

Researching webagogy: developing an appropriate pedagogy for web-based teaching through research.

**Kathy Lynch and Alan Bishop
Faculty of Education**

1. Introduction

Developments in flexible delivery are making increasing use of Web-based materials. This is an important development at all levels of education. It is becoming an important area of interest in school education but it is even more clearly influencing university education (see for example Monash's LTOP) and TAFE institutes.

New delivery environments are being created, and for many enthusiasts this heralds a new age in educational advance. It could help to overcome some of the worst inequities of our current selective and culturally prescriptive education systems. It could give students anywhere access to important information and ideas, and it has the democratic ideal at its heart.

Accepting all that, there are many issues surrounding the use of Web-based teaching, such as how should it be organised to maximise the potential benefits of flexibility? Is there a role for teachers and if so what should that role be? What criteria do we need in order to judge the quality of a flexible delivery program? The need is for research in this area which will help to develop an appropriate pedagogy for the Web. We could call this appropriate pedagogy a 'webagogy', and in this paper we shall consider how research could assist in developing webagogy.

2. Is research taking place?

Experimentation in using technologies associated with the Web are certainly being encouraged and facilitated by Australian government directives in the expectation that learning outcomes will be improved (Carr, 1997).

Educational institutions are developing Web-based teaching programs that take advantage of the scope of delivery mechanisms which use high¹ and low capacity communication services. Carr's report suggests that the use of high capacity communication services by education and training has the potential to build more effective approaches to learning and teaching through;

- increased flexibility of program delivery,
- changed interaction between students and teachers,
- individualised learning programs, and
- a new understanding of knowledge and learning.

¹ High capacity services include still or moving video, images, sound, text and data singly or in combination.

This is yet to be substantiated by research, and the results of research being conducted at Monash and other education organisations will make interesting reading.

Carr suggests that in the use of high capacity communication services in education and training there are 'two ends of the spectrum'. One end uses the technologies as peripheral to teaching practice, and at the other end the use of high capacity communication services acts as an integral component of teaching practice. It is the 'high' end that in the future will inevitably change teaching and learning, and it is this end which is of particular interest in this paper.

As yet there is little systematic evaluation of the quality and the overall performance of the various applications, but one example was that of Brack (1996) who delivered a unit for B.Sc Forestry students at ANU, based on documents that were marked up in HTML and then linked. After monitoring students' progress through the electronic version of the text, one conclusion was that students were happy with the format of presentation, and the feedback also indicated that students had a "perception of greater control and focus...(as compared to traditional printed material)."

There are also many writings about Web-based teaching generally, with the main issues being:

- Equity and access
- Technology
- Roles of educators
- Pedagogy
- Administration

We will just consider some of the writings in the area of pedagogy here. For example Berge and Collins (1995a) found that CMC (computer mediated communication) is changing instructional methods in several ways, including: ..encouraging teachers and administrators to pay more attention to the instructional design of courses. Both of these factors can improve the quality, quantity, and patterns of communication in the skills students practice during learning- a change that requires, in many cases, both teachers and students to learn different roles."

Many writers have followed the work of Diana Laurillard of the Open University in the UK, and particularly her analysis of how learners "come to know". Her philosophy comprises of a combination of situated learning plus reflection (Laurillard, 1993). Its distinctive aspects are:

- students' apprehension of structure;
- integration of distinct portions of learning into an integrated whole;
- active learning;
- the use of feedback;
- reflection.

McManus (1996a) cautions that: 'With HTML it is easy to simply start putting information together and putting it on the Web. It is easy, but it has very little to do with creating instruction. Instruction is the deliberate organization and presentation of information with the end goal of promoting specific learning. He advocates the use of Spiro's Cognitive Flexibility Theory which deals with "the special requirements for attaining advanced learning goals, given the impediments associated with ill-structured features of knowledge domains" (Spiro, Feltovich, Jacobson, and Coulson, 1991). In this paper McManus also documents appropriate teacher strategies using the Cognitive Flexibility and the Hypermedia Design Model, which have much in common with Laurillard's earlier advice:

- Define the learning domain. Set the boundaries on what you wish to present to the learner.
- Identify cases (or various learning elements) within the domain.
- Identify themes/perspectives to be highlighted. This step includes the identification of the design goals and the development of the interface metaphor.
- Map multiple paths through cases to show themes.
- Provide learner controlled access to cases. It is also important to remember that in a Constructivist environment it is essential for the learner to create her own objectives.
- Encourage learner self reflection.

Boettcher (1997) argues Now that the World Wide Web is providing a whole new context for teaching and learning, we have the need to return to the core principles of teaching and learning, and create a new model of teaching and learning." Boettcher was working for California State University when they developed a workshop called The Pedagogy and Technology: Partners for the Future (PedTech)'. One of the guiding principles of the Web-based Courses project is that technology, applied in conjunction with pedagogical concepts, can create an effective student-centered environment and enhance learning outcomes.

