develop the students' vocabulary in their own field. Since the teacher does not have the resources to comment on everything online, s/he tells the students in advance what issues s/he will focus on when reviewing their texts. These are the issues that students should pay special attention to. In language courses they might include, for example, spelling, terminology, grammar and clarity of content. The teacher also gives the exact dates and times when s/he plans to comment on the students' discussion so that they know when to participate in the discussion and can reserve time for it. Commented topics can include, for example, argumentation, reference methods and the setting of additional questions. This method also suits courses in other subjects.

NEWSFLASH

Collaborative and cooperative learning

Collaborative and cooperative learning are terms that often come up when talking about interaction in teaching. Cooperative learning means group work in which individuals are often responsible only for their own share in the problem-solving process (Lehtinen, 2003). In this case, students have a specific role and carry out a specific task (Tynjälä, 1999). Collaborative learning emphasises mutual commitment to joint work aimed at solving a common problem (Lehtinen, 2003). In this case, students do not follow a pre-defined task distribution but instead solve the problems together (Tynjälä, 1999). Compared to cooperative learning, collaborative learning puts more emphasis on the significance of the social community to the learning and knowledge building process (Lehtinen, 2003).

LOOK IT UP!

Support services for online group work

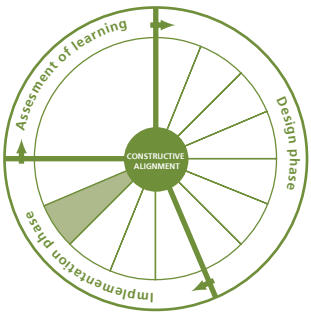
IQ Team is a tool designed for student groups, which offers a space for social activities that support and aim at virtual collaborative knowledge building. IQ Team helps students assess their activities as members of the group and enables students to jointly analyse the functionality of their group.
Further information: https://www.virtuaaliyliopisto.fi/?node=iq_etusivu_eng

Food for thought

What forms of interaction will you use in your course? How could you as a teacher promote interaction that supports learning? How could the subject be handled interactively? For example, does your own research provide examples or cases that could be used as stimulus material in accordance with the principles of problem-based learning?

2.2.4 Student support and guidance

Learning is not passive reception of information. It requires activity on the students' part. Learning-oriented teaching emphasises the teacher's role as guide of the learning process. This chapter discusses support and supervision-related viewpoints that you can use in your own teaching.



Take a moment to consider what supervision and guidance mean to you as a teacher. How do you plan to use supervision to support the students' deep learning in your course?

For guidance and support

The teacher's role in the web-based learning environment is one of a supervisor and guide of the learning process. The teacher challenges students to be active and to aim at deep understanding and cooperative learning. Students are encouraged and directed to engage in open interaction, provide peer feedback and participate in joint knowledge building.

The web-based environment makes the learning process visible. Students and teachers can follow the development of discussions afterwards and reflect on the progress of learning, reasoning and argumentation. Students are encouraged to introduce ideas, even incomplete ones, to the group in order to increase exchange of perspectives and ensure that the group members get as much benefit as possible from giving and receiving feedback.

The teacher is conscious of his/her role in the students' learning process. Students' learning should be supervised so as to deepen their understanding and enable them to apply the knowledge they have acquired. This can be achieved by anchoring the topics to real-life problems and situations. Deep learning can be promoted by encouraging students to look for interrelations between things and think about ways to put the topics into practice during the learning process. The web-based learning environment is more than a channel for superficial information distribution. It should also be used to encourage activity, for example through the use of discussions forums. Comments and questions can be formulated so as to introduce new viewpoints into online discussions and to steer students' attention towards different perspectives.

The teacher provides learning support based on the students' needs, skills and degree of self-regulation. Some students are capable of working independently, finding information, creating their own objectives and monitoring their achievement, while others need more support and guidance. This is why the teacher must take the degree of self-regulation and the differences in students' prior knowledge into consideration. Interaction helps students to benefit from the skills and knowledge of their peers. Students can be encouraged to support each other through group work that requires the input of all group members. It is especially important in web-based teaching that students do not feel they are left alone without guidance. However, excessive control of student activities is not useful either. The capability of students to adjust their own activities can be developed by regulating and modifying control.

CURRENT RESEARCH INDICATES…

Students' need for guidance

The zone of proximal development (Vygotsky, 1982) refers to the stage at which an individual is not yet capable of performing a task alone but can do it under the guidance of a more experienced person. Learning is often most effective in the zone of proximal development. Students' work in this zone can be supported by the teacher and other students, as well as by study materials and web-based learning environments.

CURRENT RESEARCH INDICATES...

Teacher's supervisory role

Constructive approaches to learning emphasise the students' own activity in regulating their learning process (Duffy & Cunningham, 1996; Bonk & Cunningham, 1998). However, the self-regulation of students should not be taken as a given (Ahteenmäki-Pelkonen, 1997). Although the students' need for independent activity and responsibility for their own learning is increasingly emphasised, teachers still need to be familiar with the dynamics of the learning process and have the ability to supervise it (Harasim & al., 1995). A supervising teacher who works side by side with the student has become the ideal in online teaching (Naidu & Olsen, 1996, Duffy & Cunningham, 1996; Bonk & Cunningham, 1998; Oliver & McLoughlin, 1999; Salmon, 2000).

CURRENT RESEARCH INDICATES...

Students' experiences of supervision in web-based courses

According to students, good supervision leads to feelings of success in online studies. Supervision is felt to be of good quality when teachers and tutors take an active approach and help students to better understand the topics taught. Students experience that the teacher's expertise does not benefit them if they do not get answers to their questions or if the teacher does not participate in discussions. The teacher's role is not any less important in web-based teaching than contact teaching because learners study at least partly on their own at a distance from the rest of the group. (Nevgi & Tirri, 2003; Mannisenmäki & Manninen, 2004.)

LOOK IT UP!

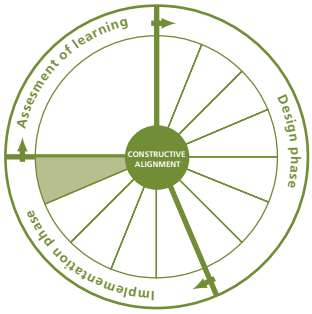
Support services for student guidance

The Finnish Virtual University has developed an online supervision service for university students and tutors. The environment offers support for course design and guidance throughout the studies.
Further information: Finnish Virtual University (starting in 2007),
http://www.virtuaaliyliopisto.fi/ovi (fi)

Food for thought

How do you supervise students in the web-based learning environment? How do you take students' needs into consideration in supervision? How can you control the course so that students can support each other in the learning process? Based on the material presented, how could you develop your support to the students' learning process? It is a good idea to anticipate how much time you need to allocate to supervision and the type of supervision that will be offered. You might also want to think about ways to supervise the course so that students can support one another's learning.

