

Enhancing Learning Through Technology: When Students Resist the Change

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Abstract

‘As a general matter, innovation represents change, and there is usually built-in resistance to change’
(Maier and Weidner, 1975, p. 70).

Where the introduction of computers in learning involves providing students with greater autonomy as learners, this commonly conflicts with students’ past educational experiences and can require a shift in their conceptions of what learning involves and what constitutes appropriate roles of students and teachers. Student resistance to the inevitable stress of such change is to be expected, irrespective of the potential learning benefits of introducing the technology. Factors that can aggravate or alleviate such resistance are discussed, with some illustration from a computer facilitated, problem based course in Forestry.

Keywords

computer-aided learning; self-directed learning, conceptions of learning, conceptual change, stress; change management

1. Introduction

Technology based innovations can have a number of different teaching and learning goals. For instance, Cuban (1993) has highlighted three goals behind the introduction of computers in education:

- to keep the education system at the forefront of technological development and students’ skills up-to-date with those expected in the workforce;
- to increase efficiency and productivity in teaching and learning; and
- to enable more self-directed learning, with students as active learners assisted by teachers to construct their own understanding.

It is within the context of the last goal, emphasising the use of new technologies to enable changes in the way we undertake teaching and learning, that this paper is set. (See also Laurillard, 1993 and Hodgson, 1993 for a discussion of different goals and uses for computers in education.)

University teachers pursuing the third goal in particular, are sometimes taken by surprise when their praiseworthy attempts to enhance the quality and satisfaction of education for their students are met with complaints and resistance. Perhaps complaints come from only a proportion of students;

perhaps resistance fades over time, but that such resistance regularly occurs is relatively unacknowledged and rarely addressed. The danger in not allowing for this reaction from students is that the enthusiastic innovator may be unnecessarily discouraged by the experience, because it is unexpected, and students are not assisted in the adjustment process, drawing it out longer than necessary. In the extreme, this can lead to unwarranted disillusionment amongst both staff and students regarding the potential of educational technology.

In this paper, we discuss why the introduction of new technologies as a means to greater learner autonomy is likely to produce at least some student resistance. In addition, we consider some of the factors involved in determining the strength of resistance, and canvas ways for staff to assist students to recognize and overcome associated problems.

2. What Are We Really Asking of Students?

The shift to more self-directed, computer based learning is often seen as requiring additional skills of students in taking greater responsibility for their own learning. Yet there is much evidence to indicate that the requirements are much more extensive than that, involving a paradigm shift in how students conceive of and approach their learning, with a major reorientation in students' assumptions and expectations about teaching and learning (Beatty, Dall'Alba and Marton, 1990; Conrick, 1994; Laurillard, 1993; Ramsden 1992; Taylor, 1986).

A number of studies examining students' understanding of the nature of learning have shown a hierarchy of different conceptions held by students, involving a change in how the nature of teaching, learning and knowledge are understood. For instance, Beatty, Dall'Alba and Marton (1990) elicited the following ways of understanding learning:

- increasing one's knowledge;
- memorising and reproducing;
- applying;
- understanding;
- seeing something in a different way; and
- changing as a person.

There is an important dividing line between these conceptions. The first three include a view of knowledge as something given; something that exists "out there", waiting to be picked up, taken in and stored. This is conceptually linked to a view of learning as a passive experience, consisting of receiving and absorbing knowledge transmitted by the teacher. By contrast, the remaining three conceptions emphasize the importance of understanding or gaining meaning from knowledge, which is conceptually linked to a more active approach to learning in which the student attempts to structure and create personal meaning from knowledge and ideas (see Beatty, Dall'Alba and Marton, 1990; Laurillard, 1993; Jones and Kember, 1994; Ramsden, 1992).

The relevance of this to the use of information technology in undergraduate courses is that conceptions of learning at one end of the spectrum support very different beliefs about the appropriate functions and activities of lecturers as teachers, and students as learners, than do conceptions at the other end. The reality is that most students' educational experiences in school rooms and lecture theatres have supported the more passive conceptions. This sets up the unfortunate situation in which students whose main educational experiences have been as a passive recipient of information may

suddenly be introduced to computer based courses providing for them unexpected opportunities for active, self-directed learning for which they are largely unprepared.

As university teachers, we think that we are providing an opportunity for enhanced learning, with the development of new learning skills. In reality, we are also setting up a situation of potential conflict with many students' past experiences and associated attitudes and values around teaching and learning, because the learning opportunities we provide may be predicated upon a qualitatively different conception of learning. If we as teachers do not acknowledge the demands this can make on students, and work with them (where necessary) in enabling the transition process, we are undermining the likely educational success of the technological innovations we are introducing.

