

## In Focus

# VLEs and Pharmacy—Learning from Experience

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*(Received 16 June 2003; In final form 26 August 2003)*

Software packages to create virtual learning environments (VLEs) are increasingly being used in higher education. This paper examines the development of online teaching, its advantages and disadvantages; in particular, the problem of providing a virtual library of adequate, good quality “reading around” support documentation for students. Initiatives to overcome these barriers, so that pharmacy educators can make full use of the benefits of VLEs, are discussed.

**Keywords:** Computer-assisted instruction; Information services; Internet; Virtual learning environment

## INTRODUCTION

One of the hottest topics to hit UK higher education in recent years is the implementation of virtual learning environments (VLEs). However, a debate is now raging as to how far down the “totally virtual” road pharmacy should go (Fincham, 2000). There are barriers to implementing VLEs successfully, but work is being undertaken to overcome these problems. e-Learning has a history and pharmacy educators and their support staff can now study the challenges others have faced and learn from their successes.

## THE HISTORY OF e-LEARNING

Computer aided learning (CAL) has been with us for some time. An excellent example of this is

the Pharmacy Consortium for Computer Aided Learning (PCCAL), which was set up in 1992 to produce computer based learning packages for undergraduates. These packages are now being used in over 60 countries.

Non-medical faculties (DiPiro, 1999) were the first to embrace online teaching, an example being the Open University, which now runs 178 courses where students must make use of online services to obtain course materials and support. Medical schools have been utilising online resources for education for some time (Bacro *et al.*, 1997; Dwyer *et al.*, 1997; Ward *et al.*, 2001) and Pharmacy schools have also been moving towards this method of teaching, with the USA at the forefront of developments for undergraduate studies (Faulkner and Sprague, 1996; Mehvar, 1999) and continuing education (Temple, 1998; Trinkle, 1999; Bastean and Bostean, 2000a,b). By June 2003, at least seven UK Schools of pharmacy had obtained VLE software to deliver some degree of online learning—Aston (WebCT), Bradford (Blackboard), Cardiff (Blackboard), Portsmouth (WebCT), Queens University Belfast (own system), Robert Gordon (based on the Virtual Campus developed by ESRI), Strathclyde (own system). Responding to the growth of the online environment, in 2001 the UK government, working with the Higher Education Funding Council, existing higher education institutions and private technological companies, launched UK e-Universities Worldwide (<http://www.ukeuniversitiesworldwide.com/>) to provide

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long distance learning. The new NHS University (<http://www.nhsu.nhs.uk>) to be launched in the autumn of 2003 will also utilise the Internet as a training method.

The growth of the Internet and the Web for information searching and sharing has led to the development of specialist online course delivery software to create integrated VLEs. Some of these software packages are open sources and thus "free"; for example, *Bodington* (<http://bodington.org/index.html>) developed by the University of Leeds, whilst others have been produced commercially, such as *WebCT* (<http://WebCT.com>) and *Blackboard* (<http://www.blackboard.com>).

Most UK higher education institutions are using this software to complement existing methods of learning rather than to totally replace traditional methods of course delivery.

### WHAT IS A VLE?

"VLEs are web-based toolkits that facilitate learning through the provision and integration of online teaching, learning materials and tools. These materials and tools usually consist of most or all of the following: facilities for electronic communications such as discussion lists, bulletin boards and chat rooms; facilities for online groupwork; online learning materials; links to remote resources; course timetables and reading lists; online assessment tools; and an administrative area, including a log-in access function" (Currier *et al.*, 2001).

The different software packages available to create VLEs differ in how they operate technically and in how they structure the delivery of course materials. For example, some can cope better with problem-based learning methods, whilst other packages are very much designed to support traditional course structures where the student is totally guided through a fixed structure of preset work. The Joint Information Systems Committee (JISC) has carried out work on the pedagogical evaluation of VLEs (Britain and Liber, 1999).

### MLEs

Inevitably, the management and delivery of a VLE will impinge on and need to interact with existing information and management processes of an organisation. For example, the VLE needs to know which students are registered on a course and consequently will need to interact with existing registry services. The VLE will also want to provide links to e-documents and databases already

subscribed to by library services. This network of systems that support a VLE, together with the VLE, make up what is known as managed learning environment (MLE).