2.2.5 Common rules



Participation in a course that utilises web-based learning environments may be a new and unfamiliar experience to many students and teachers. Activities in the web-based environment often differ from those seen in contact teaching. Consequently, you should ensure that all participants are aware of the common procedures and rules that apply to the course. Being the teacher, you are also responsible for many administrative tasks during the course.

How do you plan to create common rules for the course in cooperation with the students? What kinds of administrative tasks should you prepare for?

For guidance and support

The web-based learning environment is used flexibly and in a variety of ways to distribute information about teaching. The teacher ensures that information related to course administration, such as student selections, course enrolment, exam results, description of the syllabus and research, is up to date and easily accessible.

To ensure that studies proceed fluently, students are provided with instructions for online study. This material may include a description of the web-based environment and its use, study guidelines, the schedule for teaching and the due dates for assignments, and information about user support and how and where to contact the teacher.

The teacher and students jointly define the rules for work in the online learning environment. Decisions made at the beginning of the course include when and in what cases the teacher will be available for consultation or when, for example, the teacher will be online to answer questions and comment on the students' work. If the course involves group work, students should be reminded of the importance of being present and participating in the activities. Task distribution and duties (such as those of chairperson or secretary) should also be agreed on. When using peer feedback, the details that feedback should ideally focus on must also be determined. Do not forget to emphasise the importance of adopting a constructive tone, since messages are interpreted only on the basis of written text in web-based learning environments. This makes clarity and the appropriateness of expression increasingly important. It is recommended that students use their own name (first name or nickname) in online discussion groups.

Ethical considerations must be taken into account in online study material. The teacher is aware of problems related to the appropriate use of online information, such as plagiarism, and brings them to the students' attention as well. The teacher must also act as a good examp-

le to students. This is why references and links to other sites and materials must be added to the course home page or in the learning environment.

Decisions on how to proceed after the course are made with students well in advance. The students need to know when the learning environment will be closed and what will happen to the documents and discussions stored in the learning environment after the course ends. It may be useful to archive the course and its materials so that you and your colleagues can use the site later on. Data protection is also an issue in the storage of the learning environment and course material.

CURRENT RESEARCH INDICATES…

Students' experiences of rules in web-based courses

Students have found that clear instructions, objectives and due dates, summaries and fast feedback decrease the insecurity felt in online teaching and promote the achievement of learning objectives. Following the rules for online learning is related to good supervisory procedures. (Mäkitalo, 2006; Palonen & Murtonen, 2006.)

NEWSFLASH

Scripts

Interaction in the web-based environment can be enhanced using collaborative scripts. They consist of rules that guide student cooperation. Scripts can be, for example, text-based messages and instructions that replace oral instructions in the web-based environment and help students to work together. (Mäkitalo, 2006; Palonen & Murtonen, 2006.)

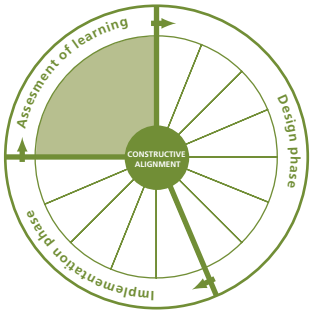
Food for thought

How will you and the students agree on common rules for the course? How will you ensure that students have enough information, for example, about where to find instructions on using the web-based environment? Do you need to remind students about principles of academic writing, such as the use of sources and references? What administrative tasks should you take into consideration?

NOTES

2.3 Assessment of learning

According to the constructive alignment model, assessment and feedback must be in line with the course objectives and teaching. This means that assessment must support the activities that are expected to promote the achievement of learning objectives. Apart from evaluating student performance, assessment could be thought of as an opportunity to help students identify their strengths and needs for improvement, as well as to develop themselves. Student assessment must be considered in detail at this phase because it steers the students' learning process.



Think about ways to assess learning in your course. Is assessment in line with the learning objectives and the way in which teaching has been carried out? (See chapters 2.1.1 and 2.2.1)

For guidance and support

The assessment of learning is related to the course learning objectives and implementation of teaching (see Chapter 1.1). Students' learning can be assessed both quantitatively and qualitatively, taking into account the objectives set for the course. For deep learning to take place, the students' knowledge structures must undergo qualitative changes. Such changes can be assessed, for example, using tasks that require students to apply information or use problem-solving skills.

Learning is supported and assessed throughout the course with continuous feedback. It can be provided by either one's peers or the teacher. Feedback is used to steer students' online discussion in a particular direction by asking questions or making counter-arguments. This kind of feedback benefits students already during the course. Focusing on the creation of a good atmosphere often increases the amount and improves the quality of constructive peer feedback and discussion. In peer feedback students give each other feedback on both completed and unfinished tasks and learn from one another in the process.

The learning objectives and their assessment are clearly explained. Students understand the input they are expected to give during the course and the criteria used to assess learning. Familiarity with the objectives and assessment criteria enables students to assess their own learning.

The purpose of feedback and assessment is not only to evaluate students' skills and knowledge but also to support their learning process and their development into experts in their field. A common form of assessment at universities is the final exam. Feedback on

it is often insufficient, although it is known that students benefit from comments on exams, learning diaries and other work. Students' development into experts can be promoted with sufficient verbal feedback that does not involve actual grades.

Students are also encouraged to assess their own learning, the goal being to acquaint them with self-assessment and related activities. In the beginning, tasks assigned to students by others, such as questionnaires and learning diaries, can serve as a good introduction to the topic. However, externally given tasks rarely make self-assessment of one's own learning an inherent part of the student's activities. Nevertheless, students' attention can be drawn to self-assessment by simple means during the course. Short discussions on a regular basis with students may motivate them to reflect on learning among themselves. Information technology enables the creation of multiple choice tests that students can use to determine their level of knowledge. The assessment of one's own learning helps students to become better learners. They may begin to think of self-assessment as a task that benefits their studies rather than as an external obligation. Self-assessment is not something emphasised at the end of the course but over its entire duration.

