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University teaching staff as learners of the pedagogical use of ICT

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Abstract

The aim of the article is to increase the understanding of how university teachers think about pedagogy in web-based teaching. The orientation to pedagogy that teachers have in their instruction is evident from their thoughts about student learning. The focus of this study is on the pedagogy that the teachers displayed in their collegial interaction during a web-based staff training course. The objective of this course was to enhance the teachers' pedagogical skills in their web-based teaching. The qualitative data consisting of the teachers' web-based discussions provides insight into their conceptions of what constitutes good teaching and learning. These conceptions can be understood in light of the theoretical model of meaningful learning (Jonassen, 1995). Furthermore, deepening a teacher's understanding by taking the learner's position appears to be a powerful tool in understanding the prerequisites for the successful use of information and communication technology (ICT) in teaching. The results show that teachers were more focused on how to facilitate student collaboration in their web-based teaching and less on how to contextualise the content or how to facilitate the transferability of the content taught into other contexts and situations. The teachers' own experiences of what it means to be a learner in a web-based environment may be an essential learning experience through which they realise that when teaching in web-based environments, it is necessary that every choice they make be justifiable in terms of pedagogy.

Introduction

The aim of this article is to increase our understanding of how university teachers are conscious and integrate pedagogy into their web-based teaching, and how they themselves experience web-based environments as learning contexts. Teachers' experiences of being learners in web-based environments are likely to influence their own teaching in these environments. For instance, Entwistle and his colleagues (2000) show that the teachers' perceptions about

teaching are strongly influenced by their own previous experiences as students (Entwistle, Skinner, Entwistle & Orr, 2000). In our article, the focus is on the pedagogy that the teachers display in collegial interaction, namely web discussions, since the teachers participating in this study were learning to use information and communication technology (ICT) in their teaching. We are interested in how the teachers display awareness of their pedagogical choices and the impact of these choices on learning while they themselves learned ICT usage and developed their teaching. The use of ICT in teaching is rapidly advancing the view that web-based teaching is increasingly being incorporated into everyday teaching and instruction. This change also has an impact on the teacher's role, which in the web-based learning environment requires different skills to facilitate students' learning than in a face-to-face classroom environment (Harasim, Hiltz, Teles & Turoff, 1995; Motschnig-Pitrik & Holzinger, 2002).

Since the first days of the Internet, an expansive body of research has addressed the development of web-based courses in higher education (e.g. Harasim, 2000; Yazon, Mayer-Smith & Redfield, 2002). The focus has been mainly on the students' learning experiences, new modes of learning (e.g. Dillenbourg, 1999) or on pedagogical and technological solutions (e.g. Brooks, Nolan & Gallagher, 2001; Oliver & Herrington, 2003). However, very little research has focussed on the teachers' pedagogical thinking and pedagogical skills to plan and develop their web-based teaching. This means that there is a need for the knowledge on how teachers justify and how they base their pedagogical solutions when developing their courses to be offered as fully or partly online. For example, a survey conducted by Woods and his colleagues (2004) revealed that teachers do not fully apply the pedagogical potential of web-based learning environments. In that study, the learning platforms were mainly used for delivering information and learning materials and the instructional and interactive features were used only occasionally. (Woods, Baker & Hopper, 2004.)

To support teachers' skills to pedagogically develop their web-based teaching, the educational development services at one of the campuses of the University of Helsinki offered a web-based course to university teachers and to the ICT support staff. This course was designed to help those who wished to develop their courses using web-based learning environments either as the only learning environment or as a supplement to face-to-face teaching. The ICT support staff participating in the course worked directly with university teachers, and their expertise may also have been utilised during the actual course.

We have explored how teachers express their pedagogical intentions and ideas while learning to use ICT in their teaching through collaborative methods in a web-based course. We explore the ways in which teachers express such elements as those outlined in the model of meaningful learning in their collegial discussions in a web-based learning environment. The model of meaningful learning (Ausubel, 1968; Novak, 1988; Jonassen, 1995; Jonassen, Howland, Moore & Marra, 2000) provides a framework for understanding teacher views and thoughts on web-based learning. This model provides a framework for analysing what teachers regard as being essential for student learning and as being important in their teaching. The **c**onstructivist meaningful learning model views learning as a dynamic process in which the learner engages actively to construct meaning rather than to reproduce the memorised facts (Jonassen & Reeves, 1996). Jonassen (1995) developed a model for designing social constructivist learning environments and suggested that the learning experience should be the following: active, constructive, collaborative, intentional, conversational, contextualised, and reflective.

