Hybrid learning – a safe route into web-based open and
distance learning for the Computer Science teacher

John Rosbottom
Dept of Information Systems
University of Portsmouth
Portsmouth PO1 3HE, UK
+44(0) 23 92 84 64 30
john.rosbottom@port.ac.uk

ABSTRACT
The hybrid learner is located on a continuum between the
traditional student attending face to face classes in a University
and the distance learner who may never visit the institution,
except perhaps to graduate. Modern methods of web-based open
and distance learning make hybrid learning attractive and
accessible to students.

Computer Science students in particular make very good hybrid
students because the content of the Computer Science curriculum
has a strong practical element that is conducive to independent
learning methods, and because they have a familiarity with the
tools used in hybrid learning.

Suggestions are given on how a teacher may develop web-based
open and distance learning (WEB-ODL) for hybrid learners.

1. WHAT IS WEB-ODL?
The term 'web based open and distance learning' has an
unfortunate emphasis on the technology of learning rather than
the pedagogy. The term 'web-supported learning' may be
preferable, but 'web-based learning' is current and there seems
little point in becoming too preoccupied with semantic issues
concerning what is essentially a practical activity.

Open and distance learning has developed rapidly during the
second half of the twentieth century [1]. Web-based open and
distance learning has developed very rapidly since about 1993.
There seems to be a synergy between developers from a technical
background and those from an educational background.

The technology-driven see education as a “killer application” for
the web, while the pedagogues see the web as a versatile new
medium for open and distance learning. Whatever the driving
factors it does seem to be the case that the web provides an
environment in which open and distance learning can flourish.

The web integrates several aspects of open and distance learning,
leading to a more efficient and more effective experience for the
learners. The activities that may be mediated through the web
include assessment, communication, provision of learning
materials, the management of learning, provision of multimedia
learning and support materials and the support of learners.

WEB-ODL is naturally multi-dimensional. Some of the major
axes in WEB-ODL are:
• individual or collaborative learning
• passive ———— active learning
• monomedium ———— multimedia
• unidirectional or bidirectional

Because of the ease and variety of communications learners, and
especially distance learners, are able to easily cooperate in
collaborative activities using e-mail, newsgroups, voting,
asynchronous conferencing, synchronous conferencing (chat,
audio and video conferencing) and whiteboarding.

The web also supports the management of collaborative activities
by a teacher, and this is particularly useful when dealing with
large groups of students. At Portsmouth two members of staff
successfully manage the work of up to one hundred and sixty
students all working in small groups where the groups themselves
are required to collaborate on some aspects of their work.
Without the web’s powerful communications ability the
administration of such a complex activity would be considerably
more difficult.

Without the synchronous presence of a teacher, learning is
generally self-directed rather than teacher-directed, and this
naturally leads to active rather than passive learning.

The integration of text, audio, video and communications in the
one environment makes the web exceptionally convenient to the
learner. Digital sound and video are accessed almost as easily as
text enabling a powerful mixture of learning stimuli to be made
available to learners.

A unidirectional transmission occurs when learners are in “receive
mode”, and may consist in reading a static web page of text,
listening to some audio, etc. In contrast bidirectional transmission
involves the learner in using dynamic web pages for activities
such as communicating with other people or communicating with
a server for purposes of registration (by form-filling), completing
a web-based survey, undertaking some formative assessment, or participating in a web-based vote.

However all these good things about the web are really only highlighting the potential of the web for learning. To make the web work as a learning medium the learning environment has to be designed with a particular kind of learner in mind. It is easy to imagine web sites that function poorly as learning spaces. It is easy to imagine learners who fail to learn on the web while others succeed. The technology provides the educator with a very powerful toolkit, but this is no substitute for learning design.

The key concepts of open learning are highlighted in italics here. It is an approach to learning characterised by:

• reducing barriers of access to education
• giving learners more control over their learning
• increasing choice and flexibility
• enabling learning at a time, place and pace that suits the learner
• enabling learning for new kinds of learners
• promoting active learning

The key concepts of open learning are highlighted in italics here. If we subscribe to the view that this kind of independent learning is an effective way to learn then we need to check whether web-based learning can support this approach.

1.2 Distance learning

Distance learning is an implementation of open learning concepts. It is always technology-based. Examples of the technology of distance learning include print (books), audio cassettes, video cassettes, the telephone, digital audio, digital video, CD-ROM, video-conferencing software, computer assisted learning (CAL) software, or the world wide web.

Where learner and teacher operate asynchronously and at a distance, the learning system must include many of the administrative and supportive functions normally performed by a classroom teacher, in addition to their teaching function. Distance learning would be incomplete without an effective student support system, an assessment system, a course management system and a more general administrative system in addition to the system for delivering learning materials.