LOOK IT UP!

Interactive feedback systems as a support for learning

A variety of tools have been developed for the assessment of study strategies and group activities in web-based learning environments. The IQ Learn and IQ Team tools created in the IQ FORM project offer teachers versatile instruments for developing students' study skills and group processes. Teachers can use them to carry out formative assessment that supports learning processes.

IQ Learn enables teachers to promote the development of students' study skills and strategies. The tool includes series of questions suitable for self-assessment. The results are displayed as both graphical and numerical presentations. Students can examine their results and find out more about them using the tutorial included in the tool. The teacher gets the results of the whole group and can discuss them either face-to-face or online. The tool also includes a learning diary that students can use to record their thoughts and observations about their study skills and strategies.

IQ Team offers questionnaires suitable for the assessment of group processes, as well as a tutorial. Teachers can use IQ Team to help online students to identify their own group member skills or analyse the activities of their group during the online course.

Further information: http://www.virtuaaliyliopisto.fi/?node=iq_etusivu_eng

Food for thought

How is the assessment used in your course in line with the objectives and teaching? What learning processes do the assessment methods encourage students to adopt? Are the assessment criteria available to students? How is feedback or peer feedback used in the course? How will you create a course atmosphere that supports mutual student feedback? How will you encourage students to assess their own learning?

NEWSFLASH

Pitfalls – tried and tested tips for novice online teachers

1) Link judiciously. It is easy to link too much material and add external links to the web-based environment. This leads quickly to information overload, making it difficult for the student to tell the difference between essential and less important information.
2) Design the course pages simple enough in terms of hierarchy. Study materials and environments are difficult to use if they are highly nested and require many clicks to be accessed.
3) Create a clear schedule and stick to it. The teaching and learning tasks, discussions and other activities must be clearly scheduled in courses that utilise web-based learning environments. Schedules are difficult to change in the middle of the course.
4) Use teaching and assessment methods sensibly. Trying out various work methods in the same course may easily make the course too taxing for both you and your students.
5) Familiarise the students with the learning environment at the outset of the course. Do not automatically expect students to be familiar with information technology but reserve enough time to describe the IT properties and operations of the environment.
6) In big courses, divide the students into groups of 4 to 7 for online discussions. One hundred students cannot carry out discussions online any better than they can in face-to-face situations.
7) Schedule the online discussions concisely and clearly over periods of a given length (e.g., one week, two weeks) so that students know when and how to participate in discussions. Underline the fact that students must take part in discussions over their entire duration, not only towards the end of the discussions.

NOTES

3. Course assessment and development

The assessment of teaching is based on feedback from students and your own evaluation of the course. This chapter provides tools for systematically using this information to evaluate the course. Use the results of assessment and cooperate with other online learning experts to develop future web-based courses, enhancing their success and quality.

3.1 Course assessment

Course assessment focuses on the achievement of teaching objectives and the success of course implementation. It is worthwhile to document the ideas and targets of development that emerge in the assessment since this information will help you design future courses. A systematic and consistent approach will lead to successful assessment.

Before reading this chapter, look back on the topics that you found to work well in your course. What issues do you want to pay more attention to in the future?

For guidance and support

When assessing the alignment of teaching you consider whether the learning objectives, topics taught, teaching methods and assessment of learning all supported the same goal or whether they were in conflict. You can also consider how these elements of teaching affected students' behaviour in the course. For example, if one of the course objectives was to apply knowledge, this has also been emphasised in teaching contexts and in the assessment of learning. If the learning objectives, teaching and the assessment were in conflict, students may have got the wrong impression of what was expected of them. Teaching and assessment that emphasise repetition of information steer students toward rote learning. (See Chapter 1.1)

Assessment of web-based courses focuses on the meaningfulness of the learning experience. Meaningfulness can be evaluated by examining how independently students have acted during the course (activity), how goal-orientedly they have worked towards the objectives (intentionality), how well the subjects taught have been linked to contexts relevant to students (contextuality), how successfully students can apply the material learned to different situations (transfer), how successfully the learned material has been linked to prior knowl-

edge (constructivity), to what extent students have cooperated to achieve common goals (collaboration), how students have succeeded in using open, but constructively critical, discussion in the web-based community (interaction) and how successfully they have analysed their own learning (reflection). Assessment also focuses on the teacher's success in promoting the different subfields of meaningful learning. Students also influence their learning experiences through their own activities. (See Chapter 1.2)

The assessment of web-based courses examines the functionality of the web-based learning environment and the study materials used. The way in which the web-based learning environment was used to present the course content, carry out discussions and construct knowledge is also evaluated as part of the course assessment. The suitability of the study material and the load generated by the learning environment can be assessed on the basis of the quality of learning results and the feedback received from students. (See chapter 1.3)

The teacher collects feedback on the web-based course and online teaching from students. Feedback collection can take place in numerous ways. The best kind of feedback conveys students' experiences about their own learning and the achievement of objectives, instead of merely indicating whether students were satisfied with the course. Students can be asked to provide feedback on the usability of the web-based environment, the suitability of teaching methods and the quality of supervision and guidance. The web-based environment can also be used to collect feedback (see Appendix 3b).

Food for thought

Review the course assessment questionnaire (see Appendices 3a and 3b). How can you use the questionnaire to assess your teaching? What areas will you pay special attention to in course assessment?

3.2 Development of the course and web-based teaching

Developing teaching in web-based learning environments is part of one's development as a teacher. Online teaching requires educational methods to be selected carefully on the basis of well-reasoned arguments. Development activities can benefit, for example, from course feedback, self-assessment and experiences of colleagues.

Recall the course assessment results and consider the development needs that they point to. How can you use the results of assessment to develop your course and

online teaching? Also, recall the targets of development that you defined before planning the course. How would you rate your success in these fields? What kind of course feedback have you received from students related to these fields?

For guidance and support

Methods that were created for this course and found to be successful could be used in future web-based courses. Teaching will also be developed by examining other good practices in the use of web-based learning environments. Development work involves keeping tabs on online teaching solutions created in different universities both nationally and internationally. As a teacher, you can distribute information about your experiences and practices that have proved their suitability.

Web-based teaching is developed in cooperation with various parties. This may involve participation in national and international development projects or monitoring of development work and research in the field. When developing a web-based course, think about the kind of cooperation that could best promote information exchange and the sharing of teaching practices. You should also try to determine the parties with which you can cooperate (for example, polytechnics, university centres for continuing education, independent institutes, open university, Finnish Virtual University, European Virtual University, other international parties, etc.).