### ADVANTAGES OF ONLINE TEACHING

Several studies have shown that the use of well designed online modules has pedagogical benefits. There are opportunities for increased interactive learning, with seamless links between text, video and sound, making for a more satisfying study environment. Marks can improve (Andrew, 2000; Rutter and Hunt, 2003) and students can respond very enthusiastically to online courses (Malone, 2002). e-Learning is sometimes seen as a way of cutting down on the costs of overheads, such as administration and building costs, although this is highly debatable.

There are many factors which have influenced the growth of online courses capable of delivering distance learning not constrained by place or time. These include the need to teach larger groups of students (in the UK, the Government aims to see 50% of all people under the age of 30 attending University by 2010); the need to offer flexibility to students who are often working part-time or have other commitments; the requirements of continuing professional development (to become mandatory for UK pharmacists) and the concept of life-long learning; competition from new non-campus higher education institutions offering online learning; the need to keep up with national and international health care initiatives like NHS Direct in the UK [the Government's commitment to e-communication was confirmed with the "NHS Plan" (Department of Health, 2000a) and the "Pharmacy in the Future Programme" (Department of Health, 2000b)] and the European Commission's "e-Europe 2005" Action Plan to create a digitally literate Europe which encompasses higher education and healthcare information ([http://europa.eu.int/information\\_society/eeurope/action\\_plan/index\\_en.htm](http://europa.eu.int/information_society/eeurope/action_plan/index_en.htm)); the emergence of e-pharmacies; and by no means least, the hugely increased use of the Internet by patients, consumers and the general public for all information purposes.

### CHALLENGES TO ONLINE TEACHING

- The standards of students' work does not always improve (Faulkner and Sprague, 1996; Woodward, 1998).
- Plagiarism can increase (Anonymous, 1999).
- Synchronous interaction and student experience can suffer. Indeed the drop out rates from courses

which are taught purely online can be as high as 50% (O'Neil and Poirier, 2000). Ultimately, most students prefer face-to-face communication (Perrier, 2003).

- Inappropriate use of e-mail. Williams and Quinsee (2003) found that 45.5% of student messages posted to a course discussion list were not connected with the course. Interestingly, one study showed that students preferred text messaging to e-mail (Banwell *et al.*, 2003). It is also possible for e-mail communications to tutors to become a burden (Courtney, 2003).
- Lack of time. It can take more of a teacher's time to develop and deliver an online teaching course than traditional preparation. It had been estimated that to produce materials for one hour of student study can take up to 200 hours (Dearing, 1997). Of course, if existing course material is to be transferred the time will be less, but this is not always desirable. Technical, computing, library and administrative staff can also find that a lot of extra work is required to support sophisticated online course delivery. The software itself can also be expensive. Stuart Lee estimated in 2002 that the average institution of 15,000 full time equivalents would need to pay £25,000–30,000 per annum, before training costs. However, usually it is envisaged that by marketing the material to other institutions, some of this cost can be recouped.
- Teachers and students must be computer literate. Time must be spent teaching these skills at the outset. Although, this is not a bad thing in itself as the student gains transferable skills.
- Computers with high specification are usually required, both on and off campus, with associated high costs. Peripheral costs for increased use of paper, printing and related costs also rise. Broadband Internet, which gives high-speed access to the Internet, is only gradually being made available across the UK. Thus, some distance-learning students, particularly in rural areas, are disadvantaged. Indeed, some students may be disadvantaged by not having any Internet access at home.
- Technical problems with computers, such as crashing and slow online connections, can delay study and cause frustration.
- Student cynicism. A study of students at the University of North London (now London Metropolitan University) who undertook a course developed using VLE software felt that teaching staff were "neglecting their teaching duties". It was also felt that the VLE was a way for the institution to pass on costs, such as printing, to the students (Williams and Quinsee, 2003). Indeed if students have to access material from home, because of a perceived lack of PC access on

site, who is paying for the Internet/telephone connection?

- Providing adequate, good quality "reading around" support material—a virtual library—for core course work can be difficult.

Copyright law is not always obvious and what is allowed when it comes to photocopied course packs, in the UK under CLA License, is not automatically permitted when distributing the same material electronically. Even deep linking, whereby learners are referred to a page within a web site rather than a web site's home page, may need the permission of the copyright holder.