2. WHO IS A HYBRID LEARNER?

Learning is not just some kind of technological or organisational problem. The systems used to present the resources and support the learners are important, but equally important is the nature of the learners themselves. Distance learning may succeed or fail depending on the kind of learners involved.

It is easy to distinguish distance learners from local learners who attend a learning institution. Hybrid learners are in-between. They attend classes in an institution less frequently than standard learners and use distance learning between attendances.

Standard learners may require frequent face to face meetings with tutors in order to maintain their motivation, to encourage effective time management, to seek guidance on learning materials and activities, etc. In other words they are dependent on a strong student support system.

Successful distance learners are distinguished by high levels of motivation, good learning skills, and the determination to overcome problems. Of course some learners who attend standard classes also have these attributes, but success in distance learning does generally demand rather better learning skills than in institution-based learning because the support systems tend to be better within learning institutions. Numerous studies have demonstrated that there is no significant difference in the attainment of successful distance learners compared with institution-based learners. However distance learning courses traditionally suffer from a high non-completion rate. The UK Open University offers a high level of personal tutorial support to help overcome this problem. A challenge for WEB-ODL is to develop the support systems that will help diminish this problem of non-completion.

In one sense the concept of the “distance learner” does not fit very well with web-based learning because the idea of distance is not really meaningful in the web environment. Web-based learners could be in another country, another continent, or just another room in the same building as the teacher. The distinguishing factor among such learners is their dependency on the web for support. Local web-based learners may have access to support systems unavailable to more remote students.

A good example of hybrid learners are work-based learners who undertake University classes and apply their learning at a distance in projects at work. Learners with part-time jobs, or family responsibilities, may also benefit by operating in a hybrid mode of study and this fits well with the philosophy of open learning to encourage new kinds of learner.

3. WHY IS WEB-ODL SUITED TO HYBRID LEARNERS?

To succeed at web-based learning the learners certainly need to be comfortable in using the technology, but this is not the most important issue. To be successful, individuals must have an appropriate attitude to learning, and the self-motivation to enable them to overcome problems and make progress.

Learners may be motivated by the desire to increase understanding and competence (the will to learn), the desire to demonstrate their understanding and competence (to do well in assessments) or the desire to avoid being seen as incompetent (fear of failure).

The more a learner is able to operate as an independent learner, the more likely that learner will have a preference for web-based learning. Because WEB-ODL is embedded in the world wide web and therefore has a wealth of links to related material it is likely to be more attractive to the kinds of learners who are motivated by the learning itself. Conversely the learner who is seeking to achieve the best possible results by concentrating only on what is “necessary” to pass the assessments may be less well disposed to WEB-ODL.
4. HOW TO GET STARTED?

A teacher who is working in an organisation that permits some flexibility in learning methods might like to try the following approach.

Step 1: Identify a lecture that can be packaged as web-based learning. Develop the relevant materials, any associated formative assessment, quizzes, etc., any multimedia desired such as audiographics [2], or even digital video clips if these are important. A mature web-based learning environment will not necessarily be exclusively web-based. There may be references to non-web-based media, such as text books, whenever these are the most appropriate way to learn. The week before the relevant lecture tell the class the good news that there will be no lecture the following week, and then the even better news that they can learn from the materials provided at any time in the following two weeks. Two weeks later carry out a survey to discover how well the "distance learning" worked. Include an examination question on the topic in the end of unit examination and compare the performance on that question with others. Note that there is no need to provide any on-line support or summative assessment for such a small-scale use of web-based open learning.

Step 2: Identify a whole week in which all lectures may be offered as web-based learning. For each lecture follow the procedures identified in step 1. At this stage a teacher has gained a whole week to read and prepare more web-based learning, or take a well-earned holiday somewhere sunny.

Step 3: Structure a whole course unit to take advantage of hybrid learning. A twelve week long unit might involve four face to face meetings with students. An initial meeting to explain the system and introduce students to the learning resources, and the support system. Two meetings in weeks 4 and 8 in order to provide support for the students by dealing with the problems they have encountered. A final meeting in week 12 may be used to explain the nature of any summative assessment to be taken at the end of the unit. This approach may be particularly useful in those distance teaching situations, where the teacher has to travel in order to meet a group of students.

The advantage of the multi-step approach advocated here is that teachers can develop gradually their use of web-based learning and can stop at whatever level is appropriate for them.

To go much beyond step 3 is leading into full distance learning. This may be appropriate in universities that intend to establish a full virtual university for remote students. To make this possible we would need a well-designed and well-resourced on-line support system. We have yet to decide how far we want to proceed in this direction.