Teachers are familiar with the educational fields in which they need to develop themselves, as well as the technical skills required in online teaching that they already possess. Teachers can assess their own skills, for example, using departmental skills requirement surveys or portfolio work.

CURRENT RESEARCH INDICATES…

Teachers' own experiences of learning in web-based environments

Personal experiences of learning activities in web-based environments are essential for the creation of good teaching practices. Experience shows that personal experiences help teachers to use the methods in their own work. (Marton & Booth, 1997; Bowskill & Foster, 2005; Palonen & Murtonen 2006; Löfström & Nevgi, 2006b.)

LOOK IT UP!

Piirtoheitin ('overhead projector') – experiences and good practices

'Piirtoheitin' is an electronic journal that focuses on web-based teaching and publishes university teachers' own experiences of teaching online. Readers can also discuss the articles on the journal's electronic discussion forum. The journal is published by the online teaching team of the Faculty of Social Sciences at the University of Helsinki.
Further information: http://www.valt.helsinki.fi/piirtoheitin/ (fi)

LOOK IT UP!

Quality management for online teaching

VOPLA is a quality management service for national online teaching that provides support to individual teachers interested in developing online teaching.
Further information: http://www.vopla.fi/in_english/

LOOK IT UP!

Tool for the development of online teaching

The ARVO tool has been designed to support the development of teaching arranged in web-based learning environments. ARVO enables the teacher to assess technical and educational usability, graphic design, accessibility and technical implementation.
Further information: Finnish Virtual University, http://www.virtuaaliyliopisto.fi/arvo/ (fi)

LOOK IT UP!

Resource centre for online teaching

eLENE-TT is a European, EU-financed (2005–2006) cooperation project for the development of online teaching. The extensive resource centre created in the project offers support and tools to online teachers, teacher trainers and representatives of administration and educational institutions so that they can make meaningful use of ICT in education. Among other things, the resource centre offers recommendations for its target groups, as well as practical tools related to the design and implementation of online courses, online tutoring, collaborative learning and assessment.
Further information: http://www.elene-tt.net/tt-centre.htm

LOOK IT UP!

Training

- The Education Centre for ICT offers training in educational ICT to the University of Helsinki staff. Training options include courses of different duration and short courses in application use. The centre also offers self-study material.
  Further information: Education Centre for ICT, http://ok.helsinki.fi/index.php?page=303
- The Helsinki University Centre for Research and Development of Higher Education arranges educational training for the university's teaching staff.
  Further information: http://www.helsinki.fi/ktl/yty/ (fi)

Food for thought

If you used the assessment questionnaire appended to this handbook for your course assessment, which fields of teaching proved to be strong? What fields will be your targets of development in your next web-based course? How did the students' opinions about the course differ from your own assessment? How can you develop the course and your teaching in practice?

NOTES

NOTES

Epilogue

The conclusion of one course is the beginning of another one. The design, implementation and assessment of teaching can be thought of as forming a spiral, an ongoing process that permeates the web-based course and creates the foundation for the design of future courses. New teaching methods in the web-based learning environment introduce a number of issues that need to be managed, ranging from practical matters, such as user accounts, to individual teachers' views of human learning. The need for development does not imply that things would have been handled incorrectly in the past. The wish to develop actions and operations is an indication of maturity. Enhancing one's teaching is personally rewarding and often results in the development of the whole community. Teachers often motivate their colleagues to participate as well. As a result, the number of good practices increases, the practices are distributed more widely and the quality of teaching improves.

University teachers get models and ideas for their teaching from a variety of lecture courses that they have attended. Very rarely, however, have teachers acquired the amount of material and ideas for successful web-based teaching through first-hand experience. This is why today's university teachers must look elsewhere for ideas on developing web-based teaching. They discuss matters with other teachers, participate in training, read relevant literature and learn from practices that others have found to be successful. What makes the field challenging – and inspiring – is the creativity and experimentation it calls for.

The first stages of development may seem complicated, involving numerous issues that need to be learned and mastered before all of the pieces fall in place and the process truly gets under way. Despite the slow start and possible missteps that you may take before understanding new ideas, web-based teaching is worth a try. It can bring new inspiration and motivation to your work. Keeping to the safe and familiar does not necessarily feed creativity, while doing something different may create new ideas – in research as well as in teaching. Utilising web-based learning environments in teaching is a good example of ways to broaden the horizons in teaching. It forces teachers to consider their own role and students' activities from a different point of view. This may facilitate reflecting more widely on the notions of learning and teaching, as well as the teaching work in general. It is precisely the development of teaching that leads to groundbreaking innovations.

The work community should encourage teachers to try out ICT and different kinds of learning environments, and to get involved in the development of web-based teaching. Teachers introduce quality into teaching, and for teaching to be of good quality, teachers must feel their work is meaningful and rewarding. When developing teaching, the teacher also undergoes a learning process, which requires time and possibly external support. A per-

sistent lack of time and continuous rush suppress enthusiasm. The design and development of web-based teaching are time-consuming processes, and the teacher's role in online studies is no less demanding than it is in contact teaching. The work community and superiors must support teachers in very concrete ways by reserving time for development and providing support for it. As is well known to teachers who have held web-based courses, investment in web-based teaching cannot be thought of as a way to save resources. Instead, web-based teaching should be considered an opportunity to create high-quality teaching and achieve deep learning.

Web-based teaching terminology

Quality of learning

High-quality learning at universities is a process that develops students into independent, critical and cooperative experts in their own field. High-quality university learning means deep understanding of the subject matter of disciplines, as well as highly honed skills in academic reading and thinking. Evolving into an academic expert also involves applying new skills and knowledge to the identification and solution of new problems.[1]

Quality of teaching

The design, implementation and assessment of high-quality teaching follow the principles of aligned teaching. High-quality teaching promotes students' development into academic experts. University teaching of good quality is based on first-rate mastery of the discipline. It supports learning that aims at deep understanding.[1]

Learning process

The learning process encompasses the activities related to studying and learning. The process is influenced by the learners' prior knowledge, motivation, orientation, study strategies, learning styles and regulation of their own learning (Tynjälä, 2003).

