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UTILISATION OF 2ND GENERATION WEB TECHNOLOGIES IN MASTER LEVEL VOCATIONAL TEACHER TRAINING

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Abstract. The Masters level Opportunities and Technological Innovation in Vocational Teacher Education project (project site: http://motivate.tmpk.bmf.hu/) aims to develop the use and management of virtual learning environments in the area of vocational teacher training, drawing on a well established international partnership of institutions providing both technical and educational expertise. This paper gives an overall picture of the first results and products of the collaboration. We touch upon the goals, the assessments and the learning process of using "Multimedia and e-Learning: e-learning methods and tools" module in details. The main cooperative and collaborative devices are presented in virtual learning environment. The communication during collaborative learning, the structured debate on forum and the benefits of collaborative learning in VLE are interpreted at the end of this paper.

Zusammenfassung. Die Master-Ebene, Chancen und technologische Innovation in der Projekt beruflichen Lehrerbildung (Projekt-Website: http://motivate.tmpk.bmf.hu/) zielt auf die Entwicklung, Nutzung und Verwaltung von virtuellen Lernumgebungen im Bereich der beruflichen Ausbildung, die sich auf eine etablierte internationale Partnerschaft von Einrichtungen, die sowohl technische und pädagogische Know-how benutzen. Dieses Papier gibt einen Überblick über die ersten Ergebnisse und Produkte der Zusammenarbeit. Wir berühren die Ziele, die Bewertung und das Lernen mit Multimedia und E-Lerning und desen Methoden im Detail. Die kooperative Methoden werden in wirtuellen Lernumgebung benutzt und damit presentiert in dieses Artikel.

Keywords: elearning, vocational education, master studies

Introduction

The article based on the results obtained in the Leonardo da Vinci project: *Masters level Opportunities and Technological Innovation in VocAtional Teacher Education (acronym name: MOTIVATE)*, project period 2007 – 2009.

The participant institutions: Budapest Polytechnic (HU), University of Huddersfield (UK), University of Lisbon (P), Fontys University of Applied Science (NL), College of Dunaujvaros (HU), Technological Educational Institute of Crete (GR), Tampere Polytechnic (FI), STRUKTURA Quality Development Ltd. (HU)

Motivation for the project. The Masters level Opportunities and Technological Innovation in VocAtional Teacher Education (MOTIVATE) project (project leader: *Dr. Pal Pentelenyi*, Budapest Polytechnic) transfers innovatory practices and developments to benefit the two Hungarian higher education institutions (Budapest Polytechnic, College of Dunaújváros) in the partnership. The innovation is twofold: the introduction of Masters level modules into the vocational and technical teacher education programmes, and the use of new and emerging web technologies in the implementation of the developed curriculum (Advanced Pedagogy, Multimedia and e-learning, Teaching a specialist subject). The other partners of the consortium (University of Huddersfield, Tampere Polytechnic, Technological Educational Institute of Crete, Fontys University of Applied Science, University of Lisbon) have the necessary expertise to provide this innovation. The UK partner, with considerable prior experience of development and delivery of Masters level professional development courses in the vocational education and training (VET) field, is the main provider of the innovation. All partners have a wide experience of VET curriculum development and technological innovation in its delivery. Tangible outcomes include development of common quality criteria for the qualifications and professional development of VET teachers and trainers in different learning environments and common core criteria for identifying their learning needs.

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Innovative solutions for sharing aims, objective and criteria include the use of social software and collaborative Web 2.0 technologies which facilitate the creation of a new online community of European partners. The possible platforms for the community could be Moodle, Wetpaint Wiki, Second Life. The new generation e-learning is used to refer to new ways of thinking about e-learning inspired by the emergence of Web 2.0. From an e-learning 2.0 perspective, previous e-learning systems were based on instructional packets that were delivered to students using internet technologies. The role of the learner consisted in learning from the readings and preparing assignments. Assignments were evaluated by the teacher. In contrary, the 2nd generation e-learning places increased emphasis on social learning and use of social software such as blogs, wikis, del.icio.us, etc. This phenomenon has also been referred to as Long Tail Learning.