The data consisted of the reflective discussions the teachers had with their colleagues and course mates. Some of the data were actually "provoked"

through provocative statements, in order to get teachers to reflect directly upon student activity, intentionality, collaboration, constructivity, reflection, contextuality, transfer of knowledge, and interactivity. The teachers' experiences of what it means to be a learner in a web-based environment may be an essential learning experience through which the teachers realise the implications of their pedagogy.

We have previously conducted research on the teacher and student experiences concerning the meaningfulness of learning in their web-based courses at the same university by administering a survey questionnaire (Nevgi & Löfström 2005; Löfström & Nevgi, 2007a). This survey revealed that the teachers generally had a more positive view about the meaningfulness of learning in their courses than the students themselves did. This is clearly a challenge for pedagogy, and this finding gave rise to the idea to explore what happens in terms of pedagogical thinking (as viewed through the model of meaningful learning) when the teachers engage in learning to use ICT. For this reason, the qualitative study was conducted in order to obtain another perspective on the teachers' views about teaching and learning.

Making Learning Meaningful – A Theoretical Perspective

Teachers need computer literacy and technical skills to be able to utilise ICT in educational settings. But the basis for this literacy and these skills is the teacher's pedagogical skills and understanding of the learning process, if not in terms of theoretical constructs, at least in terms of practical applications and their implications. Teachers also need knowledge about how to use the tools available in pedagogically meaningful ways. A number of studies have explored whether teachers have sufficient ICT skills (Oliver & Herrington, 2003; Woods, Baker & Hopper, 2004; Derntl & Motschnig-Pitrik, 2005). However, it is argued here that besides acquiring ICT skills, the teachers also need to understand the learning process in the web-based environment from the perspective of the student, for this may help teachers gain insight into what it actually means to be a learner, and what kind of cognitive and affective attributes that may go with the learning process in a new environment.

Jonassen (1994; 1995), based on Ausubel's (1968) subsumption theory, has proposed guidelines for designing learning processes in web-based environments. Jonassen's model applies situated learning theory from a social constructivist perspective, and proposes that the following ideas be addressed: a) the focus should be on knowledge construction, not knowledge reproduction, b) learning tasks should be authentic, and realistic case-based learning environments should be provided, c) reflective practice should be fostered, d) content and context dependent knowledge construction should be enabled, and e) the collaborative construction of knowledge should be supported through social negotiation rather than competition. The usability of this model in higher education contexts has been assessed in Tirri and Nevgi (1999) and Nevgi and Tirri (2003), who have also developed a survey instrument for investigating the meaningfulness of learning in higher education. A further modification of that instrument in the English language can be found in Löfström, Kanerva, Tuuttila, Lehtinen and Nevgi (2006).

Core elements of the meaningful learning model as applied in the context of web-based learning includes activity, intentionality, constructivism, collaboration, dialogue, reflection and contextuality. First, activity implies that the point of departure for any learning process is that the student engages in the mindful processing of information and acknowledges his or her responsibility for learning (Jonassen & al., 2000). Second, the criterion of activity implies that interactivity is facilitated in a web-based learning environment. This means that an activity in a web-based environment may be

increased through elements which encourage students to utilise search tools, analyse data, and create (shareable) personal working files. Third, learning is *intentional* when learners actively and purposefully set cognitive objectives and work toward their achievement. Web-based learning environments consequently need to have the tools for the design, follow-up and evaluation of learning, both for individuals and groups, in order to support intentionality. (Jonassen, 1995; Jonassen & al. 2000.)

The next core element of the meaningful learning model is *constructivity* which, as described in the model, implies that knowledge is constructed into structures of increasingly greater definition and sophistication by adapting new pieces of knowledge to previous knowledge structures in order to create meaning, reconcile discrepancy or satisfy curiosity (Jonassen, 1995; Jonassen & al., 2000). Key features of constructivist learning environments therefore include active learning, authentic instructional tasks, collaborative activities, and diverse learning formats (Cunningham, Duffy & Knuth, 1993; Duffy & Cunningham, 1996). Besides collaboration, in a web-based learning environment, the new ideas to be presented may be enhanced by previous knowledge using hypertext structures, the promotion of dialogue through discussion platforms for the exchange of thoughts and impressions, as well as by having a curriculum built taking that prior knowledge into account. Furthermore, learning tasks need to be situated in a relevant real-world context. This *contextualisation* may be supported through simulation, video clips or through problem-based learning. (Jonassen, 1995; Jonassen & al. 2000.)