Student-focused approach to teaching

Student-focused approach to teaching emphasises qualitative changes in the student's notions and opinions. The design of the learning process is based on the way in which the student analyses and understands the topic. Content-based approach to teaching emphasises the content of the subject but directs less attention to the actual learning process. Studies show that student-focused teaching is linked to deep learning, while content-based teaching leads to surface learning (Trigwell, Prosser & Waterhouse, 1999; Richardson, 2005).

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[1] Definitions of quality teaching and learning by the Helsinki University Centre for Research and Development of Higher Education.

Web-based teaching

In web-based teaching, a significant part of teaching and studies is carried out using information networks. Students interact with the teacher, other students or the study material in a web-based learning environment. (Nevgi & Heikkilä, 2005.)

Computer assisted learning

Closely related to web-based teaching, the concept of computer assisted learning involves the use of a web-based learning environment as a supportive, but not an obligatory, element of learning. In other words, the web-based learning environment is not an essential part of teaching, but may facilitate learning through the distribution of material, such as digital study materials, or cater for information and communication needs. (Nevgi & Heikkilä, 2005.)

Multi-form teaching

Multi-form teaching is an approach that employs alternate periods of contact and distance learning. The web-based learning environment supports especially the independent work and small-group activities used during distance learning periods.

Blended learning

In blended learning, data networks and databanks are introduced into multi-form teaching, effectively resulting in the merger of distance learning, data networks and contact teaching. Learning and studies take place online and online supervision and interaction form an essential part of the process. In educational literature blended learning is defined in the following way: 1) blended learning makes versatile use of audio, images, video and graphics in study materials, 2) combines different teaching methods, all of which support each other, 3) combines face-to-face and web-based teaching (Graham, 2004, 5).

Distance learning

In distance learning, interaction between the teacher and students is typically indirect and does not involve face-to-face meetings. This kind of teaching is still quite infrequent at the University of Helsinki.

Web-based course

Web-based courses involve a course site constructed in the web-based learning environment. It contains online study materials and related support for teaching and learning, and serves as the location for teaching and studying. Web-based courses can be implemented in numerous ways. Teaching can be offered entirely or only partly over the network. A web-based course can be carried out exclusively as distance learning or it can involve both online and face-to-face activities. Web-based courses also range from interactive courses to courses based on independent studies. The teacher's role and workload depend on the course type. (Nevgi & Tirri, 2003.)

Support services for online teaching

Two main types of support services can be distinguished: support services for web-based teaching and electronic administrative services for teaching and studies. *Support services for online teaching* include the production of technical, educational and digital content, publication or distribution of study materials, support for copying or printing and services related to copyrights. *Administrative services* include course enrolment, registration of studies and communication of matters related to studies or teaching. The target group of support services comprises university teachers and students. (Nevgi & Heikkilä, 2005)

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APPENDIX 1: Educational strengths and weaknesses of different learning platforms

	Description of system	Strengths	Weaknesses
Alma	University of Helsinki internal workgroup application, light system	- Clear structure - Enables integration, e.g., with email	- Educational model and discussion areas still inadequate
BSCW	Workgroup application, light system	- Supports and complements contact teaching - Suitable for material-oriented group work - Visits and updates visible to all users - Ease of implementation	- Discussion tool does not support online teaching based on interaction - May favour content-based educational models over learning-oriented teaching
WebCT	International commercial system	- Versatile and functional learning system in terms of educational aspects - Supports different teaching methods; not bound by a single learning approach - Courses are technically easy to transfer from old to new versions	- Supporting the activity of students may be difficult without other support systems
Moodle	System based on open source code	- Social constructivism used as the educational model - User-friendly for both teachers and students - Quite versatile range of functions	- Does not provide much support to student activity in the development of the student community - Some of the functions are still undeveloped
Optima	Finnish commercial system	- Suitable for all courses, including those conducted online in their entirety - Versatile and functional learning environment in educational terms - Includes many useful tools for teachers and students, e.g., several discussion areas in a single course - Supports collaboration - Clear user interface and user-friendly course administration	- Does not include certain tools that support collaborative work, such as wiki and blogs

Source: Strategic plans for online learning environments at the University of Helsinki, report by the 'Platform' (Alusta) work group, 2006.

APPENDIX 2: Links

2.1.1 General learning objectives

Core content analysis:
http://www.oulu.fi/opetkeh/julkaisu/materiaalit/ydinainesanalyysi.html (fi)

International networks: http://www.virtuaaliyliopisto.fi/?node=vy_networks_disciplines_eng

2.1.2 Target group

Tools used to survey prior knowledge:

- Student analysis: http://verkkoluotsi.chydenius.fi/ (fi)
- The E-form: http://ok.helsinki.fi/elomake (fi)

2.1.3 Learning process and teaching methods

Activating methods online: http://momu.utu.fi/tievie/aktivoivat.htm (fi)

Piirtoheitin ('overhead projector') – experiences and good practices:
http://www.valt.helsinki.fi/piirtoheitin/ (fi)

Tools for planning online courses:

- The online wizard: http://www.virtuaaliyliopisto.fi/verkkovelho/ (fi)
- The online pilot tool: http://verkkoluotsi.chydenius.fi/ (fi)

2.1.4 Resources

Contact people for online teaching: http://ok.helsinki.fi/tukihenkilot (fi)

Web-based learning environments

- WebCT: http://ok.helsinki.fi/webct
- BSCW: http://ok.helsinki.fi/bscw (fi)

ApuMatti - Publishing tool for study material: http://ok.helsinki.fi/apumatti (fi)
Information in English: http://ok.helsinki.fi/index.php?page=309

Online course design tools

- The online wizart: http://www.virtuaaliyliopisto.fi/verkkovelho/ (fi)
- The online pilot tool: http://verkkoluotsi.chydenius.fi (fi)
- Vopla: http://www.vopla.fi/in_english/

Tool for electronic forms, E-form: http://ok.helsinki.fi/elomake (fi)

eLENE-TT - Resource centre for online teaching: http://www.elene-tt.net/tt-centre.htm

OSKAR – Tool for the assessment of ICT skills:
http://www.virtuaaliyliopisto.fi/oskar/ (fi)

Training

- The Education Centre for ICT:
  http://ok.helsinki.fi/index.php?page=303
- The Helsinki University Centre for Research and Development of Higher Education:
  http://www.helsinki.fi/ktl/yty (fi)

2.1.5 Structure of the learning environment

Arvo - Development tool for online environments: http://www.virtuaaliyliopisto.fi/arvo (fi)