Chris Anderson has shown that web-based e-commerce differs from traditional commerce. In the world of physical retailing, and particularly in areas of selling goods (e.g. books, CD-s, etc.), sales are usually dominated by best-sellers. Typically, 20 percent of titles generate 80 percent of all sales, which means that most revenue comes from the "fat" part of the tail and that most of the costs of operation come from maintaining the inventory in the "long" part of the tail. (*Anderson*, 2006)

In formal, informal and non-formal learning the situation is similar. As more of learning becomes web-based, a similar pattern seems to be occurring. Whereas traditional schools offer a finite number of courses of study, the "catalog" of subjects that can be learned on-line is almost unlimited. There are already several thousand sets of course materials and modules on-line, and more are being added regularly. Furthermore, for any topic that a student is enthusiastic about, there is likely to be an on-line community of practice of others who share that information.

The new theory in social learning replaces the traditional view of knowledge and learning. The new perspective that underpins the previous electronic-based learning assumes that knowledge is a kind of substance, so it can be packaged using instructional methodologies in order to be delivered and transferred to the learners. In contrary, new generation e-learning assumes that knowledge is socially constructed.

Intangible outcomes of the project include the potential to disseminate the expertise gained in order to widen this community so that it can encompass new partners or involve trainee teachers across different institutions and countries in similar collaborative efforts. One particular advantage would be the development of Subject Specialist communities for VET teachers that, because of the reach of internet based technologies, can facilitate much larger groups of subject specialists than are possible in face to face contexts.

The goals of the project

The specific aims of the project are:

- to develop a methodology for assessing the institutional requirements for development of Masters Level VET qualifications
- to adapt Atwell's common framework for VET professionalisation to address these institutional requirements
- to develop parallel Masters Level VET qualifications in each of the partner institutions in order to support lifelong learning and professionalisation in the sector.
- to utilise Web 2.0 technologies to facilitate these developments
- to create staff development programmes to support the use of these technologies

This project aims to build on the work of those who have sought to identify common criteria and a working framework for the professionalisation of VET (*Calderhead* and *Shorrock*, 1997, *Atwell*, 1999) and to implement such a framework in a number of institutions across Europe. To this end, it seeks to develop parallel VET qualifications at Masters Level in each of these institutions, working from an agreed common framework. In order to support lifelong learning, the resulting qualifications will be made available as training opportunities for both initial trainees and as continuing professional development for existing VET professionals.

Innovations at the University of Huddersfield in the UK include the application in teacher education of Web 2.0 technologies (such as social bookmarking, social networking, blogs, wikis and Second Life) and the creation of a national collaborative platform called Associate Online (http://associate.hud.ac.uk/). This platform facilitates the formation of large, online subject specialist communities, allowing the geographically dispersed cohort to identify and interact with other VET professionals working in a similar field to their own. Similarly, developments in Finland in the provision of video conferencing will contribute to the project. The project will exploit the opportunities presented by these innovations, using them to facilitate collaboration between the project partners, and in the longer term, between the students of the partner institutions.

The target group. The project addresses the needs of training providers and their cohorts to facilitate lifelong learning and enable increased professionalisation of VET education and training, identified by the EUROPROF project and by subsequent researchers. *Atwell* noted "an imperative to seek and develop new methods for collaboration and co-operation" since the fragmentation he documented "limits the possibility for formal co-operation between governing and regulatory bodies." In addition, the limited mobility of VET teachers, the different national requirements to which they are subject and the cultural and language barriers extant between them, mitigate against student exchange. Development of parallel qualifications and online strategies for exchange between these client groups will ameliorate the effects of these barriers and facilitate the sharing and development of expertise in the field. Skills acquired in the use of these modes of collaboration can also be used to address the need for further comparative research also identified by *Atwell*. (*Atwell*, 1999)

