

VIRTUAL ELECTRONIC LEARNING IN VOCATIONAL AND INITIAL TEACHER TRAINING: AN INTERNATIONAL REPORT

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ABSTRACT

The Leonardo project under the acronym VELVITT is examining the potential use of Virtual Learning Environments (VLEs) as tools to enhance and extend the delivery of teacher training in vocational subjects. A particular focus of the project is an exploration of the degree to which various VLEs can be used as the tools for international collaboration, in the reform of Initial Teacher Training (ITT) curricula, and to introduce trainee teachers to electronic learning methods. At the heart of the project is the key concept of the multiplier effect, which describes the means by which methods taught to trainee teachers are likely to be adopted by them once they move into practice and therefore contributes in the quick and efficient spreading of innovations in the teaching and learning practice, at national level. This paper reports the most important achievements of the VELVITT project in two parallel axes: the training material developed and the issues arising from the delivery of modules of the vocational ITT curriculum in Finland, Hungary, Portugal and the UK. This is achieved by means of four distinct VLEs which are evaluated in terms of their capacity to support vocational ITT and international collaboration in curriculum reform and development of teaching methods.

KEYWORDS

Virtual Learning Environments, Initial Teacher Training, Information & Communication Technologies, Education

INTRODUCTION

Our society is characterized as the information and the knowledge-based society (Davenport and Prusak, 2000; Drucker, 2002). In order to understand and adjust to the rapid, deeply affecting changes in such a society, first, every person should have access to education and second, schools should be able to bring up students with intellectual creativity and critical thinking ability (Turkle, 1997). Thus, the emergence of the knowledge society signifies a new era for education. The rapid evolution of Information and Communication Technologies (ICT) provides the enabling technological tools for facilitating the implementation of the new paradigm in education referred to as e-learning. ICTs are seen by many commentators as prompting fundamental structural changes in the educational process, providing new possibilities for the creation of innovative effective environments of teaching and learning, by re-defining the educational frameworks and deploying new learning facilities (Kalogiannakis et al., 2005).

Further to that, new technologies, particularly those which provide an intermediary and communicative route between participants can work to break down traditional teaching methods and lead to the emergence of innovative forms of participatory learning (Davies and Shukry Hassan, 2002). A key concept used frequently in modern analyses of teaching and learning applying liaising means is the notion of legitimate peripheral participation, put forward initially by Lave and Wenger (1991) and then developed by Wenger into Communities of Practice (CoP) (Wenger, 1998) where learning is organised not according to the conventional configurations of the classroom with the inevitable uneven power relationships between teacher and student, but rather in social groupings where a joint sense of

enterprise and common purpose creates a new type of learning community based on communication and shared understandings.

Gray (2001) has written of the need for the reflective learning cycle to be incorporated with learning in web based environments, and argues that a combination of virtual technology and reflective learning can be of great benefit. VELVITT has been using VLEs in this specific way, and the project design has sought to evoke the power of distributed discussions amongst a variety of participants with differing perspectives on teaching and learning (Makitalo et al, 2002; King, 2002). So learning in VLEs as conceived in the common module delivery is not simply a matter of content, although content and curriculum materials were developed, tested, delivered and refined. Learning is rather a complex activity undertaken by trainee teachers through the variety of electronic means that VLEs have to offer and with clear links to the arguments made by Avis et al (2002) about the use of pedagogic knowledge and communities of practice within the further education sector in the UK.

Virtual Learning Environments are built on a foundation of two key elements: computer technology and education. The technology aspect of virtual learning environments provides facilities for learning management tools, online learning frameworks, collaborative learning environments, web course design tools, etc. The software typically resides on a server and is designed to manage or administer various aspects of learning, delivery of materials, student tracking, assessment etc (Milligan, 1999).

VLEs are inevitably designed with a pedagogical model in mind that is not always made explicit. The development of virtual learning environments is typically guided by the consideration of two key elements: Technology and Education as shown in Figure 1. *Technology* is made up of many sub-categories based on computing and information technology. *Education* is made up of many sub-categories based on educational models (Britain and Liber, 1999).