Carr (1997) agrees with Boettcher: Without appropriate pedagogy, use of high capacity communication services cannot provide significant improvements in learning outcomes. In general, it is the pedagogy that provides for learning, not the technology or the software alone.'

3. Sources for research ideas

Research in education needs at least these three components: enquiry, evidence, and theory (Bishop, 1992) if it is to be effective:

- **Enquiry**, which concerns the reason for the research activity. It represents the systematic quest for knowledge, the search for understanding, and it gives the dynamic to the activity. Research must be an intentional, not an accidental, activity, and the intent is to enquire, to find out, to discover, to question.

- **Evidence**, which is necessary in order to keep the research related to the reality of the educational situation under study, be it teaching materials, teaching approach, learner behaviours, discursive accounts, historical record, etc. Evidence samples the reality on which the theorising is focused.
- **Theory**, which is the way we represent the knowledge and understanding which comes from any particular research study. It helps us to interpret and interrogate evidence and it recognises the existence of values, assumptions, and generalised relationships. Theory is the essential product of any research activity and theorising is therefore the essential goal of any research.

In these terms therefore there seems to be plenty of developmental activity in the area of webagogy but not much research. Traditional classroom practices of teaching and learning, which have been the focus of much pedagogical research, do not appear to have much relevance in this new context. However we recognise that although traditional practices may not be helpful in the new context, the theoretical ideas which underpin them may well continue to have relevance. Moreover theoretical ideas are often the source for good research questions, and so in the remainder of this paper we shall look at some ideas from educational research which we consider could be most appropriate for researching webagogy.

In general, educational activity concerns a curriculum, some learners, and one or more teachers, all operating within a socio-cultural context. But before considering these aspects we need to situate Web-based teaching in an appropriate research domain. For this we can use the distinction which is often helpful in education between formal, non-formal and informal education (Coombs, 1985).

Formal education, according to Coombs, takes place in schools, is part of culture's and society's formal induction process, is mandatory, is mainly concerned with teaching children, and involves specifically registered and trained teachers. It is what most people would normally think of when hearing the term 'education'.

Non-formal education, is carried on outside the normal framework of the formal system, involves adult learners as well as young people, is intentional, organised and structured, involves people as teachers who are recognised for their expertise in specific areas, is voluntary and is planned for particular sub-groups of the population.

It includes job training programs, after-school study programs, university and TAFE courses, youth and community programs.

Informal education occurs for every person throughout their life-time, happens when reading newspapers, watching TV, playing sport etc., is unorganised, unintentional and unsystematic. It is also highly dependent on each individual's life-style and life-chances.

It is helpful for us in considering Web-based teaching, because we can think of each of those sectors developing a pedagogy. In that sense webagogy would seem to be situated in the area of Non-formal Education. Its flexibility implies that it is different from Formal teaching and its related pedagogy, which demands a formal approach to teaching and instruction. Equally it would seem that it would not be productive to consider Web-based teaching as a kind of Informal Education. It may well be the case that much learning from the Web is informal, in Coombs's sense, but in terms of developing webagogy for learning centres, universities, TAFEs, schools etc. it would seem important to be focusing on the systematic and intentional, yet flexible, attributes of Non-formal Education.

Turning now to the specific areas of interest in researching webagogy, let us consider first the **learners**, to which discussion Burns (1995) makes an interesting contribution. He develops the idea of 'androgogy' which concerns the adult learner, and insofar as most Web-based teaching is with adults these ideas would seem to have some importance here. He contrasts androgogy with pedagogy, arguing that the latter has developed from, and is primarily associated with, formal school education. He demonstrates that there are significant differences between the two in terms of dependence/independence of the learners, resources for learning, reasons for learning, motivation, and the role of the teacher. These are clearly some of the issue areas concerning learners which research into Web-based teaching should consider.

Two other ideas from research on learners also seem important to consider. Situated cognition (Kirshner & Whitson, 1997) is important, as has already been mentioned, because it draws attention to the fact that learning is context- and situation-specific. Web-based teaching provides a materials-based educational experience, which means that although it can be a material-rich, and stimulating, learning situation it can also be a socially impoverished, and lonely, learning situation. Which it is for the learners will in part depend on another important construct, the learning style (Gardner, 1993) preference of the learner. Some learners will undoubtedly thrive in the new liberating learning situation, while others will flounder. It will be important for the teacher(s) to monitor, interpret and then to try to alleviate that situation.

Another focus for research is the **curriculum** and there is a distinction often made in the educational literature between curriculum and pedagogy, where curriculum focuses attention on 'what' is taught, whereas pedagogy is about how it is taught. A further and more provocative distinction can be made between three levels of curriculum (Robitaille & Garden, 1989) :

- the **intended** level (which is about the goals and the content to be covered' in the statements of intent, and is usually reflected in the assessments)
- the **implemented** level (which is how the intended curriculum is embedded in the materials and the teaching involved)
- the **attained** level (which is what the students actually learn from the educational activity)

Robitaille and Garden argue that the curricula at the three levels are different, not because the teachers are ineffective or that the learners are belligerent, but because different people are involved in meaning-making at the different levels and they bring with them different motivations, assumptions, knowledge and values, to the situation.