2.1.6 Study material

ApuMatti - Tool for publishing study material: http://ok.helsinki.fi/apumatti
Information in English: http://ok.helsinki.fi/index.php?page=309
Copyright: http://kampela.it.helsinki.fi/apumatti/lcms.php?am=8488-8488-1

2.1.7 Coordination

Support personnel: http://ok.helsinki.fi/tukihenkilot
Information in English: http://ok.helsinki.fi/index.php?page=311

Information channels for online teaching cooperation networks: www.uta.fi/itpeda (fi)

Tool for the time management of online teaching:
http://www.komiti.fi/tiedostot/mitoituskehikko_2006.pdf (fi)

Lokari - a personal publishing system for the maintenance and administration of weblog sites:
http://www.valt.helsinki.fi/blogs/lokari (fi)

Support for students' web-based studies:
http://tievie.oulu.fi/verkkopedagogiikka/luku_5/verkko-oppimisen_taidot.htm (fi) and
http://opiskelija.edu.fi/page.asp?path=30385,41820 (fi)

2.2.2 Individual differences in the learning process

Accessibility online: http://appro.mit.jyu.fi/essikurssi/ (fi)

2.2.3 Interaction

Lokari - a personal publishing system for the maintenance and administration of weblog sites:
http://www.valt.helsinki.fi/blogs/lokari (fi)

IQ Team - Support services for online group work:
http://www.virtuaaliyliopisto.fi/?node=iq_etusivu_eng

2.2.4 Student guidance

OVI - Support services for student guidance: http://www.virtuaaliyliopisto.fi/ovi (fi)

2.3 Assessment of learning

Interactive feedback systems as a support for learning

- IQ Learn: http://www.virtuaaliyliopisto.fi/?node=iq_etusivu_eng
- IQ Team: http://www.virtuaaliyliopisto.fi/?node=iq_etusivu_eng

3.2 Development of the course and online teaching

Piirtoheitin ('overhead projector') – experiences and good practices:
http://www.valt.helsinki.fi/piirtoheitin/ (fi)

Vopla - Quality management for online teaching:
http://www.vopla.fi/in_english/

Arvo - Tool for the development of online teaching:
http://www.virtuaaliyliopisto.fi/arvo (fi)

eLENE-TT - Resource centre for online teaching: http://www.elene-tt.net/tt-centre.htm

Educational competence of teachers

- The Education Centre for ICT:
  http://ok.helsinki.fi/index.php?page=303
- The Helsinki University Centre for Research and Development of Higher Education:
  http://www.helsinki.fi/ktl/yty/ (fi)

APPENDIX 3a:
Course assessment – questionnaire for the teacher

COURSE ASSESSMENT – QUESTIONNAIRE FOR THE TEACHER

The following statements help you to assess your course. The questionnaire is designed as a tool to develop teaching. You can choose one or two targets of development for your next course based on, for example, your experiences of what could have worked better in your latest course. This questionnaire is based on the recommendations presented in section 2 of the handbook and can also be used to assess the meaningfulness of learning.
The statements have been drawn up in compliance with Nevgi and Tirri's (2003) indicator for meaningful learning.

It is a good idea to fill out this questionnaire before getting feedback from students. In this way you can compare your own assessment to that of the students before making your final evaluation. Students' views of learning and studies can be collected using the questionnaire for students, which corresponds largely to this survey for teachers.

Evaluate the statements on a scale of Yes – To some extent – No. If the question is not relevant to the course or if you do not know the answer, circle the letter N.

		Yes	To some extent	No	Not applicable/ No answer
2.1.1	**General learning objectives**				
1.	The goals set for understanding the course content were realistic.	☐	☐	☐	N
2.	Students were aware of the course objectives.	☐	☐	☐	N
3.	Students knew which of the course topics were essential.	☐	☐	☐	N
4.	Students compared their own objectives to those set for the course.*	☐	☐	☐	N
5.	I and the students jointly set the learning objectives at the beginning of the course.*	☐	☐	☐	N
2.1.2	**Target group**				
6.	I succeeded in estimating the students' prior knowledge of the subject matter.*	☐	☐	☐	N
7.	I succeeded in estimating the students' ICT skills needed in the course.	☐	☐	☐	N
8.	I found out before the course what kind of students would be attending it.	☐	☐	☐	N

2.1.3 Learning process and teaching methods

9.	I thought about the course objectives when selecting teaching methods.	☐	☐	☐	N
10.	I consciously used my knowledge about pedagogy when designing the course.	☐	☐	☐	N
11.	I included tasks that develop group work skills.*	☐	☐	☐	N
12.	I paid special attention to ensuring that the course would develop skills needed in working life.*	☐	☐	☐	N
13.	I designed the course tasks to encourage student activity and independence.*	☐	☐	☐	N
14.	Students showed interest in understanding and enhancing their own learning.*	☐	☐	☐	N
15.	When choosing ways to implement the course I compared the advantages and challenges of online and contact teaching.	☐	☐	☐	N
16.	I planned ways in which real-life problems and situations could be linked to the topics studied in the online course.*	☐	☐	☐	N
17.	The online discussions proved that the students were able to apply course topics to practice.*	☐	☐	☐	N
18.	Online studies have improved the students' skills in using ICT as a versatile support for learning.*	☐	☐	☐	N

2.1.4 Resources

19.	I used the technical support services offered by the university.	☐	☐	☐	N
20.	My technical competence was sufficient for using ICT in teaching in the way I wanted.	☐	☐	☐	N
21.	I had sufficient educational skills to teach in a web-based learning environment.	☐	☐	☐	N
22.	I estimated my workload correctly before the course.	☐	☐	☐	N

2.1.5 Structure of the learning environment

23.	The course included activities enabled by the web-based environment, which would have been difficult or impossible to carry out in contact teaching.	☐	☐	☐	N
24.	The learning environment was clearly constructed so that students could easily find the documents, tasks and other course material.	☐	☐	☐	N
25.	The chosen learning environment offered the functions needed in the course.	☐	☐	☐	N
26.	Students used the online environment as I had planned, or even better.*	☐	☐	☐	N