Learning is *collaborative* when students engage in knowledge-building communities and share their knowledge and skills with other members of the community. A recent study in which students' learning experiences and learning outcomes were compared in two different virtual learning environments revealed that students achieve better learning outcomes when the learning environment supports collaborative learning and when the students are provided with specially designed collaborative learning tools (Romanov & Nevgi, 2006). Learning thereby takes place through *dialogue* in which learners benefit from engagement in knowledge-building communities. Collaborative learning and dialogue can be supported by offering synchronous and asynchronous discussion platforms and shared file management spaces. Dialogue not only provides information about students' learning, but is also an important means for a teacher to gain instant feedback about how students learn. (Jonassen, 1995; Jonassen & al. 2000.)

Finally, meaningful learning is also *reflective*. This is when students learn to identify their learning processes and reflect upon these as well as their implications (Jonassen, 1995). In web-based learning environments, reflective learning can be supported by offering cognitive tools for the self-evaluation of the student's individual learning (Niemi, Nevgi, & Virtanen, 2003), or by facilitating the use of discussion platforms for interaction, role-play and peer assessment (Rovai, 2004). Further, Ruokamo and Pohjolainen (1999) and Tirri and Nevgi (2000) have also supplemented this meaningful learning model by adding the criterion of *transfer*. They argue that learning is situational, implying that learning content does not necessarily transfer from one context to another, reducing the student's experience of relevance. This transfer can be facilitated through hypertext, data banks and problem-solving tasks. (Tirri & Nevgi, 2000.)

As Jonassen (2000) points out, the role of technology in learning is that of an intellectual tool which helps the learners to articulate what they know, reflect on what they have learned, support the internal negotiation of meaning-making, construct personal representations of meaning, and support intentional, mindful thinking. These characteristics are interrelated, interactive and interdependent. For instance, theoretical content can be

combined with multimedia applications, animation and simulation to support different aims of learning, such as understanding, exploring, applying, and producing new knowledge (Laurillard, 2002). Partlow and Gibbs (2003) have identified categories of constructivist-compatible teaching principles and instructional practices and these include project-based tasks, cooperative group work, direct instruction, tasks requiring higher order thinking, interactivity among learners and the teacher, and learner choice. The application of constructivist principles in web-based learning also increases the students' experience of the effectiveness of learning (Bangert, 2004).

Method

Objective and Data

The aim of the article is to increase understanding of how the university teachers think about pedagogy in their web-based teaching, and how they learn to use new technology in order to facilitate student learning. The research question addressed was: What kind of pedagogical conceptions do university teachers display in the process of learning to use ICT?

The informants (N = 13) were teachers and ICT-support staff (hereon referred to as teachers) who participated in a web-based course on web-based pedagogy during the spring term 2005. This course was intended for teaching staff as well as the pedagogical and technological support staff, and it was arranged by the educational development services at one of the university campuses. This one-semester course included both face-to-face and web-based learning, with a strong emphasis on instructional methods. In other words, the teachers were developing their teaching using ICT while simultaneously participating in a course to improve their ICT skills. The participants mainly had quite limited hands-on experience of teaching in web-based environments or if they had experience of using these environments, the objective to participate may have been to increase their pedagogical knowledge.

The data consisted of web-based discussions and written essays produced through the technique of *conscious provocation*. The web discussions generated by thirteen teachers (four of whom were male) on three different occasions during the course provided part of the data. In addition, the course participants were presented with a set of provocative statements about learning in web-based courses. Six participants individually reflected upon these provocative statements by providing written accounts. The idea of conscious provocation as a data collection technique is based on de Bono's (1990) concepts of lateral thinking and provocation. According to this concept, lateral thinking, which is connected to creative thinking, involves the creation of novel, unanticipated thoughts and ideas that allow a creative way to use one's senses. The leaps in thinking caused by disturbances justify the provocation, which may be caused through coincidence or conscious organisation (De Bono 1968; 1990). A similar approach has been used by Entwistle, Skinner, Entwistle and Orr (2000), who presented their informants with contrasting views of good teaching. Their most complex accounts were those in which the informants argued for and against the presented perspectives, integrating the arguments into their own reasoned conclusions about the topic.