Obtaining licences for electronic material can be time consuming and expensive. For example, the University of Kingston's Copyright Clearance Unit asks its customers to allow up to 3 months, and this is not unrealistic. As yet, publishers are unsure how to provide electronic access and receive adequate payment. This has resulted in academic institutions having to cope with many different licensing agreements for journals and digitisation of texts. Many publishers are still unwilling to give permission for digitisation—around 35–40% of requests are refused (SCONUL, 2000). No single password and username will allow you to access all online services, and therefore obtaining, remembering and entering different access codes is frustrating for users.

Some publishers are demanding high payments for access to their electronic material and for digitisation. Printed journals and books are VAT free but e-journals are considered a service by Customs and Excise and so incur a 17.5% VAT payment.

There are archival problems with e-publications. Often, only the latest journal issues are available electronically and there is no legal deposit requirement.

- You cannot buy an MLE software package and unfortunately, getting different systems to inter-operate can prove difficult, as there are no agreed standards for describing data. Therefore, getting VLE software to talk to the registry or library software is not always easy.

All the above barriers sound terribly negative, however, the advantages of online teaching are encouraging numerous initiatives, and many of the challenges and problems can be overcome.

## OVERCOMING THE CHALLENGES

Most of the potential problems are not insurmountable and many come down to course design,

resource allocation, staff commitment and positive PR to students. This list is certainly not exhaustive, but gives a taste of the experiences of institutions who have used e-learning/VLEs.

- Software selection. JISC ([http://www.jisc.ac.uk/index.cfm?name=mle\\_briefings\\_readership](http://www.jisc.ac.uk/index.cfm?name=mle_briefings_readership)) and WCET (<http://www.edutools.info/course/index.jsp>), amongst others, have provided detailed guidelines.
- Choose VLE software that matches the pedagogic model of the course to be taught.
- Plagiarism can happen just as easily with written submitted material as it can with online work. The JISC Plagiarism Service (<http://www.jiscpas.ac.uk>) can provide practical help, including training materials to educate students in citation and a detection service for tutors.
- Choose VLE software that has some degree of interoperability with other systems in the institution, such as Registry, Library and Timetable services, and with systems in other organisations. It is worth remembering that although you may be happy with the VLE software you have selected today, in the future you may move to another vendor's product, and if they use different standards you may not be able to easily transfer your hard earned data. If possible select a VLE that supports IMS specifications (<http://www.imsproject.org>). The Centre for Educational Technology Interoperability Standards (<http://www.cetis.ac.uk>) is working to encourage the development and use of standards. Its web site includes news and features on various products and their compliance to a range of standards.
- Utilise the expertise of all the sectors of staff who will work on or be affected by the VLE. For example, Library staff can provide expertise in the following areas:

Providing guidance in the selection of electronic sources of information. Although some VLE products come with links to free internet resources, for example, in Blackboard this is provided under "Academic Resources", these may not be the most appropriate for the course being designed.

Creating Web sites that detail high quality online sources. For example, the Open University has successfully used ROADS software to help develop ROUTES to create a database of quality Internet resources relevant to specific courses (Bremner, 2001). Adding quality Web resources is becoming easier with two JISC (Joint Information Systems Committee) Initiatives—the Distributed National Electronic Resource

(<http://www.dner.ac.uk>) and the Resource Discovery Network (<http://www.rdn.ac.uk>). Developing electronic libraries.

Working with various bodies to ensure material is available in electronic form. Digitisation of copyright cleared learning resources is being undertaken. The CLA has created standard electronic licensing procedures.

Heron (Higher Education Resources ON demand), initially set up by JISC but now owned by Ingenta, works with the CLA, to provide a one stop copyright clearance and digitisation service and is creating a database of digitised materials.

Commercial electronic libraries already exist. Pricewaterhouse Coopers specifically mentioned three in a report for HEFCE on the business model for the new e-university—Questia, ebrary and XanEdu. However, as yet they do not have the breath and depth of traditional university libraries, and there is a risk that commercial e-libraries will only be interested in providing material that the publishers are keen to hand over at a low price. Also, as purely commercial companies, they are susceptible to economic downturns. Using their experience of authenticating and authorizing users for online services, initially, many publishers were only willing to grant access to their electronic information via IP address registering, which made off-campus access impossible. Fortunately, they are now increasingly willing to accept password authentication. Athens software is one of the attempts at making this task easier (<http://www.athens.ac.uk>). It also provides users with a single password and username that gives access to several online databases.