It is worth raising the question of why should a teacher wish to develop hybrid learning? Teachers who enjoy working with learning technology may find the methods discussed here intrinsically interesting. Those who teach non-standard students such as work-based learners, who need a more flexible approach to learning, will recognise the value of the flexibility inherent in web-based learning. Our experience with work-based learners at Portsmouth has been that they are able to attend important meetings that are held monthly, but their work does not always permit them to attend weekly meetings. Some teachers will just want to use web-based learning as a supplement to standard learning; it may be used as an interesting way to provide revision material for example.

5. EXPERIENCE AT PORTSMOUTH.

At Portsmouth we have been providing web-based support for learners for a number of years. We have followed the conservative route of using WEB-ODL as a supplement to traditional learning, although we have also treated some students as hybrid learners. For example a teacher who is absent from the University at a conference can leave an on-line multimedia lecture for students to study. We have also supported several individuals who have operated as genuine distance students; however in those cases the level of support we had to provide was extremely labour intensive and could not be scaled up to handle large numbers of distance learners. To make this possible we would need a well-designed and well-resourced on-line support system. We have yet to decide how far we want to proceed in this direction.

It should be obvious that when teachers transform a set of teaching materials from a word processed form to HTML in order to "put their course on the web", they are not engaging in web-based or distance learning. The student support system and the course management system identified above are necessary elements in distance learning. There is nothing wrong with using the web as an efficient way to communicate learning materials, but we should not confuse this with web-based learning. (In fact some students would argue that there is something wrong with using the web to distribute lecture notes because the duplication and distribution of the notes is being shifted from the teacher to the student causing the student extra work, and perhaps extra expense too.)

We have drawn on open-learning theory to provide a structure for our web pages in line with published descriptions of how to write open learning materials. In 2000-2001 we have drawn on the ideas expressed in this paper so that web pages are now presented in a two dimensional form. The major (horizontal) axis divides the web site into four separate regions labelled administration, learning, assessment and support. For each of these major sub-divisions there is a minor (vertical) axis that further sub-divides each of the four major sections. Advantages of this approach are that the learners are presented with a logically segmented web-space, rather than seeing the whole structure at once, and the same idea may appear in a different role in more than one major sub-division. For example communication may figure in any of the four major segments.

6. CONCLUSIONS

Superficially the economics of web-based open and distance learning seems very attractive. It is possible to conceive of an
institution offering a "golden egg" course in which many thousands of students manage their own learning, access resources through the internet, and do not consume on-campus space or other resources. The behaviour of many Universities suggests that some of this kind of thinking must exist. However this is an oversimplified one-dimensional view of WEB-ODL.

Successful web-based open and distance learning depends on having the right sort of learners. In these pioneering days there is an understandable emphasis on the technology of web-based learning, but it would be a serious mistake to suppose that institutions will be able to deliver WEB-ODL by simply throwing technology at the problem. As well as the provision of on-line, web-based learning resources WEB-ODL requires a course management system and a student support system that is optimised for the needs of web-based distance learners.

The student support system is likely to prove expensive to maintain as support must include some element of individual interaction between a tutor and a learner. In a web-mediated environment this is generally less efficient than in the face to face situation unless a tutor is able to speak to a group of perhaps several hundred students, and then take questions. Also expensive is a tutor-marked on-line assessment system because assessment too requires tutors to deal with individual learners. So the idea that WEB-ODL is like the goose that lays golden eggs is far too simplistic. The overall costs of WEB-ODL are likely to be similar to the costs of institution based provision.

The arguments in favour of WEB-ODL are not primarily economic in nature. WEB-ODL offers a more effective form of learning for certain kinds of learner. The benefits of WEB-ODL include its greater choice and flexibility, offering improved access to education for new kinds of learners, and enabling learners to have better control over their own learning.

To be truly successful in the field of WEB-ODL providers must adopt strategies that will minimise the non-completion rate. How we go about this is still an unsolved problem although the strategies used by the Open Universities provide many valuable clues to what would be successful.

Those institutions that are content to develop web-based learning as a supplement to their standard learning provision are running a much lower risk strategy, but such systems tend not to include an on-line support system because there is an existing support system for the standard students. This makes it unlikely that distance learners will succeed in such an environment.

The key factors that make the web attractive as a learning technology are the speed of communications, the flexibility to support genuine collaborative work, and the integration into a single environment of multimedia experiences.

7. NOTES AND REFERENCES

[1] Relevant readings on open and distance learning include (among many):
http://www.ouh.nl/eadtu/separator.html (European Association of Distance Teaching and the European Open University Network);
http://www-iet.open.ac.uk/iet/iet (Institute of Educational Technology)

[2] Audiographics are a set of presentation slides that play automatically, accompanied by a spoken commentary. See for example Rosbottom J (1999), Canned lectures: something gained, something lost, presented at ALT-C 1999, Bristol.
Culwin F (2000), Lecturelets – Web based java enabled lectures, ITICSE’2000, Helsinki, explores the same territory in a different way.