Atwell's 11 points for a common Masters level framework will be reconsidered in the light of more recent curriculum changes and analysis by the project team of the current curriculum at each of the partner institutions. This will allow the project team to adapt the 11 points to ensure they provide a flexible framework that will nonetheless support parity and comparability of Masters Level work across the partnership. In particular the project will seek to develop modules in areas of perceived shortfall in the recipient institutions, such as mentoring and the use of multimedia in Education. (*Atwell*, 1999)

Students training to be vocational teachers will be the direct beneficiaries, in terms of increased opportunities for lifelong learning and the scope to gain higher qualifications for continuing professional development. They will also benefit from participation in online communities, both in terms of the consequent access to the kinds of large, vibrant communities of practice required, and in terms of developing skills in the use of Web 2.0 in education.

This expertise will enable VET professionals to exploit new technologies in their own teaching, making the students of these individuals the indirect beneficiaries of the project. Very many of the young people who will be taught by current VET trainees are digital natives; that is, individuals who do not know what it is like to live in a world without mobile technology, myspace and digital gaming environments. In order to meet the expectations and requirements of this emerging group, VET professionals will need to develop the knowledge and skills to exploit the affordances of the digital world.

Whilst the project partners are drawn from across Europe with considerable socio-economic and cultural diversity, the wider audience for the project will be pan European, including all providers of training for VET professionals. The project will provide models both for collaboration and for curriculum development for these institutions.

1. Theoretical background

Web 2.0 is a term describing changing trends in the use of World Wide Web technology and web design that aims to enhance creativity, secure information sharing, collaboration and functionality of the web. Web 2.0 concepts have led to the development and evolution of web-based communities and its hosted services, such as social-networking sites, video sharing sites, wikis, blogs etc. In this chapter we give the pedagogical background and present the most important element of it.

According to constructivist pedagogical approach learning environments should keep the activity, intentionality and collaboration for students.

Activeness means that the student is in a key role in her own learning. She is actively engaged in the learning process, processing information. Activeness leads to students taking responsibility in their learning.

Intentionality refers to the learners' active attempts to achieve a cognitive goal. Striving to reach the goal makes the learner think – and thus also learn – more.

Collaboration comes from the students' natural tendency to form communities in which the members can benefit from each others' skills and social support.

Collaboration in education means that two or more co-equal individuals/students voluntarily bring their knowledge and practices together by interacting toward the common goals in the best interest of students' needs for the improvement of their educational success.

Collaboration equipment can be divided into three categories depending on the level of collaboration such as communication tools, conferencing tools and collaborative management tools. (*Salmon*, 2002)

Electronic communication tools send messages, files, data, or documents between students or student and teacher, and hence facilitate the sharing of information.

- *Email* is a store-and-forward method of writing, sending, receiving and saving messages over electronic communication systems.
- *Synchronous conferencing* is the formal term of online chat technologies (e.g. IRC). It has arisen at a time when the term chat had a negative connotation. Today it is occasionally also extended to mean audio, video conferencing or instant messaging systems, given they provide a text-based multi-user chat function. The word synchronous in this case is not to be considered a technical term, but rather describing how it is perceived by humans – chat happens in real time before your eyes.
- *Wiki* enables participants to work together on web pages to add, expand and change the content. Wikis are often used to create collaborative websites and to power community websites, e. g the collaborative encyclopedia "Wikipedia" is the best known wiki.

Electronic conferencing tools facilitate the sharing of information, but in a more interactive way.

- *Instant messaging* is a form of real-time communication between two or more students mainly based on typed text. The text is conveyed via computers connected over the Internet.
- *Chat* allows participants to have a real-time synchronous discussion via the web. This is a useful way to get a different understanding from each other and also get the topic being discussed - the mode of using a chat room is quite different from the asynchronous forums. The Chat module contains a number of features for managing and reviewing chat discussions.
- *Forum* takes place for discussion. A forum can be structured in different ways, and can include peer rating of each posting. The postings can be viewed in a variety for formats, and can include attachments. By subscribing to a forum, participants will receive copies of each new posting in their email. A teacher can impose subscription on everyone if they want to.
- A *videoconference* is a set of interactive telecommunication technologies which allows two or more locations to interact via two-way video and audio transmissions simultaneously. It has also been called visual collaboration and is a type of groupware.
- *Workshop* is a peer assessment activity with a huge variety of options. It allows participants to assess each other's project achievements, as well as exemplar projects, in a number of ways. It also co-ordinates the collection and distribution of these assessments in a variety of ways.