2.1.6 Study material

27.	The study material steered students toward deep understanding of the topic.	☐	☐	☐	N
28.	The online environment was light, that is, it did not overload the students' cognitive processes.	☐	☐	☐	N
29.	The online study material worked well in terms of technology.	☐	☐	☐	N
30.	The online study material was of high academic quality.	☐	☐	☐	N
31.	Students participated in the selection of study material, using the Internet and databases.*	☐	☐	☐	N
32.	The study material selected by the students offered good support to the achievement of course objectives.*	☐	☐	☐	N
33.	Students made active use of the online study material.*	☐	☐	☐	N
34.	The amount of online study material was in proportion to the course scope.	☐	☐	☐	N
35.	The multimedia materials provided versatile support for learning.	☐	☐	☐	N
36.	Online study material was easily accessible	☐	☐	☐	N
37.	Students found my study material and exercises to be interesting. *	☐	☐	☐	N
38.	Copyright issues were taken into consideration in the course.	☐	☐	☐	N

2.1.7 Coordination

39.	Task distribution between teachers and tutors was sufficiently clear.	☐	☐	☐	N
40.	The course schedule worked well.	☐	☐	☐	N
41.	Students got detailed information about the course well in advance.	☐	☐	☐	N
42.	Students had easy access to the learning environment.	☐	☐	☐	N

2.2.1 Common learning objectives

43.	Students were informed about the assessment criteria at the beginning of the course.	☐	☐	☐	N
44.	Students were encouraged to reflect on their own learning objectives. *	☐	☐	☐	N
45.	The course allowed students the freedom to pursue their personal learning objectives.*	☐	☐	☐	N

2.2.2 Learning process of different learners

46.	Students were offered support and guidance, taking into consideration their individual needs.*	☐	☐	☐	N
47.	Students had the opportunity to influence their own study methods in the online course.*	☐	☐	☐	N
48.	Students were given enough time to work on learning assignments.	☐	☐	☐	N
49.	The level of difficulty was suitable in view of the students' competence and prior knowledge of the topic.*	☐	☐	☐	N
50.	New topics in the online study material were related to prior knowledge or subjects that the students had studied previously.*	☐	☐	☐	N

2.2.3 Interaction

51.	The course made use of cooperative or collaborative learning.*	☐	☐	☐	N
52.	Students took an active part in group work.*	☐	☐	☐	N
53.	Students took an active part in online discussions.*	☐	☐	☐	N
54.	Group work supported deep learning.*	☐	☐	☐	N
55.	Students were committed to cooperating in the online course and took responsibility for the group's activities.*	☐	☐	☐	N

2.2.4 Student guidance

56.	I used the results of online student activities (e.g., of online discussions and argumentation) in my teaching.	☐	☐	☐	N
57.	Students got feedback on their learning from other students during the course.*	☐	☐	☐	N
58.	Students got feedback on their learning from the teacher during the course.*.	☐	☐	☐	N
59.	Students were not afraid to present incomplete ideas for joint discussion.*	☐	☐	☐	N
60.	I helped students to relate the topics studied to real-life problems.*	☐	☐	☐	N
61.	Supervision took into account the students' abilities to regulate their own learning.*	☐	☐	☐	N
62.	The supervision needed by students was adjusted throughout the course according to student needs.*	☐	☐	☐	N
63.	In the online course, students were encouraged to question their previous notions about the topic studied.*	☐	☐	☐	N

2.2.5 Common rules

64.	Course-related communication was always up to date.	☐	☐	☐	N
65.	Students could easily find information about the course.	☐	☐	☐	N
66.	Students were given information about guidelines on online studies.	☐	☐	☐	N
67.	Clear rules for online work were agreed jointly with students.	☐	☐	☐	N
68.	Peer feedback for students was appropriate and considerate.*	☐	☐	☐	N

2.3 Assessment of learning

69.	Students got feedback reasonably quickly.*	☐	☐	☐	N
70.	Students learned to assess their own learning in the online course.*	☐	☐	☐	N
71.	The purpose of giving feedback was to support students' learning.*	☐	☐	☐	N
72.	Students got feedback from the teacher more than once during the course.*	☐	☐	☐	N
73.	Students were able to give feedback on the work of other students.*	☐	☐	☐	N
74.	Course grading was based on both the learning process and the final outcome.*	☐	☐	☐	N
75.	The assessment methods steered students toward deep learning.	☐	☐	☐	N
76.	Joint online discussions seemed to help students to learn.*	☐	☐	☐	N

You can now see what you did well in and what fields still need to be developed. It is also worth considering why you chose ‘Not applicable’ for some statements, since these issues may become future targets of development. Remember to choose a few development targets for the future.

If you want to separately assess teaching and learning based on the model of meaningful learning, check your answers to the statements marked with an asterisk (*). In addition, the following list shows the sub-fields of meaningful learning and the statements related to each field. Questions concerning meaningful learning are based on the indicator for meaningful learning (Nevgi & Tirri, 2003).

Activity: 13, 26, 31, 33, 47
Teacher feedback and support: 46, 58, 61, 62, 69, 71, 72
Intentionality: 4, 5, 32, 44, 45
Contextuality: 16, 37, 60
Cooperation and interaction between students: 11, 51, 52, 53, 54, 55, 57, 59, 68, 73, 76
Transfer: 12, 17, 18
Constructivity: 6, 49, 50, 63
Reflection: 14, 70, 74

APPENDIX 3b: Course assessment – questionnaire for the student

COURSE ASSESSMENT – QUESTIONNAIRE FOR THE STUDENT

The following statements will help you to assess learning and teaching during the course. It will also give valuable information about the course to the teacher. You can reflect on and evaluate, for example, your own learning and activity during the course, as well as the achievement of learning objectives.

Evaluate the statements on a scale of Yes – To some extent – No. If the question is not relevant to the course or if you do not know the answer, circle the letter N.