Inspired by these ideas, we collected data using the following six open-ended questions designed to provoke the respondents:

- It is said that web-based learning enhances the activity and independent knowledge-seeking behaviour of the student. What do you think?

- While studying in a web-based environment, the learner strives more consciously to set goals for his or her own learning than while studying in a traditional way. What is your view?
- While studying in a web-based learning environment, the learner becomes aware of his or her own thinking and learning processes. What is your experience?
- While studying in a web-based environment, the learner is able to integrate novel and prior knowledge into meaningful structures. How well do you think this idea is realised through web-based studying?
- It is considered that the web-based learning environment inspires learners to share their knowledge with others and actively discuss it. Students are eager to create shared learning experiences through conversation in web-based learning environments. Do you think this claim holds true?
- Web-based learning environments enable learners to gain authentic experiences of the content to be learned that are analogous to real life. This is why the contents learned through web-based studying are generally easily applicable in different learning situations. What do you think about these statements?

Data Analysis

All written materials (web discussions and the responses to the statements of conscious provocation) were content analysed. Content analysis produces categories or concepts that describe the phenomena, and it is suitable for analysing unstructured, qualitative data, for instance diaries, narratives, and reports in which the researcher's intention is to describe phenomena in a condensed and more general or applicable form. (Weber, 1985.) The analytical procedure employed in the present research can be described as deductive content analysis (Tesch, 1990; Miles & Huberman, 1994) in which data are analysed against an existing model. The model of meaningful learning was used as an analytical device in extracting categories. The teachers' awareness of pedagogy was analysed by how they expressed the facilitation of student learning. These expressions were viewed against the categories of the meaningful learning model in order to provide structure for the analyses. The web-based discussions touched upon the issue of web-based teaching more broadly, but also included elements from the meaningful learning model. The provocative statements were based on the model of meaningful learning, and thus the themes brought up in these statements were the same as in the model. Responding to the provocative statements, teachers had the opportunity to express how they thought that web-based environments could facilitate learning. The question tags added at the end of each provocation were intended as encouragement for teachers to explore their personal views.

Validity

To increase face validity, the two researchers analysed the data independently. The categories, i.e. the elements presented in the meaningful learning model, were agreed upon in advance. For those categorisations on which the researchers disagreed, negotiation was pursued until consensus was reached.

The researchers were neither associated with the unit arranging the course nor were they involved in planning, teaching or evaluating the course. Instead, they cooperated with the course leader, through whom they also informed the participants about the research. The course was arranged as an optional staff development course with no sanctions for not participating. Apart from the credits that the participants received after completion of the course, there were

no direct awards for participating. The teachers who take part in this type of extra staff training are usually highly motivated and interested in developing their teaching. It is also possible that these teachers also displayed an exceptionally positive attitude towards research, which aims at developing university teaching and teaching practice.

In addition to the course reported in the present research, the researchers also studied another course with similar objectives during the 2005 spring semester. The findings of that study are reported in Löfström and Nevgi (2007b). Both courses studied by the researchers were arranged by different units at the university, and the researchers were not associated with these units. The authors' main objective was to gain a broader understanding of the teachers learning to use ICT as a means to facilitate a pedagogical instructional approach to teaching. Short-term courses on specific tool- or environment-related topics were also available for research purposes during that period, but these were not studied, as their focus was primarily in the development of technical skills and not so much on developing pedagogical awareness.

The course had already commenced when the participants were asked for permission to use their discussions for research purposes. It is therefore possible that after this point, the participants may have become more self-conscious and aware of their writing. It is also possible that the teachers, if perceiving the provocative statements as describing the ideal situation, may have responded particularly favourably in order to please the researchers. This phenomenon of social desirability is well documented in the literature (Morgeson & Campion, 1997). Using question tags in connection to the provocative statements, the teachers were invited to reflect upon the meaningful learning elements rather than to merely accept them as they were. In this way, the researchers hoped to get the teachers' individual views about the model itself. In the present study, the provocative statements were presented as an optional task for the teachers by providing them with an opportunity to reflect more deeply on certain aspects of their teaching and their students' learning in web-based environments.