Collaborative management tools facilitate and manage group activities.

- *Knowledge management* comprises a range of practices used by communities to identify, create, represent, distribute and enable adoption of what it knows, and how it knows it. E.g. the knowledge mapping is commonly used to cover functions such as a knowledge audit (discovering what knowledge exists at the start of a knowledge management project), a network survey

(mapping the relationships between communities involved in knowledge creation and sharing) and creating a map of the relationship of knowledge assets to core teaching-learning process.

- *Social software* allows users to interact and share data. This computer-mediated communication has become very popular with social sites like MySpace and Iwiw, media sites like Flickr and YouTube, and commercial sites like Amazon.com.

2. Results

1. Common module delivery

The specifications for module were prepared. "Multimedia and e-learning: e-learning methods and tools" was offered for students of initial vocational teacher training. Almost partner institutions having vocational teacher training participated in the common module delivery. The first experience was gained with the guidance of the British team by using Associate Online for the module "Researching multimedia in education".

Due to the technical development and free availability of Moodle the consortium decided to examine the inter-compatibility of these VLEs. With Finnish volunteering the new common module delivery was decided for "Multimedia and e-learning: e-learning methods and tools". Resources can already be reached on the Moodle area of Tampere Polytechnic (moodle.tamk.fi).

Now by the "Multimedia and e-learning: e-learning methods and tools" module we introduce the syllabus of the virtual course and the teaching-learning process in VLE.

I. Aims and Assessments

The aim of the course is to introduce the learner to different methods and tools used for e-learning. The learner finds out what can be done with different tools, how they have developed and what the future trends in e-learning tools might include. The learner is not given ready answers but is encouraged to evaluate critically the uses, functions and relevance of the tools and methods from the viewpoint of their own work. The approach is not merely tool-centered, but also the changes in the conception of knowledge and learning that are currently taking place in the modern information society are discussed. The relation between the changing conceptions, changing tools and the need for change in pedagogical thinking is considered.

In the case of the module relevant information ("ready knowledge") was placed in the system shell in an electronic format. In the module "Multimedia and e-learning: e-learning methods and tools" the students independently processed the following topics in the course of acquiring information:

- Factors influencing learning (e.g. previous educational experience, motivation, learning style)
- Theories and models of teaching and learning (e.g. adult learning models, experimental and reflective models, cognitive theories, learning styles, motivational theories)
- Basic forms of collaborative learning
- Role of communication and language in teaching and learning
- Barriers to learning
- Opportunities for professional development for specialist teachers and trainers
- Organizations and networks, community-links, the role of teamwork. (*Smith*, 1999)

Table 1 shows the learning outcomes of would-be-teachers at the end of the module.

Table 1. *Learning Outcomes of Would-be-teachers*

Knowledge and Understanding:	
1	Critically understands the possible transformations to teaching and learning brought about by the use of ICT

2	Demonstrates an in-depth knowledge of techniques and strategies for researching the use of multimedia in teaching and learning
Abilities:	
1	Applies multimedia and interactive content for use within teaching and learning with originality
2	Selects suitable technologies for application in a specific teaching and learning context appropriately from a range of ICT based approaches with reference to current developments
3	Researches innovations in teaching and learning using an methodologies derived from action research approaches
4	Evaluates critically a range of technology based approaches to teaching and learning

The students had to produce a portfolio of evidence showing that they had achieved the module outcomes (2.500 – 3.000 words approximately). The portfolio should have contained the following elements (project + evidence of reflection)

- Plans for learning sessions and/or program of study are appropriate to particular teaching and learning situations, incorporating, where appropriate, IT and other key skills
- Consideration of VLE usage for collaborative learning
- Evaluations of the design and delivery of teaching and learning
- Consideration of fundamental issues and principles relating to teaching and learning within the specialist area
- Evidence of reflection on teaching and learning processes

During the teaching and learning process all students have to prepare a project work as well, in which the learners analyse the impact of the tools and theories introduced during the course in their own teaching and make a course plan including pedagogically relevant use of e-learning tools.

