

Teaching Made Easy

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Chapter 9

E-learning and virtual learning environments

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E-learning is learning using any type of computer-based technology but it often refers to the use of online resources or tools accessed through the World Wide Web. This includes access to general information sources (e.g. Wikipedia), academic and specialist learning resources (e.g. Internet for Midwifery), multimedia such as audio podcasts, as well as tools such as online discussion boards, wikis for collaborative writing, and so on. Business ‘productivity’ tools, email, presentation software, and word processing, are also widely used in education. This chapter describes some common uses of these learning technologies and some issues about their use.

In the UK, the term virtual learning environment (VLE) refers to an integrated collection of online tools for teachers and learners to perform many of the common educational activities traditionally done face-to-face and on paper.¹ Common examples are Moodle and Blackboard. Their advantages are that, being under institutional control, they are stable, supported and covered by institutional data protection policies. They integrate, into a single site with a consistent interface, many commonly needed course elements like resource files, web links, on-screen assessments, and discussion boards (described below). A disadvantage is that they can never include the most recent technical features available on the public Web. Nonetheless, if you have one, use it!

It used to be assumed that learning online would be a feature of distance learning courses (replacing paper) but in fact technology is more widely used alongside traditional learning and teaching, face-to-face and paper-based, to create ‘blended learning’.² The degree of online and face-to-face activity in a course varies but the two modes need to complement and reinforce each other.

Technology has often been called a Trojan horse for pedagogy. When only traditional teaching methods were used, both learners and teachers assumed they knew, for example, what a lecture was for. Now online alternatives to lectures are available (e.g. digital slides, video, audio, audio over slides). In selecting a technology question its advantages and disadvantages for your specific context (subject, learners, programme, etc.), and what traditional methods the technology may replace. Using technology thus requires a more thoughtful and systematic selection and design of teaching methods, both technology-based and traditional, if they are to be individually effective for learning and mutually reinforcing.

Young adult learners are ‘digital natives’: they cannot remember a world before networked computing, probably own a laptop *and* a smart phone and routinely use email, text

messaging, online chat, and social networking websites. Although familiar with technology, learners will require you to explain its purpose in their course.

Rather than organise examples of learning technologies by their technical characteristics, this chapter considers common educational activities and suggests how some technologies can be useful. This is inevitably messy because some educational activities can use a wide range of technologies and, conversely, some technologies are useful for a range of activities.³ Furthermore, new technologies and new uses for them continually arise, so specific examples soon become out-of-date! However, the principles of selecting technologies and designing their use will continue to apply.

Presenting information

Teachers often give presentations of information and it is common to show slides (e.g. with PowerPoint) from a computer with a digital projector (also *see* Chapter 8). This provides a structure to what you say and allows you to show quotations, pictures, audio or video. One risk of slides is to show too much content, too quickly. Learners are trying to listen, watch the screen and (hopefully) make notes. Merely placing content on the screen does little to help learners understand it. Furthermore, slides full of content can become the teacher's autocue – guaranteed to bore! Avoid using built-in graphical features such as patterned backgrounds and animated text; they often distract and hinder learning.

Digital slides or handouts can easily be made available to learners on a course website or VLE. Consider making them available in advance so that learners can prepare and bring a handout to class if you are not providing one, unless this would spoil a planned surprise element. In the latter case provide them immediately afterwards. Providing lecture slides and course notes electronically has been disparagingly termed 'shovelware' but learners find it valuable, and often expect it.

As an alternative to PowerPoint you could show web pages or Word documents on the screen but make sure the text is large enough (generally, 24 point). Another display option is <http://prezi.com>, which allows you to organise your content as a visual cluster and then zoom into the detail as you want it.

Providing resources for individual study

The Web can be used to give learners further resources for learning, as pictures, audio or video. However, 'resource-based learning' needs learners to perform purposeful activities with this content, so set clear learning tasks and provide a support system in case of problems. To minimize technical problems, provide the content in common file formats (*see* Box 9.1) and check that all your learners have been able to access it.

Box 9.1: Common and useful file formats

For text, .rtf is read by all word processors and .htm is read by all browsers. Acrobat .pdf files are also common but learners must download and install the free Acrobat Reader software (<http://get.adobe.com/reader/>).