Finally, considering the nature of the research and the small number of respondent results, this study is to be interpreted as describing the situation in a particular university in a particular type of context (i.e. that of voluntary staff training) not able to be generalised across samples and contexts. However, this study shows that the teachers' experiences about pedagogy and student learning can be analysed and interpreted using the meaningful learning model as a conceptual tool.

Results: Changing Perspectives - Teachers as Learners in a Web-based Course

Responses to the Provocative Statements

The provocative statements on learning in web-based environments yielded responses in which the respondents were encouraged to argue for or against the presented statements. Both perspectives are synthesised in a summary presented below of the responses to each statement.

The provocative statement on *activity* yielded responses related to the prerequisites of facilitating student activity in the learning process and the conditions of activity as a prerequisite for studying in a web-based environment. The prerequisites of facilitating student activity mentioned in the learning process included challenging learning tasks, sufficient time to gather the necessary information, well-functioning learning environments and platforms, and easily accessible knowledge. These items were experienced as facilitating student activity. Student activity was regarded as being vital in

web-based environments, but studying in a web-based environment was not in itself regarded as a prerequisite for learner activity. In a face-to-face classroom situation individual students may get away with being passive, but according to the teachers, this behaviour was not considered to be an option in the web-based environments. Moreover, the teachers acknowledged that while a student may appear to be passive, in fact he or she may be engaged in substantial thinking processes. In the web-based environment, this thinking activity becomes documented in the form of written accounts, and thus becomes apparent to the teacher. The teachers guessed that the main reason for students dropping out of the web-based courses was the teachers' lack of means to truly support active participation.

Web-based environments were considered to have the properties necessary to support the learners' *intentionality* and goal setting. The teachers distinguished between different types of goals, i.e. those set by the teacher and based on the curriculum, and the students' own learning objectives. Studying in a web-based environment was regarded as being strenuous enough, and without personal goals, the teachers thought that the students would not have the perseverance to complete the course. The teachers implied that dropping out is easier when the students remain anonymous in the learning environment. The role of the teacher in helping the students to set their personal learning objectives was regarded as being crucial in order to facilitate student self-regulation. However, web-based learning *per se* was not regarded as guaranteeing that the students would display intentionality in their studying.

The teachers related *reflectivity* to the properties of web-based environments that support an increasing awareness of thinking and learning processes. The teachers emphasised that learning is by nature a process. The teachers appreciated that they were able to trace the learning process in the web-based environment, as this may provide students with an opportunity to return to previous phases, identify development and learning, and pinpoint the junctures where their thinking changed. The level of the students' awareness of meta-cognitive processes also depends on the quality of the guidance and tutoring in that reflective practice, and the degree to which the guidance is individualised. The teachers felt that substantial encouragement is usually needed and that study skills also play an important role.

The teachers experienced that *knowledge construction* can be promoted in web-based learning environments by providing the students sufficient time to think and to formulate their thoughts in writing. They acknowledged the role of the group as a support to the individual learner, but the teachers felt that the relevance of the groups' contribution, however, was not always unambiguously assessable. Identifying the free riders was felt to be more difficult in web-based environments. Yet these environments may potentially activate students to *collaborate,* since students often have the need to receive feedback on their work. Due to the absence or limited availability of face-to-face contact, the net discussions and chats were seen as serving the students' need for feedback about their learning. The teachers felt that the lack of social cues may even have further strengthened the student's need for response from their peers, but the difficulty of creating a shared social consciousness in the web-based environment was regarded as being a possible threat to enduring discussions and sharing.

The role of web-based learning environments in *providing context* and *facilitating transfer* was not well perceived by the teachers. Instead, they found actual hands-on practice to be much more useful for contextualising the subject matter. Either the teachers were not familiar with the use of simulations, or the games were not available in their specific content area. Furthermore, the teachers did not mention assignments or trigger materials related to problem-based learning as a means of increasing contextualisation

and the transfer of knowledge, although these are a relatively easy means of increasing contextuality when simulations and other advanced multimedia applications are not available.