By developing and supporting "middleware" projects, such as ANGEL (<http://www.angel.ac.uk>). Middleware software is designed to increase break down barriers between different electronic systems in order to increase interoperability. For example, to decrease the number of times a user would have to enter a password. The aim here is to give the end-user seamless access so a user could move from their institution's VLE to an outside resource, such as Pharm-line, without having to enter another password. Another example of middleware is software that can create a database of all resources available to a tutor for inclusion in a VLE, whether it be print, electronic or video. This database can also track any changes made to resources, for example, if a web link URL changes the tutor will not need to alter their module,



as the database will make the change automatically.

Attempting to improve licensing agreements—one such scheme is NESLi2 (<http://www.nesli.ac.uk>).

Supporting and publicising projects to widen access to electronic information such as the Public Library of Science (<http://www.publiclibraryofscience.org>) and BioMed Central (<http://www.biomedcentral.com>). BioMed is a publishing house that aims to give free access to peer-reviewed biomedical research in over 50 online journals. Authors who publish with BioMed retain copyright.

Encouraging and helping students to learn skills in using electronic information. Teaching critical Internet analysis so that students can confidently explore the Web for themselves rather than being restricted to sites chosen by their institution. This can be achieved with online tutorials as well as with traditional methods.

Providing expertise on copyright issues and intellectual property rights.

Advising on data protection rules and regulations.

Participating in the debate regarding archival issues. The National Preservation Office at the British Library is developing a strategy for UK digital preservation.

Helping design the look of web-based materials. The Centre for Digital Library Research at the University of Strathclyde has developed recommendations for publishing educational materials online (<http://eboni.cdli.strath.ac.uk>). This is important, considering that a “user’s ability to retrieve information from Web publications can be improved by up to 159% by altering the on-screen design of the text” (Morkes and Nielsen, 1997).

Providing materials that cannot be obtained electronically.

- As the evidence suggests that those students who logon to their VLE often achieve better marks than those who do not, it is worth using computer logs to track who is accessing the system (Williams and Quinsee, 2003). Then, students having difficulty can be identified and encouraged to access the system.
- Feelings of isolation are one of the biggest complaints by students undertaking e-Learning. Helpdesks, electronic notice boards, e-mail and chat rooms generally improve student interest and performance. This is not to say that academic and support staff must be available 24 hours a day! Set advertised times for student electronic interaction with their teachers seems to work well.

The lines of communication can improve and it is not always the younger students who find it easiest to accept the new technology — at the University of Sheffield “mature students responded more positively than new students to the increased opportunities for communication and group work” (Stubbley, 2002).

- Provide a help line for students and staff.  
The help line should cover not just IT issues, but also issues surrounding the understanding and completion of course work. A study at the University of Reading found that students would utilise the e-mail/telephone help line manned by university staff rather than use a student trouble-shooting discussion list (Cipkin, 2002).
- To borrow a phrase from the British Prime Minister—it is all about “education, education, education.” All staff and students need to receive appropriate on-going training on how to develop, use, maintain and evaluate the system. An understanding of the philosophy behind the new teaching method and the benefits it will bring are invaluable for winning over hearts and minds.
- Given the technical problems that can occur with computer networks, and the need for face-to-face interaction, provide communication links between staff and students that are not just electronic.
- Consider accessibility for disabled students when designing courses. In the UK, the teaching and learning sections of the Special Educational Needs and Disability in Education Act became law in September 2002. Practical information on providing assistive technology for computer use and electronic learning can be found in the JISC publication “Access all areas” (Phipps *et al.*, 2002).
- Build in feedback and evaluation procedures.

## CONCLUSION

We have not yet seen the creation of the completely virtual school of pharmacy at the undergraduate level and it is questionable whether such a development would be possible or an improvement in educational terms. However, what we are witnessing is a hybrid-learning situation, with some course delivery done by traditional means and some via online facilities. So far, the evidence is that the most favourable pedagogical outcomes arise from the hybrid module. Technology with the human touch.

Internally, successfully developing a VLE within an institution requires adequate resource allocation,

cooperation between different departments and student orientated PR. Externally, for VLEs to fully meet their potential, publishers and funding agencies must cooperate. It is not just the setting up of the system that we must concentrate our energies on, but also the training aspects, maintenance and user feedback.

Ultimately, we must make sure that we harness the technology to improve the learning/teaching experience, and not just because VLEs have become the latest educational fashion accessory. As always efficiency, efficacy and excellence must be our goals (Beck, 2002).

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