For images, .png is the best general-purpose format, but .jpg is also readable by web browsers and it is the format created by most digital cameras.

For audio and video, the choice of file format is more complex and there is more risk of problems. Mp3 is widely used for audio and mp4 for video. Flash is widely used for video on the Web but learners must download and install the free Flash Player (<http://get.adobe.com/flashplayer/>).

Creating multimedia content is now easy. Audio files are often called ‘podcasts’ (although technically this also involves using a web feed like ‘really simple syndication’⁴). They can be recorded on simple digital recorders or on a computer with a microphone. Minimise background noise from the computer and environment. Recordings of up to five minutes are good for introducing a lecture or providing feedback on questions or coursework. Recordings of whole lectures can be useful for learners to re-play while watching your slides online. Creating video is a little more complex but ‘Flip’ video cameras are cheap and easy to use. Many digital cameras will capture video. While the production quality does not need to be of top standard, mounting the camera on a simple tripod vastly improves the recording.

If you use ready-made content, be aware of copyright restrictions.⁵ You can provide access to many existing digital resources by providing links to them (URLs), embedded in your website or VLE. Alternatively, you can maintain a list of links to useful web resources on a social bookmarking service such as delicious.com,⁶ and reuse it in several courses. A good place to start looking for quality-assured content without copyright problems is Intute.⁷ You can also provide your reading lists as web pages with links to texts, electronic journal articles, ebooks (if your institution has them), or digitised content (many Universities have a licence from the Copyright Licensing Agency to digitise some existing paper content for courses). Your institution may have centralised reading list software to help you create electronic reading lists that may improve usage.

While most learners now use a word processor this creates only a local file. A blog is a web page that a learner can write, often as a diary or journal, without any technical expertise, that can then be read by other learners or teachers. An e-portfolio (e.g. Pebblepad) extends this idea, to provide an online space where a learner can create a website of web pages, blogs and linked files, and give access to it for particular people such as their tutor or potential employer. Institutional VLEs and e-portfolios often provide blogs and there are many free

blogging services e.g. www.blogger.com. If you want learners to create learning journals or portfolios you should consider blogs and e-portfolios.

Using models and simulations

Simulations and models are a category of software that can provide powerful learning environments. A simple numerical example is to use an MS Excel worksheet to model the growth of a human population. A model has one or more inputs, such as age of first reproduction and infant mortality rate, and one or more outputs such as population size and age profile. Equations in the worksheet connect the inputs to the outputs. Learners can firstly enter different values for the inputs (perhaps using data for different developing countries) to observe the predicted population sizes and demography.

Models are simplified versions of reality. Learners can be asked to compare the model's predictions with actual historical data and improve the model, perhaps by adding additional factors using more inputs or modifying the equations. This is a powerful way of understanding population growth. Creating such a spreadsheet model is not difficult once familiar with spreadsheet software.

A virtual reality simulation relies on realistic audio and video to help learners imagine and respond to relevant aspects of their environment. For example, a 'virtual patient' on the screen can be programmed to have symptoms of a wide range of ailments for diagnosis.⁸ While this is less realistic than a real patient, or a human actor, it can provide many varied experiences to many learners, to allow learners to practise diagnosis repeatedly and when they need to – the software simulation is 'scalable' as a learning environment. If you have the use of an appropriate simulation then it is well worth considering. However, simulations are very costly to produce, and require detailed knowledge of the subject and considerable technical skills, so they are well beyond the scope of individual teachers.

Helping learners to collaborate

Modern theories of learning emphasise both individual intellectual activity and the social context of learning. Learners learn from each other informally but you can structure collaboration for specific learning purposes. While learners may be able to meet face-to-face, there are advantages of textual 'discussions' online, on a private 'discussion board'. This is available anytime, anywhere over an extended period. Messages remain for the period of the course, for group members to read and re-read. There is no limit on 'space', and files can be attached to messages. The software provides tools to assist individuals to organise messages as they choose, or find particular messages. Teachers can control the group composition and monitor individuals' activity in relation to contribution to the discussion. Online textual 'discussion' proceeds much more slowly than verbal discussions, typically over weeks, so their structure must be planned in advance.⁹ However, this slower pace means that learners have time to think before contributing. In face-to-face discussions some learners may be unwilling or unable to take a turn in contributing to the continuous flow. Some disadvantages of online collaboration can be found in Box 9.2.