The Teachers' Web Discussions

Two ways of reflecting on the criteria of successful web-based teaching and learning emerged in the web discussions: teachers expressed their views about successful web-based teaching based either on their own experiences of studying and learning in a web-based environment or on their own teaching experience. Both these types of expressions were mixed in the data, and are presented through the excerpts from the teachers' written accounts presented below. Implicitly, the teachers provided cues about how their pedagogical knowledge had developed as a result of a personal and authentic learning experience. The central themes for successful web-based teaching and learning were related to course design, collaboration in groups and pairs, peer feedback, knowledge building, student activity and intentionality, and challenges such as the lack of social cues.

On the basis of their own learning experiences, the teachers emphasised a number of issues related to course design, including the course structure, teaching and learning methods and their materials as the centre of focus. The teachers were aware that students should plan their studies in relation to course objectives and instructions, and the objectives should form the basis for motivating students. One female teacher in the social sciences expressed how she gained a deeper understanding of the importance of course design:

> During this course, I have realised that it is important to be aware of the possibilities offered by the environment for course design, yet without jumping in at the deep end. By this I mean that it is not wise to try to implement everything there is available in every single course. When designing a course, the focus should be much more on how the course is structured and what kind of methods and materials support the learning of the content.

Course design should not, however, be only the teacher's duty. The teachers pointed out that students should have opportunities to take responsibility for course planning in order to enhance student activity, motivation and commitment. The teachers' own learning experiences also brought out the importance of the teacher's ability to identify with the student role in order to assess the workload properly. Particularly in web-based environments and in teaching new courses, the teachers found it difficult to evaluate the workload of students, and they were careful with their choices of assignments and discussion tasks. In addition, the necessity for explicit objectives and clear, accessible instructions were emphasised. One group experienced confusion and a teacher in that group described the experience as follows:

> There was a lack of clarity in the instructions about how to bring the results of the pair work to the discussion platform. The purpose became clear only at that stage when we were supposed to evaluate each others' work. I realised how insufficient our reporting had been. (Female teacher, social sciences)

However, the same teacher later noted:

> I had not read the instructions well enough and because of that I had not prepared myself properly for the assignment. (Female teacher, social sciences)

The teachers agreed that the group composition, including group division and group size, needs to be considered in advance. This would also help the students orientate towards their group discussion. The teachers strongly agreed that group sizes should remain relatively small if group work is used as a method. This was because initiating discussion was felt to be easier in small groups. The larger groups rarely had enough time to deal with shared issues. In addition, for a course to be successful, the students' personal commitments and schedules must be taken into consideration. Towards this end, the teachers thought that well-structured yet flexible course schedules would help students with their time management. In addition, the teachers preferred to schedule courses so that all participants have the opportunity to read each others' work. Yet the teachers expressed concern for the students' overall workload. For example, one teacher was willing to make substantial adjustments in her courses:

> For my future courses, it was useful to acknowledge the scheduling problem. I am going to stretch the schedule and give students at least one week to complete each assignment so that they could genuinely have the option of doing the homework when it is convenient for them. This is particularly important for students who work or have other demanding courses simultaneously. (Female teacher, veterinary sciences)

The teachers reflected on their changing role in web-based environments. Their emphasis appeared to be shifting from lecturing content to the initiation of the course, the provision of focus, and the facilitation and guidance through the learning process. The teachers were also keen on developing interactive participation, and much of it was felt to depend upon the teacher's initial actions and introduction of the course, not the features of the web-based environment *per se*. The teachers distinguished between spontaneous and planned interaction, and emphasised the importance of creating positive dependence among the participants in web-based courses. Peer feedback and pair work were found to be useful methods for activating students and creating positive dependence. Two teachers described the role of a facilitator in different ways. One stated the following:

> I think that the teacher should stay in the background when the discussion is progressing well. If important content areas get less attention, or the discussion gets sidetracked, the teacher needs to get involved. (Female teacher, veterinary sciences)

Yet another teacher expressed these concerns:

> It is difficult to determine whether web-discussions should be voluntary or compulsory. It would be ideal if the discussion is experienced to be personally useful and that participation in it would be of value in itself. But how can positive dependence be encouraged? (Male teacher, natural sciences)

The teachers preferred to use authentic material in learning assignments rather than invented examples and cases. The use of authentic assignments directs the learning process and may facilitate a student's ability to apply what has been learned later in other contexts. The following quote by a female teacher in the social sciences illustrates her realisation about how important it

is that the assignment be authentic to motivate her and to be able to contextualise the topic:

> In our course, those who planned a real web-based course were prepared to use more time for the assignment in which we were to plan the process. For me, planning an artificial course that would not be executed did not motivate me very much.