Figure 1. The traditional framework for VLEs

Focusing on supporting the learner and the learning environment, the traditional framework does not make explicit the importance of learning experience and the context in which learning occurs. Clark and Maher (2001) propose a framework for virtual learning environments, illustrated in Figure 2, which considers the learning experience and emphasizes on design, as is common in pedagogy courses.

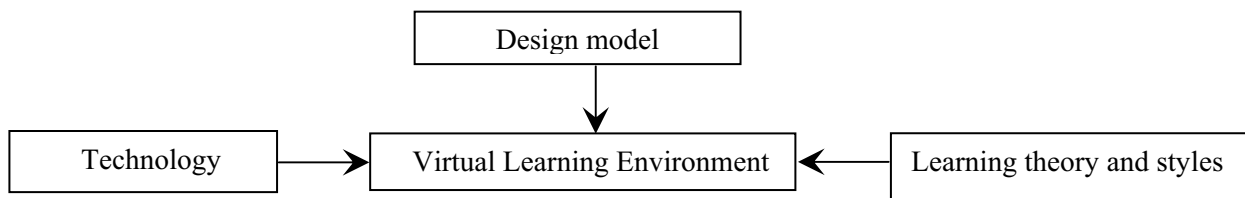


Figure 2. A framework for VLEs considering the importance of design

The development of this framework leads to a model for virtual learning that can benefit from architectural theories and principles of teaching design. Figure 2 illustrates the framework with design of the model being the third component. Design of the model brings relevant design theories and pedagogy to the learning environment, focusing on the role of context and experience.

Each of the components of the framework in Figure 2 can be elaborated to take into account numerous alternatives, such as certain forms of VLEs. One of them, in particular, supports the four key processes fundamental to a constructivist learning environment, identified by Jonassen (1994) as: context (meaningful and authentic), construction (of knowledge), collaboration and conversation (student to student and student to teacher/facilitator/mentor).

With all the above in mind and during the years 2003 to 2005, the lifetime of the VELVITT project, a consortium formed by experts from Finland, Greece, Holland, Hungary, Portugal and the United Kingdom attempted to:

- develop a methodology for assessing institutional requirements for networked learning and for selecting and implementing appropriate solutions, including the choice of VLE;
- create staff development and training programmes to support the management and use of virtual and networked learning;
- increase trans-national collaboration in vocational ITT and develop capacity to deliver programmes where this takes place;
- investigate the specific application of VLEs in vocational ITT, and revise curricula to maximise benefits to teaching and learning processes;
- compile and analyse data comparing various VLEs, and disseminate this with a view to standardising policy in vocational ITT.

TRAINING MATERIAL

Training material was developed for the three common modules delivered during the VELVITT project: Basic Teaching Skills, Computer Mediated Skills and European Collaboration. The content of each was chosen to compliment the existing curricula of each of the participating institutions and ensure that the content could be integrated into existing teaching and learning timetables.

The Basic Teaching Skills module is the first of the modules and covers core concepts and ideas in the area of teaching as an applied practice. The emphasis is on helping participants to gain an overview of the necessary pedagogic skills needed for effective work in vocational education and to spend some time developing appropriate theoretical frameworks to describe their practice. The second module, Computer Mediated Skills, focuses on the skills needed in using digital and electronic learning methods to support learning. These skills encompass the use of Virtual Learning Environments, but refer also to a wider sphere of technologies and activities including the use of Weblogs and Wikis for teaching and learning purposes and teaching skills in facilitating learning using the internet and online tools. The final module, European Collaboration, was explicitly focused on exploring issues of collaboration in vocational education within EU member states. The module encouraged participants to explore the policy backgrounds to EU processes of integration in vocational education and to take an active part in researching and evaluating similarities and differences in provision at national levels. A summary of the three modules is presented in Appendix I and two screen shots, related to the delivery of the Computer Mediated Skills module by means of two different VLEs, are presented in Appendix II.