3. Change is Stressful

Trying something new typically produces feelings of discomfort or anxiety (Bonwell and Eison, 1991; Woods, 1994), especially when change has been imposed externally (e.g., by the instructor) and the person feels relatively little control over the event (Woods, 1994; Fisher, 1994). Time spent acquiring new learning skills takes away from time spent on content, which can arouse fears of learning less (Bonwell and Eison, 1991; Woods, 1994). Plus, all innovation requires short term costs in an investment of time and energy in acquiring new skills with no certainty of payoff. This may be aggravated further in the situation where students are not unhappy with their previous learning experiences, producing little incentive for change. In this case, 'deviation from established methods invites risk, but offers relatively few rewards' (Bonwell and Eison, 1991, p. 53).

Taylor (1986) has documented the disorientation experienced by students when they encounter a major discrepancy between expectations and experience, such as the shift to self-directed learning, that requires a reorientation in their (typically implicit) assumptions about the teaching and learning process. The disorientation is marked by confusion, anxiety and tension, plus loss of confidence. During this time the problem is defined by the students in terms of whom to blame; aggravation and hostility are expressed towards others, particularly the instructor - a stage that can last for varying lengths of time.

Taylor (1986) has described the adjustment required of students as a "cultural journey", and others have used a similar analogy of different teaching and learning cultures (Conrnick, 1994; Cuban, 1993). Is it any wonder that some students should experience culture shock as they commence, unprepared, this journey into unfamiliar learning territory?

4. Factors Affecting the Stress of and Resistance to Change

Hewton (1987) outlines three broad strategies for introducing educational change:

- use of power to force change;
- convincing people of the benefits of change through logic and argument; and
- changing people's attitudes and perspectives.

(See also Dunphy (1981) for an outline of approaches to organizational change.)

4.1 Change through force

Forced change, as an edict from the instructor, is how most innovation occurs within courses. While this allows for the most rapid change (Dunphy, 1981), it can also be the most stressful approach.

Change that is imposed on students is likely to encourage a feeling of lack of control, which increases stress (Fisher, 1994; Woods, 1994). Fisher draws a distinction between people's reactions to situations of high demand, depending on their perceived control over the situation. Where the demand is accompanied by a sense of personal control, it is more likely to be seen positively, as a challenge. Whereas the same task with low control is likely to be seen negatively, as distressing. Stress can be seen as an imbalance between demand (the requirements of a task) and capacity (one's ability to meet the requirements).

This implies that the stress resulting from change would be reduced where students feel confident of their ability to handle the new circumstances. Thus, student resistance would also be reduced by introducing changes gradually and including appropriate skill development activities, communicating to students as clearly as possible what is required of them, and introducing activities to increase their confidence in their ability to meet the requirements. Possible strategies include:

- giving demonstrations of the activities required;
- showing students examples or simulated examples of previous students' outputs;
- asking previous students to talk to the class;
- introducing new skills gradually, in developmental stages; and
- providing opportunities for students to work in groups and discover that they share similar concerns.

As an additional strategy, Woods (1995) suggests introducing an initial workshop for students on responses to change, aimed at helping them understand any negative reactions they may be having.

4.2 Change through persuasion

Unless a teacher sees a discrepancy between their teaching goals and students' achievements, they are bound to regard teaching innovation as undesirable and unnecessary. The greater the discrepancy, the more likely they are to consider making changes (Eraut, 1975). By extrapolating to students, we can expect that some students may welcome change, in particular, those that have been dissatisfied with their educational experiences and whose conception of learning does not match the traditional approach. In support of this claim, Jones and Kember (1994) found that student resistance to self-study packages was associated with their preferred approach to learning.

However, McFarlane (1992) and Jones and Kember (1994) found strong support among students for lecture-based approaches to teaching and learning. So, there are a large number of students who are *not* dissatisfied with traditional approaches to higher education and we can expect such students to be far more resistant to change. Possible strategies to reduce student resistance by convincing them of the benefits of change include:

- describe "up front" the approach to teaching and learning you have chosen and why;
- provide students with a structured opportunity to reflect on the advantages and disadvantages of the traditional and innovative approaches (preferably in a group setting so that they can experience the different perspectives of their fellow students); and
- present evidence, if available, from previous student evaluations of the course, plus any papers in the area that have influenced you.

4.3 Attitudinal and conceptual change

Acceptance of change through argument may lead to conceptual and attitudinal change. Hence, strategies for encouraging conceptual change would overlap with those for convincing through argument. However, the *outcomes* would be different, with a change at the level of values and beliefs, not just at an intellectual level.

Laurillard (1993) argues that fostering an appropriate conception of learning is fundamental to any kind of teaching, but is particularly important with the use of educational technology as this presupposes a reduction in teacher-student contact. She argues further that where students are expected to take personal responsibility for development of their knowledge and management of their learning, discussion of 'the status of knowledge, one's personal commitment to it, and the appropriate ways of approaching the study of it, are all topics which should be figural in any course' (p. 215). Her recommendation for creating an environment where students can develop their conception of learning includes:

- 'Demonstrate your own commitment to the subject, and your way of approaching it.
- Give students opportunities to exercise choice in their method of study and defend their choice.
- Provide opportunities for discussion of the status of the knowledge in the subject, how it can be known and how it may be learned' (p.215).