Assessment Criteria:

1. The mini projects will demonstrate

- integration of a range of ICT tools and techniques creatively into current teaching practice.
- evaluation of the use of ICT to support teaching and learning and make sound judgements about its use.
- synthesis of theoretical ideas and current debates around teaching and learning using ICT.

Table 2. *Achievement of the common module*

Week	Contents, tools	Pedagogical consideration	Learning task
1	Introduction		
2-4 Module 1	VLEs Electronic mail, instant messaging Discussion forums (student/teacher roles) Video conferencing - chat (Marratech + Moodle-chat)	collaborative learning, communication (synchronous / asynchronous)	Participation in an online discussion. Considering e-learning tools and methods, where do you stand now? How about in 5 years? Will things change? How? What causes the changes?
5-7 Module 2	Blogs (Introduction, online identity and presence, finding existing resources) Wikis - wetpaint Podcasts	Progressive inquiry / distributed expertise / collaborative knowledge construction	Evaluating changes in the conceptions of knowledge and learning. The learners watch related videos and participate in an online discussion. They write an evaluative summary of the topic in small groups through a wiki.

8-10 Module 3	Flickr YouTube Second life Delicious Facebook / MySpace / Ning VoiceThread for narratives	Narratives in teaching and learning	Exploration of Flickr / YouTube / Second Life or some other application the learner has not used before. The experiences and observations are shared and discussed in the online learning environment. Each learner must also come up with at least three ideas of how they could use some of the tools in their own teaching. The ideas are commented on and possibly further developed by the group.
11-13 Module 4	Google applications (other than the search engine) Mobile learning / Ubi PLEs - portfolios, life-long learning. e-literacy	Changing conceptions of teaching and learning. Teacher's need for lifelong learning.	A discussion concerning the necessity of VLEs. VLE vs PLE. How will things change? What does it mean in one's own work?
14.	Evaluation		

2. The essay will demonstrate

- the use of an ICT technique creatively, making sound judgements about its educational effectiveness.
- synthesis of current practices and debates about the role of ICT
- critical understanding of theoretical perspectives on use of ICT to enhance teaching and learning.

II. Teaching and Learning Process

The forms of electronic learning may be interpreted within the framework of traditional and distance learning alike. In the former case the so-called face to face forms of education are combined with the Internet-based learning environment. In the course of processing the modules "Multimedia and e-learning: e-learning methods and tools" we realized the form of learning referred to as "blended learning" in the technical literature. Virtual classroom is defined as the entity that associates a course with one or more students and one or more tutors/mentors/facilitators with the purpose of reaching some common educational goals (realization of course). Virtual classrooms use the services of the system to reach these goals.

The course is divided in four modules (Table 2), all of them introducing new tools and methods of e-learning. Each module also introduces a pedagogical theory and gives tips and ideas of its possible use in an e-learning context. The themes proceed in a chronological order; the most common, long-established and familiar tools are introduced first whereas the last module offers a glimpse of future trends in the field of e-learning.

Each module contains learning tasks related to the topic. Assignment types vary from discussions and group activities to individual written tasks. The emphasis, however, is on collaborative learning. At the end of the course the learners submit an individual essay in which they analyse the impact of the tools and theories introduced in their own teaching and make a course plan including pedagogically relevant use of e-learning tools.