Assessment

Each of the modules was assessed through a “portfolio” approach. Participating students were guided to collect evidence, using a variety of methods and media, to show that they had met the learning outcomes of each of the modules. This method of assessment was flexible and provided the students with an open-ended set of possibilities for successful completion of the modules, rather than being a closed set of activities which would hamper creativity and autonomous learning. The development of independent learning strategies amongst trainee teachers is vital, and the modules modelled how responsibility for learning could be transferred to the student. The construction of a suitable portfolio of evidence for assessment was therefore a key requirement of the modules and our evaluation has determined that students were able to meet the learning outcomes for the modules in a variety of ways which suited their individual needs and learning dispositions. Students submitted their portfolios

through email to their respective tutors. This use of email submissions was not new in all countries, but in many cases it was and the students and tutors benefited from trying a novel approach to submission which will probably supersede paper based submissions in the near future.

Teaching Methods

The exact nature of the teaching methods for the common modules varied according to national context, but in all cases face to face teaching was used to support the online delivery. The delivery could therefore be described as being a hybrid (Cray, 2000) or blended (Whitelock and Jelfs, 2003; van Eijl et al, 2005). The modules were not designed to be studied solely as distance learning materials and without the support of the tutor. Instead the online material and activities compliments the activities of face to face teaching and provides students with a developmental context in which to gather evidence to assemble their portfolio submissions. The amount of time used in each country differed according to timetable constraints, but typically 3 to 4 teaching sessions of around one hour were used to orient students to the material, clarify assessment procedures and give them further guidance on completing the work.

SELECTING A SUITABLE VLE

In the course of the VELVITT project a survey was carried out for the four VLEs used by the participating institutions, indicated in Table 1. The objective of this survey was to find an answer to the following questions:

- What are the possibilities and limitations of the various virtual learning environments?
- What virtual learning environments are suitable in given situations?

In order to compare different learning environments, a questionnaire with specific questions and statements relating to developers, managers, lecturers and students was circulated among the VELVITT partners. The evaluation aspects were broken down into the following five broad categories:

- the educational vision (primary objective, target group);
- the didactic functions (cooperation possibilities, communication forms, coaching and support possibilities, test and question systems, possibilities for managing competences and skills, possibilities for adding content);
- the organisation of education (portfolio, student monitoring system);
- the functional structure (interface, ease of use);
- the technical infrastructure (data interchange, methods for adding content, standards).

Table 1. VLEs used and evaluated

Virtual Learning Environment	Education Institution
WebCT	Tampere Polytechnic – Finland
Blackboard v6	University of Huddersfield – UK Budapest Polytechnic – Hungary
N@Tschool v8	Fontys PTH – The Netherlands
Moodle	Tampere Polytechnic – Finland Dunaújváros Polytechnic – Hungary

The University of Huddersfield, in UK, that has been using Blackboard since 1999, acted as an advisor to the consortium. In order to offer all three courses during the VELVITT project it negotiated guest access for the students from Finland, Hungary and Portugal. As Blackboard is a commercial product there were cost implications here and funding was provided by the project. The Tampere Polytechnic delivered the Computer Mediated Skills course on Moodle, the VLE that was also adopted from the Dunaujvaros Polytechnic in Hungary and the New University of Lisbon, in Portugal, mainly for its free,

open source code feature. TEI of Crete, in Greece, only experimentally used Moodle during the project, while GUNet (the Greek Universities open source platform system) is still used for its e-learning activities. Finally, N@Tschool was used by FONTYS PTH in the Netherlands.

Detailed results of our findings on the first three of the above five categories are presented in Appendix III. This is because we believe that upon selecting a VLE, an educational institution first looks into the areas of applications and functions. The functional structure and the technical infrastructure generally are only considered at a later stage. The results of this survey can be used by educational institutions wishing to make a choice from existing VLEs, although our experience with the VELVITT partners indicates that finally the best VLE is the one that best suits your needs!