		Yes	To some extent	No	Not applicable / No answer
2.1.1	**General learning objectives**				
1.	The goals set for skills and learning were realistic.	☐	☐	☐	N
2.	I was aware of the course objectives.	☐	☐	☐	N
3.	I knew which course topics were considered essential.	☐	☐	☐	N
4.	I compared my own objectives to those set for the course.	☐	☐	☐	N
5.	Joint learning objectives were set at the beginning of the course.	☐	☐	☐	N
2.1.2	**Target group**				
6.	The course content and level of difficulty were appropriate in view of my prior knowledge.	☐	☐	☐	N
7.	I had the ICT skills needed for the course.	☐	☐	☐	N
8.	I was able to use my prior knowledge in this online course	☐	☐	☐	N

2.1.3 Learning process and teaching methods

9.	The teaching methods were suitable for achieving the course objectives.	☐	☐	☐	N
10.	The course design showed the teacher's expertise (educational competence) in teaching methods and learning.	☐	☐	☐	N
11.	Online studies helped me to develop my group work skills.	☐	☐	☐	N
12.	Online studies helped me to develop skills needed in working life.	☐	☐	☐	N
13.	I took responsibility for my own learning, was active and motivated.	☐	☐	☐	N
14.	I expressed my interest in understanding and developing my learning.	☐	☐	☐	N
15.	The advantages and challenges of online and contact teaching had been taken into consideration in the implementation of the course.	☐	☐	☐	N
16.	Real-life problems and situations related to course topics were also dealt with.	☐	☐	☐	N
17.	In online discussions, I showed my ability to apply course topics to practice.	☐	☐	☐	N
18.	Online studies have enhanced my ability to use ICT as a versatile support for learning.	☐	☐	☐	N

2.1.4 Resources

19.	I got the support needed for online studies from the university's online support personnel.	☐	☐	☐	N
20.	The teacher used the latest ICT expertly in teaching.	☐	☐	☐	N
21.	The teacher offered expert supervision for learning and studies in a web-based environment.	☐	☐	☐	N
22.	The teacher had succeeded in estimating the course workload.	☐	☐	☐	N

2.1.5 Structure of the learning environment

23.	The web-based environment enabled study methods that would have been difficult or impossible to carry out in contact teaching.	☐	☐	☐	N
24.	The learning environment had a clear structure; it was easy to find documents, tasks and other material.	☐	☐	☐	N
25.	The functions of the learning environment suited the course requirements.	☐	☐	☐	N
26.	I used the online learning environment as instructed by the teacher.	☐	☐	☐	N

2.1.6 Study material

27.	The study material supported deep learning and helped me to reflect on my own learning.	☐	☐	☐	N
28.	The online environment was light, that is, its use did not seem to rob resources from learning.	☐	☐	☐	N
29.	Online study material worked well in terms of technology.	☐	☐	☐	N
30.	Online study material was of high academic quality.	☐	☐	☐	N
31.	I was able to take part in the selection of materials.	☐	☐	☐	N
32.	The course material supported the achievement of course objectives	☐	☐	☐	N
33.	I used course material actively during the course.	☐	☐	☐	N
34.	The amount of online study material was in proportion to the scope of the course.	☐	☐	☐	N
35.	Multimedia materials provided versatile support to learning.	☐	☐	☐	N
36.	The study material was easily accessible.	☐	☐	☐	N
37.	Course exercises were interesting.	☐	☐	☐	N
38.	The origin and copyright of course material were clearly expressed.	☐	☐	☐	N

2.1.7 Coordination

39.	Task distribution between teachers and tutors was sufficiently clear.	☐	☐	☐	N
40.	The course schedule was good.	☐	☐	☐	N
41.	I got detailed information about the course well in advance.	☐	☐	☐	N
42.	The learning environment was easy to access.	☐	☐	☐	N

2.2.1 Common learning objectives

43.	I was told about the criteria used to assess learning at the beginning of the course.	☐	☐	☐	N
44.	The teacher encouraged students to think about their own learning objectives.	☐	☐	☐	N
45.	The course allowed me the freedom to pursue my personal study learning objectives.	☐	☐	☐	N

2.2.2 Learning process of different learners

46.	I got support and guidance tailored to my needs.	☐	☐	☐	N
47.	I was able to influence my study methods in the online course.	☐	☐	☐	N
48.	There was enough time to work on learning assignments.	☐	☐	☐	N
49.	The level of difficulty was suitable in relation to my competence and prior knowledge of the topic.	☐	☐	☐	N
50.	New topics in the online study material were related to my prior knowledge or subjects I have studied previously.	☐	☐	☐	N

2.2.3 Interaction

51.	The course involved cooperative work, for example, in small groups where the input of each individual was necessary for the final result.	☐	☐	☐	N
52.	I took an active part in group assignments.	☐	☐	☐	N
53.	I took an active part in online discussions.	☐	☐	☐	N
54.	Studying in a group helped me to understand the topics taught.	☐	☐	☐	N
55.	I was committed to joint work and took responsibility for the group's activities.	☐	☐	☐	N

2.2.4 Student guidance

56.	The teacher followed online discussions and used examples from them in teaching to link course topics to contexts relevant to students.	☐	☐	☐	N
57.	I got feedback on my learning from other students during the course.	☐	☐	☐	N
58.	I got sufficient feedback on my learning from the teacher during the course.	☐	☐	☐	N
59.	I was not afraid to present incomplete ideas for joint discussion.	☐	☐	☐	N
60.	The teacher enhanced learning by relating the topics taught to real-life problems.	☐	☐	☐	N
61.	I was encouraged to assess and develop my learning skills.	☐	☐	☐	N
62.	I got the supervision I needed during the course.	☐	☐	☐	N
63.	The teacher encouraged students to question their previous notions about the topics studied.	☐	☐	☐	N

2.2.5 Common rules

64.	Course-related communication was always up to date.	☐	☐	☐	N
65.	I could easily find information about the course.	☐	☐	☐	N
66.	I got information about guidelines on online studies.	☐	☐	☐	N
67.	The teacher and students jointly created clear rules for online activities.	☐	☐	☐	N
68.	The feedback I received from other students was appropriate and considerate.	☐	☐	☐	N

2.3 Assessment of learning

69.	I got course feedback in a reasonable time.	☐	☐	☐	N
70.	I learned how to assess my competence in the online course.	☐	☐	☐	N
71.	The feedback I received was encouraging and supported learning.	☐	☐	☐	N
72.	The teacher gave feedback on my learning more than once during the course.	☐	☐	☐	N
73.	Students were able to give feedback on the work of others.	☐	☐	☐	N
74.	Course grading also consisted of other signs of learning, not only the final exam.	☐	☐	☐	N
75.	Learning was assessed using methods that supported deep understanding.	☐	☐	☐	N
76.	Online discussions helped my learning.	☐	☐	☐	N

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What is in line in aligned teaching?
What makes learning meaningful?
Does technology put a load on learning?
What special features need to be considered in teaching in web-based environments?

Quality Teaching in Web-Based Environments: Handbook for University Teachers offers the reader pedagogical principles and insights into how these can improve student learning. The aim of the handbook is to provide teachers ideas and tools for the planning, assessment and development of web-based courses. The handbook can be used as a work book. Its content is based on research results and offers practical examples of teaching solutions for use in web-based learning environment.

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