An atmosphere that allows incompleteness and different points of view and likewise supports an inquiring dialogue is advantageous for learning. The teachers experienced how learning through becoming acquainted with other's work could provide refreshing perspectives and enhance one's own work. For example, a female teacher in the social sciences observed, "Realising the variety of points of view or how things can be seen differently is in itself worthwhile learning". Another female teacher in pharmacy stated, "Seeing other course participants' plans gave me ideas about how to design and teach courses myself."

The teachers also pointed out problems that potentially occur in learning situations where collaboration is required. These problems were free riding, the incompatibility of the group's working methods, and a lack of understanding for what supporting one another's learning means. One teacher described a situation in which the group found itself struggling after a promising start:

> After the face-to-face meeting, the spark went out and our group was unable to get the work done. Maybe we did not make a clear enough agreement about working methods at the beginning, but we left it open to be decided upon during the web-discussions. Consequently, there was little web-discussion. (Female teacher, social sciences)

Another problem pointed out by the teachers was the students' work load. Simultaneous web-based courses all requiring discussions may, instead of increasing motivation, work the opposite way. A rapidly progressing discussion may be difficult to keep up with and students may ultimately drop out. Some teachers experienced the work load themselves and began to reflect upon what the depth and duration of an optimal web-discussion might be. For example, a female teacher of pharmacy commented as follows:

> Even for a first-timer, it was easy to participate in the discussion, although I sometimes felt almost despair over all the numerous messages. I wonder whether web-discussions would inspire those students who are participating simultaneously in several discussions.

Another female teacher of pharmacy expressed her concerns over her own participation:

> I would have liked to participate more in the discussion but I was not active enough. I only had time to read the new messages, nothing else. When I later had time to concentrate on the discussion it was too late. The discussion had already moved on.

The teachers also described the problems that prevented knowledge from being related to one's own context. Some of the respondents found that if assignments and instructions provided by the teacher were too structured, the learner would be prevented from making content personally relevant. One teacher, however, explained that having the assignment provided by the teacher would have helped him complete the course work. One positive point

made was that the fast-paced discussions made it difficult to crystallise one's own ideas. Communicating in writing was also felt to be a possible source of misunderstanding, and the lack of social cues was characterised as a defining feature of web-based interaction. Owing to this lack of social cues, the teachers estimated that planning a web-based course and the related communicative activities required more attention than planning group tasks for face-to-face teaching. One female teacher in the humanities offered the following explanation:

> It (interaction in a web-based environment) leaves one with a somewhat more disconnected feeling than face-to-face oral communication. It is not easy to internalise all the knowledge when everything is in written form and everything depends on whether I am able to and feel like reading the messages and instructions and learning from them.

One male teacher in the natural sciences had this observation:

> According to my own experiences, the best discussions were those that were a bit assertive and which involved a personal aspect. There is, however, a place for caution here. One must be careful not to take the discussion to a level that is personal in an intimidating sense. Written communication may create wrong images and messages that are much harder to rectify afterwards.

The teachers' views about what makes web-based teaching and learning successful are summarised in Table 1 along with exemplary samples from the teachers' web discussions. In addition, these prerequisites for successful web-based teaching and learning are related to the components of the meaningful learning model in the table. Where challenges were emphasised, they have been related to the component of the model which the particular aspect challenges.