CONCLUSIONS

Under its European collaboration perspective, the VELVITT project provided us with an excellent opportunity to analyse research data gathered on the use of different virtual learning environments. Investigating the possibilities of VLE operation across different platforms contributed to making recommendations for future EU harmonisation regarding VLE usage, as we believe that VLEs and networked learning will increasingly become key factors in the delivery of training and education. Although it is not possible for a paper of this length to provide a full evaluation of the four VLEs tested as tools for supporting pedagogy in vocational teacher training, some vital observations are summarized here below.

A common ground for the four VLEs tested is that they are all continuously developed, have a considerable developer and applier background and, for every one of them, regular users conferences are organized. For almost all of them, several big ICT and education companies have developed interfaces and add-ons, so learning materials developed by means of this system can easily be built in the particular VLE. If the above is considered positive, a negative common ground also stood out. Although multiple language versions do exist in all four VLEs, they can only be set at server level, so the installation at the host University had to run in English. A facility for users to set languages on a per session basis would be an excellent addition to any system, but one which we have not yet found on any of the VLEs tested. What almost appears to be a common ground is the fact that every system tested was found to have a well supported content management system, to be sufficiently secure and reliable and to cope well with multiple user sessions from the four countries around Europe.

Coming to the issue of cost, now: Blackboard has the highest cost and adding more users has had implications for the host organisation. On the other hand, Moodle is a system of open source code that can be downloaded for free from the official website of the program. WebCT and N@Tschool stand in between. Licences for Blackboard (and in a certain way for WebCT and N@Tschool) are granted for the number of students at the host university and additional students from other countries incur additional licence fees. This was definitely a block to further integration and collaboration amongst the four European nations that participated in the VELVITT project. The contrast with an open source environment such as Moodle is evident, with no user number or licence limitation being imposed when collaborating across countries. This explains why, at the end of 2005, Moodle was running in 3048 registered copies in 114 countries and was available in 50 languages. Our Hungarian partner found the installation of Moodle a very simple task that took place by means of a browser with continuous communication with the installer and, in addition, it was very easily adapted to the Hungarian language.

Bearing in mind that there are aspects that have not been addressed in our survey, we are completing our concluding comments here with some of the weaknesses that we have noticed in particular VLEs. Customisation is not well supported in Blackboard and asynchronous discussion tools are limited and not universally praised by participants. In WebCT we noticed the lack of a separate learning material developer. It is the teacher who has to prepare the complete material, and the system does not provide a unified interface for the development. Despite the fact that N@Tschool operates in an environment very similar to the Windows it was found to require quite a long period for establishing and commissioning

all the possibilities and functions supported by the system. Finally Moodle does not offer a portfolio system facility and was also found short regarding the authentication of students. As it only supports manual account handling, all the details of each user have to be entered manually.

During the VELVITT project, it became obvious that the importance of online mentoring and guidance has not been emphasized enough. Online teaching is *teaching* after all, in contrast to merely publishing material on a website which, nonetheless, can be a very useful practice when it is done in addition to other means of teaching. However, it cannot be regarded as a web course. If there are no resources for a web course that involves online teaching, the web course stands on a shaky pedagogical basis. As an online course student aptly pointed out in our survey, a web course without an online teacher is like an empty classroom with just a pile of handouts left on the desk for the students. On the other hand, once the pitfalls of online studying are taken into account in advance and a student centred approach is maintained during the design phase as well as in the implementation, the result can be something that enriches both learning and teaching processes.

As an overall, the VELVITT project findings highlight that the effectiveness of the learning process is critical at the dawn of the 21st century, with globalisation and competitiveness being among its main characteristics. Information and Communication Technologies play a fundamental role in this context; they have to be supportive and inclusive, not exclusive nor obstructive. Taking into account the crucial role of the educational use of ICTs, the quality of online teaching must be given special attention.