2. Creation of on-line communities for students of in-service teacher training

In this chapter online communications will be introduced by focusing on text-based computer communication, via Moodle Forum. Forum is commonly provided in VLEs, such as Moodle. They provide the facility for students and tutors to hold discussions and contact each other in the same group. This method is similar to the regular e-mail system, but there is a difference. Discussions are threaded, in other words, the relationship between the message and the responses posted to it are displayed graphically on the screen in a way that gives a meaningful structure to a discussion or

activity. Discussions are also recorded, enabling students and the tutor to return to them. The Moodle Forum is a "virtual market", which shares individual student questions with the whole group. Evaluating the role of discussion board in electronic based communication we can notice that there might be new roles of students and teachers/tutor. Summarizing these, discussion board allows students to contact tutors on an individual basis, to collaborate on and share tasks, including the exchange of files, to provide each other with feedback, to raise questions, to participate in open discussion, to share experiences, ideas and resources. It allows teachers to contact students individually, to provide an answer to an individual question to all students, to facilitate collaborative discussions and activities, to upload electronic teaching materials, to provide reminders and information.

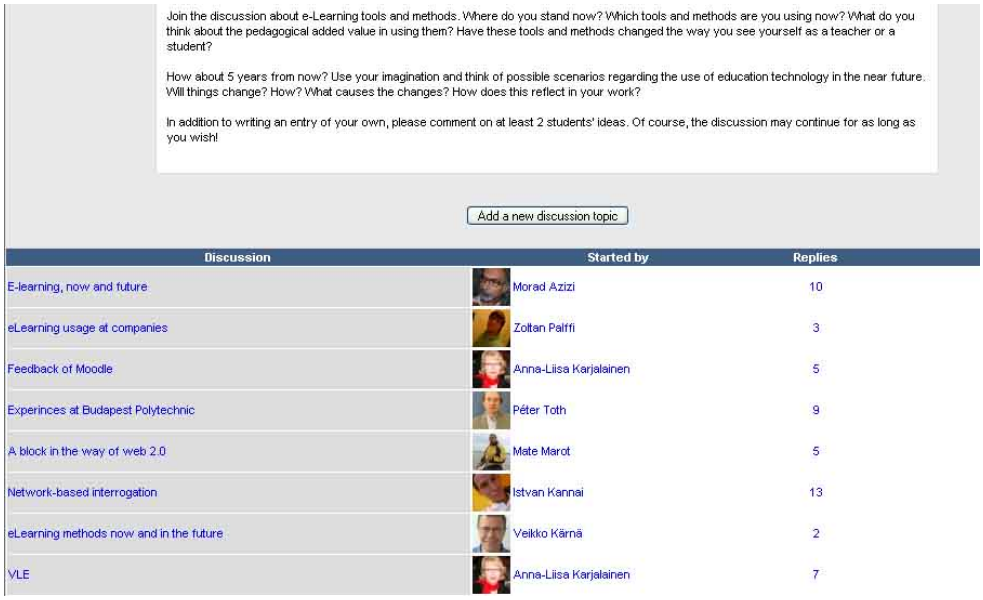

Figure 1. *Forum in "Multimedia and e-learning: e-learning methods and tools" module*

On the evidence of our experience the benefits of using discussion board in virtual learning by collaboration are as follows:

- the flexibility of participation in learning any time, any place
- the disadvantage of this flexibility is a lack of immediacy, since students may have to wait for responses and feedback, which might result in loss of motivation
- discussions/contributions are recorded, which enables students and tutors to return to review activities or access answers to queries by others
- the development of important transferable skills, for example, discussion boards may facilitate the development of "virtual" written discussion skills, potentially linking to key skills for would-be-teachers

Finally we give some students' opinions about the on-line community and learning by virtual courses.

- positive effects of using a VLE

"It can be used everywhere (work, home, school, etc). It has even less barriers than the classroom type education."

"I have a freedom with timetables, interesting presentations (for instance trough You Tube) and collaborative learning with groups."

"No need to use pens. I love to use my laptop for learning. Forum helps me a lot to write my thesis about web 2.0 applications in education."

"The best of all is better time management. I have always been struggled by strict time appointments. Some new tools (e.g. chat, forum) can be used."

"Made the international connection possible and learning when you have time, instant testing of links provided by others. I think it's essential to get personal experience on different virtual courses before you can plan your own."