Prerequisite		**Meaningful learning element**
Course design	- Utilisation of the possibilities of the environment	- Constructivity
	- Responsibility for course design shared with students	- Activity, intentionality
	- The teachers' ability to emphasise with the role of the student and their ability to assess work load	- Teacher reflection
	- Prior knowledge	- Constructivity
	- Explicit objectives and clear instructions	- Intentionality
	- Teachers' pedagogical and technical proficiencies	- Teacher reflection *
	- Flexibility	- Intentionality and activity
	Challenges:	
	- Numerous, simultaneous web, discussions, overload	- Activity, collaboration

Motivation and relevance	- Authenticity of assignments - Utilisation of video clips and problem-based learning type activities Challenges: - Assignments that do not help students to relate content to their own, relevant context	- Contextuality - Transfer - Contextuality
Collaborative learning as a method and the application of constructivist principles	- Group work utilised to enhance learning - Facilitation of the exchange of ideas through small groups (large groups require more time for processing shared issues) - Constructive peer feedback - Learning advanced through pair work interaction - The possibility of learning from others' work - Different viewpoints taken into consideration - Allowances for incompleteness and inquiring dialog Challenges: - The incompatibility of a group's working methods - A lack of understanding the meaning of supporting others - A lack of cues in the written text, making interpretation difficult and increasing possibilities of misunderstandings - The difficulty of expressing oneself in writing - Rapidity or a lack of spontaneous discussion	- Collaboration - Interactivity and collaboration - Interactivity - Interactivity, collaboration - Collaboration - Interactivity, critical thinking - Interactivity, reflectivity - Collaboration - Collaboration - Interactivity - Interactivity - - Interactivity, collaboration
Learner activity and intentionality	- Independence and creativity as a requirement for understanding context and relevance Challenges: - Free riders	- Activity, critical thinking - - Activity, intentionality, interaction, collaboration

Table 1: Prerequisites for successful web-based teaching and learning as expressed by teachers

Discussion

The essence of good teaching lies in the teacher's ability to assume the role of a learner focussing on the learner experience (Marton & Booth 1997; Ramsden 1992). The responses to the statements of conscious provocation indicated that teachers experienced students' activity, intentionality, and collaboration to be the main benefits of web-based learning environments. Issues such as contextualisation and the transfer of knowledge were, however, not elaborated on. This may have been because the teachers use examples in their teaching that they themselves easily can connect to a real life or practical context, but they fail to actually pinpoint these connections for the students (see also Nevgi & Löfström, 2005; Löfström & Nevgi, 2007a). Further, the transferability of knowledge is difficult to evaluate as it truly comes to light only after the course or learning event is over, perhaps years later. More visible features in the learning process, and thus much more readily assessable, are activity and collaboration.

Adopting the learner role appears to be a powerful tool in understanding the prerequisites for what issues a teacher must address in his or her own teaching. The teachers' experiences were particularly related to realisations about course design, workload, the management of possible obstacles to collaboration, and students' lack of intentionality and activity. Adopting a student role increased the teachers' awareness of learning in a web-based environment. Interestingly enough, the teachers came to behave much like their students. For instance, some accused themselves of being guilty of free riding, while some expressed annoyance with free riders, a heavy work load, and strict time limits. These experiences may help the teachers to reflect upon their own learning experience and seek a deeper understanding for the studying and learning of their students.

The teachers had the opportunity to re-experience being students. In fact, there is evidence of an increasing *conceptual change student-focused approach* (Prosser & Trigwell, 1999; also Ramsden, 2000) among the teachers in the course. The emphasis appeared to be shifting from lecturing content to the initiation of the course, the provision of focus, and to facilitation and guidance through the learning process. In a conceptual change student-focused approach, the focus of attention changes from content to the identification of ways to actively involve the students and engage them in exploring the discipline from a broader perspective (see also Entwistle & Walker, 2000). As noted, the teachers displayed increased understanding about course design, collaboration, and the importance of the learner's intentionality and activity.

Teachers do need support, and the experience is that the support provided has corresponded well to the teachers' training needs (Löfström & Nevgi, 2007a). This means that both technical and pedagogical support is needed. With an increased understanding of how these new media are adopted and taken into use in daily teaching, it is possible to develop training programmes that address the teachers' learning needs, and take into account their perceptions of learning to use the media. The present study showed that the teachers who participated in the course were keen to develop their teaching, but they had reservations about adopting the use of ICT. Instead, they appeared to carefully consider the implications of ICT for learning. This was particularly evident in the responses to the provocative statements.

The technique of conscious provocation gave rise to the idea of exploring the possibilities of using this technique more broadly in training courses for university teachers. In addition, Entwistle and Walker (2000) suggest the use of alternative perspectives in order to facilitate reflection in staff development in higher education. More research is needed on how these teachers'

reflections have an impact on their teaching, and how this change is then experienced by the students.

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