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Appendix I: Summary of the three modules

1. Basic Teaching Skills Module

Module Synopsis

This module develops an understanding of ways in which people learn, together with the ability to design effective learning experiences and considers theory and practice relating to the teaching of a vocational subject. It also covers possible approaches to evaluating teaching and learning.

Assessment Plan

(Example products: note these can be adapted by each country according to local needs.)

The student will produce a portfolio of evidence showing that they have achieved the module outcomes (3,000 – 4,000 words approximately). Typically the portfolio *could* contain the following elements:

- Plans for learning sessions and/or programmes of study are appropriate to particular teaching and learning situations, incorporating, where appropriate, IT and other key skills;
- 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.

2. Computer Mediated Skills Module

Module Synopsis

This module introduces students to a range of computer mediated options for retrieving information and for communicating and collaborating in educational settings. The module develops practical skills and provides opportunities for students to ally these to an understanding of the potential benefits of these systems for teaching and learning.

Assessment Plan

(Example products: note these can be adapted by each country according to local needs.)

Students will produce a portfolio of evidence to demonstrate their achievement of the learning outcomes. Typically this portfolio *could* include:

- Documentary evidence of use of a range of electronic methods of communication and information retrieval found in VLE systems;
- A report on an electronic search (for instance CD-ROMs, Electronic Journal systems, WWW sites, discussion boards) for material relating to teaching area. This should include indicative material from the search and accompanying documentation concerning search strategy, key words etc;

A report containing reflection on the benefit of computer based technologies in teaching and learning and detailing how their use could be developed within professional practice.

3. European Collaboration module

Module Synopsis

Explores European educational issues and the ways in which international collaboration can be developed amongst partner countries. There is a focus, through the use of online collaboration, on practitioners building up a network of contacts in Europe with professionals working in similar areas and an exploration of the funding and policy frameworks which could promote further cooperative work in the future.

Assessment Plan

(Example products: note these can be adapted by each country according to local needs)

Students will produce a portfolio of evidence to demonstrate their achievement of the learning outcomes. Typically this portfolio *could* include:

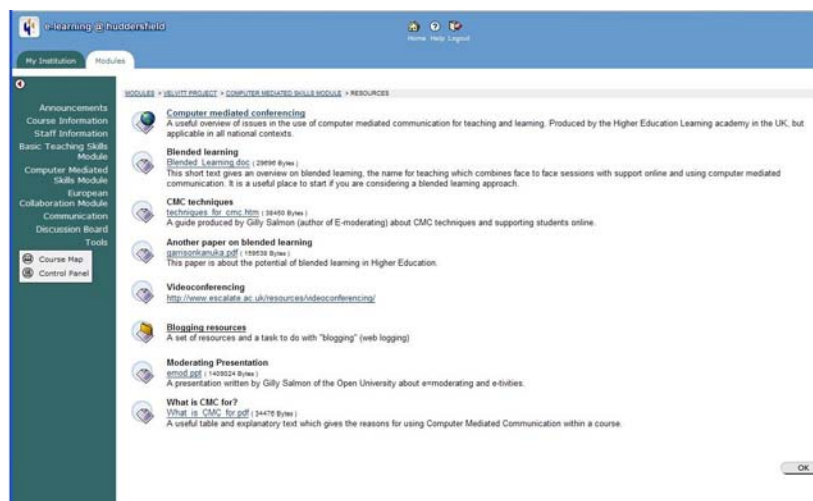
- Notes in preparation for a bid to a European funding source for an educational project taking due account of current policies and guidelines, (500 words);
- Evidence of engagement with discussion and collaboration online

- (saved evidence from VLE usage etc), (1000 words);
- A short report comparing some aspects of educational provision in vocational education in EU countries, (500 words).