5. Change Management in Practice -- One Small Step

We have undertaken some preliminary work on helping students adapt to educational change. This will be presented here to help illustrate some of the factors we have discussed. The work is set within the Fire Science and Management unit (hereafter called 'fire'), at the Australian National University (ANU). It is a third year undergraduate unit offered as part of the compulsory core of the ANU professional BSc (Forestry) degree. The curriculum is in transition from a lecture-based format to a problem solving approach requiring self-directed, small group work (see Trevitt and Sachse-Åkerlind, 1994). In addition, computer based resources have been introduced as a major component of the course (see Trevitt, 1994; Trevitt and Sachse-Åkerlind, 1994). A range of materials is being developed in digital form, suitable for access from the extensive student computer laboratories distributed across campus. These include text, graphics, imagery and animations to help visualize abstract concepts and difficult to schedule field and practical activities.

5.1 Resistance to change in content delivery

With the support of student self-access to the computer based materials, more and more lecture time previously devoted to delivery of subject content has been deliberately set aside in favour of activities designed to facilitate development of broader professional skills.

Initial response to this transformation of 'lecture' time away from content delivery was not entirely positive, with a number of criticisms of lack of content coverage in lectures (see Trevitt and Sachse-Åkerlind, 1994). To assist students to adjust to this emphasis on skills as well as content, a questionnaire, designed to heighten their awareness of the importance of skill development in addition to development of subject knowledge, was administered to students during the first week of the 1995 course. The questionnaire was based on Cross and Angelo's (1988) topic and skills checklist, and listed a number of topics and skills being addressed within the unit.

Students were asked to rate (i) their perceived knowledge and understanding of each topic, and their perceived ability and experience with each skill; and (ii) what *importance* they accorded each topic or skill listed. As well as highlighting the issue for students, it enabled a contrast between student and lecturer perceptions of the relative importance of skills and 'content' in the course. Further, this awareness raising activity was supplemented by a clear emphasis on seeking feedback on skill development, in addition to other aspects of students' learning, in the formative (i.e., developmental) evaluation procedures conducted throughout the course.

Although the success of this process in preparing students for change has not been formally assessed, an end of semester course evaluation questionnaire showed far less criticism from students about lack of content coverage in 1995 than a similar questionnaire in both 1993 and 1994.

5.2 Resistance to change in assessment practices

Another aspect of the reorganization of the 'fire' unit has been a major restructuring of assessment since 1993, with increasing emphasis on self-assessment and criterion-referenced assessment (see Trevitt and Pettigrove, 1995). Again, initial responses indicated that this was a source of some stress and uncertainty for students (Trevitt and Sachse-Åkerlind, 1994). Attempts to reduce student resistance were handled in a quite different manner in this area, by changing the *context* in which the assessment was being perceived, and by introducing changes gradually.

One item of assessment introduced in 1993, which the end of semester evaluation indicated was particularly stressful for students because it was outside their experience, was an end of course oral debrief. In part, instructions to students read:

“Organize all of your notes in your diary / dossier / logbook so that they make sense to you: bring them along to the debrief. Determine how clear and comprehensive you think these notes are, and how well you can comprehend, integrate and analyze the content. Compile a one page (or less) summary of what grade you believe you have earned for this unit and why.”

Changes introduced in 1994 gave a more familiar context to this form of assessment, couching it in the more tangible terms of a job interview (see Trevitt and Pettigrove, 1995). The amended instructions now read:

“Come along to your ‘job interview’. Organize all of your notes... <as before>... and analyze the content. Be prepared to use these notes to defend (justify) the claims you made in your ‘letter of application’ for this ‘job’.”

Emphasis was also placed on the *gradual* introduction of novel assessment skills. The overall concept was that during the course students would move from a form and style of assessment with which they were quite familiar (e.g., short answer test) to a variety of more novel activities that more closely resembled expected professional activities after graduation. Experience of a group interview preceded the final individual interview, and experience of self-evaluation commenced with early self marking of short answer tests, providing an opportunity to discuss the issues this raised for students.

One outcome that indicates these efforts have been largely successful is that the end of semester evaluations show a rise in student agreement, from 77% in 1993 to 90% in 1995, that the form of assessment in the unit was appropriate.

7. Conclusion

We would like to emphasise the following points from this paper:

- Technological innovation in education involves a process of change, not just acquisition of additional skills.
- The change required will be greatest where it conflicts with students' past educational experiences and current conceptions of learning.
- Such conflict is most likely where educational technology is used to enable more active and self-directed learning, as contrasted with technology that is used mainly to enable easier access to a greater range of material, without changing the way students interact intellectually with material.
- Change produces stress and, unless acknowledged and managed appropriately, can inhibit the learning process and subsequent success of the innovation.
- Lack of awareness of this aspect of innovation can cause unnecessary disillusionment for both staff and students regarding the potential of educational technology.
- Strategies to help manage the change process for students have been presented and illustrated in a computer facilitated, problem based course.
- The course-based example has illustrated the potential benefits of assisting students manage the change process.

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