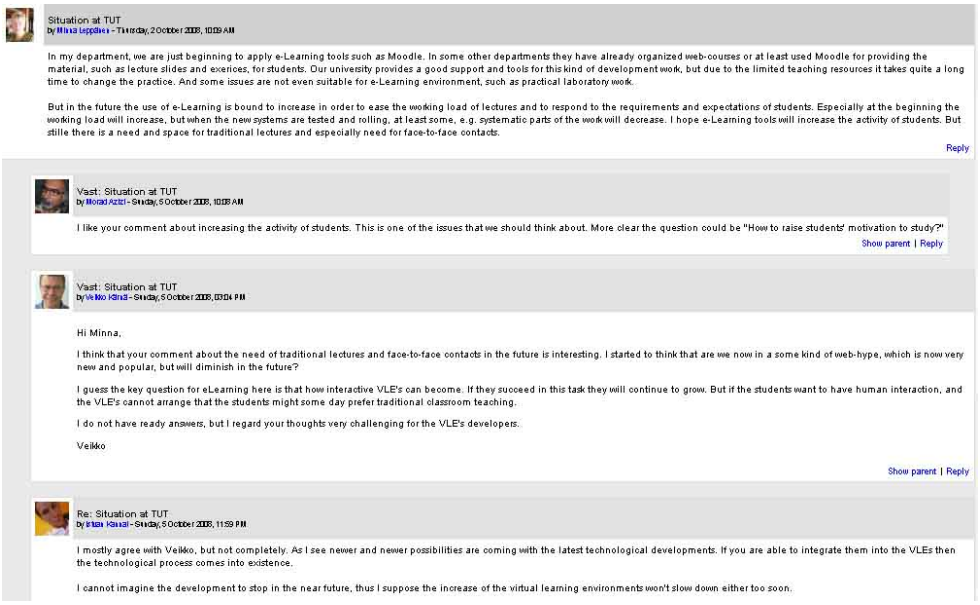

Figure 2. *Reflections in the Forum of "Multimedia and e-learning: e-learning methods and tools" module*

- values of learning together with foreign students

"It was very interesting to compare other students' different opinion and experience and to know a litter better a different culture and habits."

"I hope some people realized that English is more important than they thought before, so I hope they start to learn it again. And I think all of us will be a great teacher and have great success by using the right way of these web 2.0 applications in education."

"Learning together with foreign students made studying more interesting and pleasure."

"New friendships can be made. It allows us to discuss the curriculum from different points of view in an international context."

- influence of learning in a VLE in students' own studies

"Extra item was added to my everyday routine. I received some positive ideas about using it as a learner and a teacher. I have decided to plan an own my course in VLE."

"I would help learning in the secondary school as well where I teach, but the school leaders don't find it is a good method to be used at that age. I am thinking about using VLE in some other way. :)"

"I started to use Youtube, delicious and Flicker for private use and also for teaching and research after testing during this course; another course gave me motivation to use Facebook. I'm going to test Google documents soon. So I got new tools and ideas for own web courses."

- suggestions for the ratio of classroom and VLE learning in different courses

"It is depends on the subjects of the course. On average, I think about 20-40% VLE and the rest is classroom learning."

"I would suggest 50-50 percent in most cases. The presence of a teacher can help much, but VLE has also a lot of added value."

"I find that many courses can be moved on to VLE, but I know, too, that some subjects demand also face to face learning. You only have to find the balance."

Conclusions

Educational planners need to be aware of the fact that new technologies have as much potential for wasting time and money as they have for inducting progress. Nevertheless, we also have to keep in mind that "we cannot afford not to go up this slope if everybody else goes up".

Many teachers (groups) suffer from a lack of access to training and development programs and the increased delivery of training through networked learning will have a direct benefit to them. Networked learning offers the opportunity to deliver training programs in a flexible and learner-centred way.

The European collaboration provides an excellent opportunity to analyze research data gathered on the use of different virtual learning environments. Investigating the possibilities of virtual learning environment operation across different platforms contributes to making recommendations for future EU harmonization regarding virtual learning environment usage. Virtual learning environments and networked learning will increasingly become key factors in the delivery of training and education in the 21st century.

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