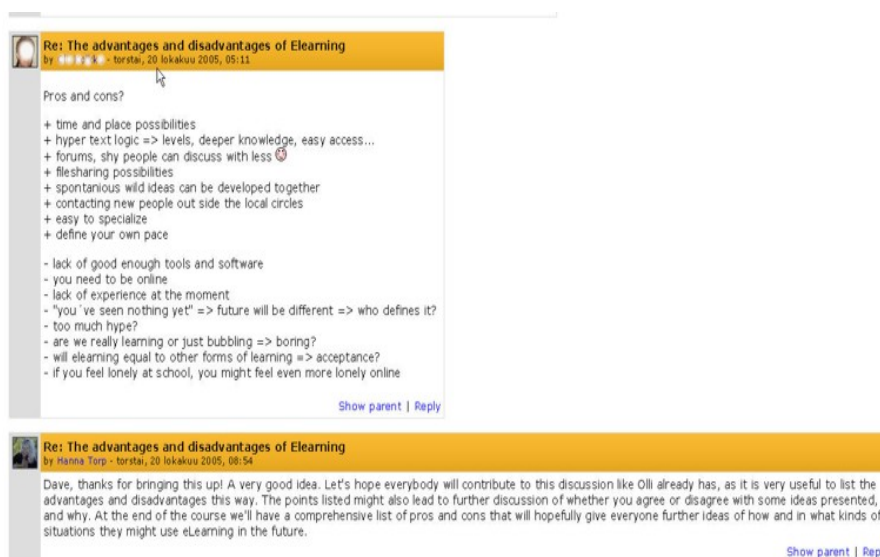
Note: It is optional for students to complete their assignment in English. They may complete the work in their own language, although students writing entirely in English will maximise the possibilities for interaction between students in different countries. In some cases it may be possible for students to complete the work in their own language and then produce a short summary in English, which can be shared with other participants.

Appendix II: Screen Samples

The following screen shot shows a content area relating to the Computer Mediated Skills module, delivered on Blackboard from Huddersfield University. This area contains links to policy papers about e-learning, academic papers and links to other sites which students can explore.



The following screen shot is an example, again from the Computer Mediated Skills module, this time delivered on Moodle from Tampere Polytechnic, demonstrating that teacher's participation in the discussion is a way of encouraging and giving feedback to students online.



Appendix III. VLE's Evaluation Survey

A summary of the most important results of the survey, broken down to the three first categories (the educational vision, the didactic functions and the organisation of education) is presented here below:

	VIRTUAL LEARNING ENVIRONMENT			
	WebCT	Blackboard v6	N@Tschool v8	Moodle
Educational vision:				
Primary objective	Making and offering online courses	Establishing tailor-made education (VLE has course management facilities)	Self-study and cooperation in groups, accessible via Internet	Making Internet-based courses
Target group	Groups of students	Groups of students	Groups of students	Groups of students
Didactic functions:				
Cooperation possibilities:				
Working in subgroups	Yes	Yes	Yes	Yes
Communication forms:				
Whiteboard	Yes	Yes	Yes, in new version	Yes
Chat	Yes	Yes	Yes	Yes
Video communication	No	No	Yes, in new version	No
Discussion forum	Yes	Yes	Yes	Yes
E-mail between VLE users	Yes	Yes	Yes	No
E-mail between VLE users and external users	No	Yes	No	No
Coaching and support possibilities	No specific facilities for process supervision	No specific facilities for process supervision	Contains a separate supervision module	Contains a separate supervision module
Test and question systems	Yes, commonly-used question forms can be included	Yes, different question types can also be used	Yes, the VLE offers both open and closed test modules	Yes, different question types can also be used
Possibilities for managing competences and skills	No	No	Yes, there is an extensive competence instrument. The whole system is linked to the portfolio.	No
Possibilities for adding content	All types of content	Teaching material in all normal formats, but also the use of multimedia material (text, photographs, audio, video)	All types of content	All types of content
Organisation of education:				
Portfolio	No, no specific portfolio function. It is possible to make a presentation area, to be used as a portfolio	No, no portfolio facility present	Yes, there is a portfolio facility present	No, no portfolio facility present
Student monitoring system	Yes, there is a 'track students' function	Yes, there is an online grade list available	Yes, the study results available to the lecturer are registered	Yes, the lecturer can monitor all activities of the students on one page