Box 9.2: Disadvantages of online collaboration:

- Some learners may not have easy access to the web server supporting the discussion (e.g. from home)
- Learners may forget their login details
- Initial unfamiliarity with system features may slow down or demotivate learners' participation
- Some learners may be reluctant to contribute such permanent messages yet read what others write ('lurking') – this may or may not be acceptable, depending on the set task
- Learners are unlikely to engage unless it is clearly helpful to passing the course – make the purpose of discussion clear, or directly assessed.

Just as face-to face discussions or debates can be used as role-plays of professional activities so online textual discussions can be used to simulate some situations for which the course is preparing learners, especially as many professional activities now take place through email messages.

Learner online collaboration can go further than discussion boards. Many systems allow file sharing and shared editing. While a blog is written by one person and made available to others, a wiki allows groups of people to collectively edit one or more documents, and link them together. This can be used to support group projects, for example, leading to a collectively written report. The wiki¹⁰ tracks each user's contribution so the teacher has an audit trail of the group process.

Interacting with large groups

One view is that teaching is essentially a personal dialogue with learners, and technology can support that dialogue,¹¹ using the tools already mentioned like email, discussion boards, and blogs. Within a VLE teachers can make 'announcements' that go to all learners as institutions will provide class emailing lists. When learners use email or other text communications with teachers, they may not realise the change in tone that is appropriate in an academic context compared to writing to family or friends. Tell them what you expect; effective communication skills require an understanding of the audience. When you write to learners use a clear, friendly but formal tone: this is professional, not social, and learners need to appreciate this issue for employment. Similarly, online text discussions with other learners as part of coursework should observe 'netiquette' so as not to offend or confuse others.¹²

As the size of the learner group grows, interacting with each individual becomes more difficult in the classroom. Electronic voting handsets, or 'clickers', are a popular and effective means of creating interaction with the whole group.¹³ A computer with a projector display must have a radio receiver and appropriate software installed so that, when each learner presses a button on their handset, the computer detects their choice and displays the aggregated votes as a bar chart or pie chart. With most systems (e.g. TurningPoint), the questions must be multiple choice. A simple strategy is testing understanding every 10 or 15

minutes throughout a lecture. If most fail, there is no point proceeding until the problem is addressed! More interesting uses can include voting for conflicting views on a contentious issue, which can be discussed in small groups once learners have decided and communicated their initial view.¹⁴

The practical disadvantage of clickers, apart from their considerable cost, are that the computer must be ready and the handsets must be distributed and collected. Information ‘coverage’ is reduced– but this is not a disadvantage if learners did not previously understand the information given. For large groups the benefits in learner engagement and learner-teacher feedback far outweigh cost in time. If the technology is not available a low-technology alternative is the card ‘communicubes’, which require no technical support, never fail, and are much cheaper.¹⁵

Assessing and giving feedback

Assessment is a special kind of interaction with learners. Assessment is summative, giving a grade, or formative, giving feedback on the learner’s performance, or both (*see* Chapter 14). Many courses now assess (grade) learners using coursework. The traditional process was for the learner to word process, print and submit a paper copy, which the teacher would then grade, write feedback on, and return. There are a various technology-based, and hybrid, alternatives. A learner can submit the word-processed file to an electronic ‘drop box’ from where a marker collects it, annotates it electronically with feedback, and returns it to the drop box for electronic collection. Simultaneously, the teacher provides a grade to an electronic grade book that the learner may access in due course. Anonymity and second marking are possible. A hybrid process involves submission of both an electronic and a paper copy. The paper copy is marked and returned with feedback while the electronic copy is archived, but is available in cases of suspected plagiarism.

Plagiarism in coursework has increased in the last twenty years, partly because technology makes easier. The best defence against plagiarism is the better design of assignments,¹⁶ but another tool is text-matching software (e.g. Turnitin¹⁷). Learners submit their files and teachers mark them, as above, but they are simultaneously checked for matching text on the Web, in electronic journals, in electronic copies of text books, and in the software’s database of all learner work submitted to it. Routine submission of coursework to text-matching software is a disincentive to the tiny minority of learners who might cheat. It can also be used educationally, by allowing learners to see the ‘originality report’ for a draft of their own work. This makes clearer, in a personal, ‘concrete’ example, the ideas of plagiarism and the proper acknowledgement of sources – crucial topics in educating learners about academic writing.