In a Web-based teaching situation, as a kind of Non-formal Education, there is certainly an intended curriculum and also the learners do construct for themselves their own attained curriculum. We would anticipate moreover that the more flexible the system, the greater the difference between those two curricula. This demonstrates that what we are addressing in this paper is at the level of the implemented curriculum, and that research on webagogy must include the implemented curriculum. This is because in Formal education one can conceive of a teacher teaching without recourse to materials, whereas in Web-based teaching materials of various kinds are necessarily involved. (We are using the word materials' to mean any pre-prepared text, audio-visuals, etc. to be used as part of the course.)

The other issues which this language helps us to think about concern the **teacher(s)** involved. Someone has responsibility for producing the materials, which embody the implemented part of the intended curriculum for that course. Their effective use will of course depend ultimately on the learner, but will also depend on the role and actions of the teacher'. This is an important person to consider here.

The teacher's role in Web-based teaching has already been identified as being very different from the teacher's role in Formal education, with words like facilitator, supporter etc being used. What is being referred to by these terms is of course not the person, or people, who produced the materials. The terms of facilitator etc. are referring to the person who is on-line and interacting with the students in various ways. It may be the same person who produced the materials, but it increasingly will not be. Also the on-line teacher may or may not be one person, and there will be a range of activities in which they will engage, and a range of roles which they will fulfil.

We suggest that it would be helpful to call the on-line person the tutor' for the course, whilst recognising that that word also has other connotations. In more traditional distance education this tutor would have been the principal corresponding contact for the student, reading assignments, answering questions, directing them to further reading etc. These aspects of the tutor role continue in Web-based teaching but there exists also the possibility of the tutor chairing and managing discussion forums between groups of students. This is an exciting new role for the tutor and will help to make the learning experience far more interactive for the learners. This is the role which is usually referred to as facilitator'.

Boettcher (1997) suggests three basic modes of dialogue and communication in this situation: (1) the dialogue between the tutor (which she

calls the instructor) and the student, (2) the dialogue between the student and the materials (which she calls the instructional resources), and (3) the dialogue between and among students. We would however include another which is the dialogue between the students (plural) and the tutor as in the discussion forum, where the tutor can manage and facilitate the on-line discussion.

We are reminded that in Formal educational contexts and pedagogy there are three principal groupings of learners which are important to distinguish: the large group, the small group, and the individual. They are important not just for the learners, who know that they are three very different learning contexts, but they are also important for the teachers, because the teacher needs to behave very differently in each of the three scenarios, in terms of choice of language, private and public speech, speed of the activity, modes of presentation of ideas etc.

In Web-based teaching the role of large group teaching activities has essentially been taken over by the preparation and organisation of the materials. The person who creates the prepared materials makes the same kinds of assumptions about the learners as are done by the textbook writer. However the materials cannot be instantly modified according to learner feedback, at least not in the large group' mode, unlike the real classroom situation. Individual modification' can be programmed into some learning materials, but we believe that this is ideally where a real tutor should come in.

We do not seek to use Web-based teaching to remove the personal dimension, rather we are concerned to understand more about the role and possibilities of interpersonal teaching through the Web. In our view this is precisely the kind of issue which the Non-formal/Informal education distinction forces us to consider. If Web-based teaching is a kind of Non-formal education, then the interpersonal dimension of the teaching is a crucial part of it.

Therefore, in our conception, the individual, personal context of learning is still present, and should involve the tutor. In addition, the interpersonal learning context can be developed by using discussion forums managed and facilitated by the tutor. Of course the Web also allows students to organise their own networks for support and stimulation without there being management by the tutor.

4. Towards a research agenda for developing webagogy

There is a clear need to develop knowledge about webagogy more systematically than is happening at present. What is needed is a research agenda which builds on the most relevant theoretical ideas from previous research, such as those above, and which also enables us to focus on the critical issues for new research.

One distinction often made in educational research is between survey, or status research, and experimental research. The first kind of study examines what kinds of practice is going on, and documents in as detailed a way the differences between approaches being used. The second kind appeals more particularly in a relatively new field of endeavour, and in a field where there is much experimentation. The problem is that as we have seen there is much experimentation but it is not experimental research. That is, it does not meet the three criteria described earlier, and as a result it is very difficult to learn anything substantial from the experimentation being done.

In fact, and perhaps paradoxically, it is necessary in our view to undertake several systematic survey, or status, studies before one can sensibly engage in any experimental research. Status studies should not be just descriptive, but they should enable relationships between variables to be explored, if not explained. Perhaps the most useful kind of status research here is that in which evaluation is undertaken of particular schemes, courses and programs. In any evaluation there are many questions which could be asked, but the three main foci of research should at least be included, that is, the implemented curriculum, the learners, and the tutors, all within their socio-cultural contexts. In this kind of evaluation, although the foci may be specifically one or other of these the aim is to be able to generate data and representations so that theoretical constructs can be developed which will further the research agenda.

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