Computer-based assessment traditionally meant multiple choice quizzes, or other forms of ‘objective tests’, conducted on the computer screen. There are many systems available and all VLEs include one. The computer does the grading, but this is not free: the teacher’s effort has been transferred from doing the grading to creating the tests so the computer can later do the grading automatically. Writing valid, reliable objective tests is difficult. Their use for summative assessment should be limited to testing introductory, factual material in large

classes (where the initial development time can be justified). However, a better use of on-screen tests is to provide formative feedback to learners, on demand. Many learners find such tests helpful and motivating,¹⁸ and tests for this purpose are easier to write: if the validity or reliability is not perfect that is no great problem if the purpose is to provide feedback.

Providing timely, informative feedback is increasingly highlighted as a part of teaching that is lacking. Feedback may be narrowly regarded, by teachers and learners, as the written comments on a returned piece of coursework, but it is much wider than this (*see* Chapter 13). Learning requires information on current performance and guidance on how to improve it. Providing more traditional face-to-face or written feedback is not scalable for large classes but technology can help. For example, feedback as a numbered list of common deficiencies, and suggestions for their improvement, can be emailed to the whole class, with specific numbered points sent to each individual. Marking of electronic submissions can be done by annotating the learner's file (e.g. in Word using 'insert comment' or 'track changes') or in Turnitin's online marking tool, Grademark. This can reduce turnaround times and streamline the process. It also avoids a common complaint of illegible handwritten comments.

A more recent innovation is the use of digital audio feedback. Using the technology described above, this can provide more information (in voice tone) and take no longer to create than written feedback. In large cohorts it may be a good alternative to providing individual feedback tutorials. If it is possible to provide a short face-to-face meeting to provide feedback, making an audio recording of the meeting (or letting the learner do it) provides a record a learner can return to for confirmation and further understanding.

A technology not yet mentioned is screencasting. Using either PC software (e.g. Camtasia) or free web services (e.g. jing.com or screenr.com), the moving computer screen is captured along with a verbal commentary of up to five minutes. The screen can show the learner coursework, with highlights added to focus the attention on aspects being discussed in the verbal feedback. With a little practise, this takes no longer than writing the feedback and provides more information and personal contact.

Which software?

Some learning technologies are part of a VLE, which provides them in a stable, supported, integrated environment within an institution. Other technologies may not be available within your institution but may be available as free services on the Web. Whether you should use these free services depends on a number of factors. For example, European data protection laws mean that any personal data, including learner names, should not be placed in most IT systems outside Europe. Furthermore, systems in the USA are subject to the Patriot Act and may be open to the security services. Free web services may disappear without notice, or require you to pay. Therefore, for 'high risk', graded work you should only use institutional systems or ask for advice. However, for optional, informal group discussions or support, a social networking (e.g. Facebook) group, may be familiar and preferable to learners who would not use the discussion board in your VLE unless it was a course requirement.

Mobile learning

The continuing development of mobile, networked devices is creating increasing possibilities for 'mobile learning'. The range of devices already includes laptop/notebook PCs, netbooks, handheld PCs, mobile phones, iPhones and other smart phones, iPods, e-readers and iPads. As wifi hotspots proliferate and phone networks improve, these devices will be permanently 'connected'. New opportunities will arise for designing and supporting active and social learning, and we will need to be creative in grasping them.

Tips from experienced teachers

- Explain to students why you are using each teaching method and technology.
- Have a Plan B; any technology can fail so be ready to switch to a second copy of a file, a whiteboard, or an alternative activity.
- Deliberately leave some details out of the handout version of your PowerPoint slides, so annotation becomes a learning activity (e.g. labelling a diagram).
- Make wider reading for your course available electronically to encourage learners to use it.
- If you want learners to write reflectively, consider utilising blogs or e-portfolios.
- Clarify ground rules for the tone of online discussions at the start.

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Further reading

- Bostock SJ. *e-Teaching: engaging learners through technology*. London: SEDA; 2007.
- Essential Skills in Technology Enhanced Medical Education (ESTEME) www.amee.org/index.asp?lm=97
- International Virtual Medical School www.ivimeds.org