Barriers to the Integration of Technology into Teaching and Learning

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Abstract
This paper has been directed towards emphasising the importance of professional development to any program concerned with the integration of the information technology more generally, into teaching and learning. It alluded to the importance of considering different teachers’ attitudes to change and the consequences that can result from change that is too frequent. It then referred to a number of policy documents to show the historic emphasis on professional development as a key to the integration of information technology into learning environments.

Key Words: Integration, Technology, Attitude

1. Introduction

Technological developments have found their way into almost every area of our lives, and it appears as if the integration of technology into education is obvious. Given the important place that technology has come to occupy in our lives, schools have a great responsibility to educate individuals who are capable of effectively using technology. Today, educational leaders are making the necessary investments to ensure that technology is integrated into the teaching-learning process. Educators, teachers and researchers consider technology to be an indicator of high quality in education. Much will be said at this paper about the barriers to the integration of Technology into teaching and learning, and without doubt these are significant. However, while the technology generates specific technical challenges because of the need to ensure connectivity between electronic devices, many of the barriers to the integration of the Technology into teaching and learning are identical to
those that arise from the integration of information and communication technology more generally into teaching and learning.

This paper will proceed by considering attitudes to change as a barrier to the integration of information technology into learning and then by exploring issues relating to the professional development of teachers with respect to information technology.

2. Attitudes to Vary

Integrating any information technology into educational settings requires change. It requires change in the way teachers think about teaching and in their teaching practices. Poole (1995) says, “The task of making the transition from traditional teaching to teaching with technology is much tougher than it seems. This is because the transition is as much a cultural one as one of mere methodologies. It involves a shift in teaching paradigms, a shift in the way of thinking about teaching”.

Different teachers will handle this change differently. A large part of this difference comes about from different attitudes to change. Rogers (1983) identifies 5 types of personalities with respect to the adoption of change. At the vanguard of change are the innovators who represent about 2.5% of the population. These people are eager for change, and have a desire for the rash, hazardous and risky. Often they are socially ostracised for their attitudes. The next group is the early adaptors (13.5%) who have more social acceptability than the innovators and are leaders of social opinion. This group serves as role models. The factors which seem to contribute towards a person being an early adaptor include longer education, wider networks, higher levels of literacy, more contact with change agents, greater exposure to mass communication channels, active seeking of information about innovations and greater degrees of opinion leadership. The third group, the early majority (34%), follow the early adaptors with deliberate willingness. The fourth group is the late majority (34%) who are more sceptical and often only take on the particular innovation as a result of economic or network pressures. The final group is the laggards (16%) who hold traditional views and may in fact adopt after the innovation has been superseded.

The problem that arises when change is very frequent, as it is with information technology, is that only the innovators and the early adaptors are able to keep pace with the changes. Toffler (1970) noted that human beings have shown themselves to be very adaptable creatures, but he warned that their ability to absorb change is not infinite. He suggested that we were then, in 1970, approaching something he called “future shock” which he defined as “the human response to over-stimulation”. In Toffler’s view the symptoms of this ‘future shock’ include anxiety, hostility, senseless violence, physical illness, depression and apathy. It is nearly 30 years since Toffler wrote this and many of us probably feel that we, and perhaps most of the world, are in terminal ‘future shock’.
3. Skilled Expansion

As noted above, inappropriate or inadequate professional development is frequently cited as a barrier to the integration of computers into educational settings. Sherwood (1993) says, inadequate pre-service teacher training courses and inappropriate in-service workshops … [do] not prepare teachers to integrate computers into their teaching. It does not include enough time for them to become comfortable with the software, nor does it include support to help them troubleshoot during the early implementation stages and the training experience is not tailored to their needs.

Carlson (1994), while specifically addressing professional development needs for using educational multimedia, makes some comments that apply equally to information technology in general. She says “Clearly, time, effort, and money are as essential to … staff development as they always have been”. This would seem to be obvious but it is often the first of these three, time, that is the most overlooked and the one that is often the biggest problem for teachers. Without time being made available, and by time I mean working time not teachers’ private time, it is farcical to expect any real uptake of information technology. Education is one of the few professions where it is expected that teachers will undertake professional development on their own time and often at their own expense. It is a mark of the professionalism of teachers that they have been prepared to do this to the enormous extent that they have. It does not however necessarily constitutes good or ideal practice if educational change is what we are aiming for.

Carlson notes the different questions asked of professional development programs by the various stakeholders. She says while administrators are concerned with making choices between existing demands for staff development and with costs, and staff developers are concerned with effective models of staff development and with motivating teachers, the teachers themselves are more likely to ask questions such as “How do I use this machine?”, “What’s this program good for?” and “How will these tools help me reach my goals for students?”. These three issues of the practical, control and belief levels need to be met by professional development before teachers will be prepared to add information technology to what Carlson calls their teaching ‘toolkits’.

At the practical level, it needs to be understood that teachers operate in tightly constrained environments where there is little time for things to go wrong, therefore they require their tools to be simple, reliable, durable, and versatile. Information technology and the Internet specifically, can be all these things with proper professional development. Some suggestions for addressing the practical include following up demonstrations with practice on equipment in the teachers’ schools, working in pairs, and using a problem-solving approach in training teachers to troubleshoot.

With respect to control, it should be acknowledged that information technology is a powerful and complex instructional tool. To gain the confidence and comfort to adopt this
new approach, teachers need to gain a feeling of power and command over it. Professional development can assist with control by providing opportunities for teachers to use the program in settings similar to those in which they would use it with students; following hands-on experiences with discussion of what teachers observed during their experiences; and by prompting teachers to think about various instructional situations in which the program could be used.

More than any other single factor, teachers’ beliefs influence what they do in classrooms. Teachers hold beliefs about students, teaching, and technology that are imbedded in the powerful images of what they would want to happen if they had ideal conditions. Linking those beliefs to information technology is perhaps the most critical aspect of professional development in this area. Some suggestions of ways this might be accomplished include assisting teachers uncover their personal beliefs about teaching; encouraging teachers to describe their experiences with technology and the assumptions they have about technology, and allowing time for reflection.

4. Wider Issues

The literature provides numerous examples of what are claimed as successful models of professional development with respect to information technology for teachers (Williams and Dundas, 1996; Holzberg, 1997; Taylor, 1997; and Bottino et al., 1998). In its aims it states specifically “to improve student learning outcomes through integrating computers in the curriculum”. This in itself is valuable in an introductory sense and as confidence building for teachers, and in fact teachers have applauded the specificity and clear guidelines for professional development detailed in School, but it’s possible outcomes are very limited.

Current curriculum documents, to a great extent, owe their philosophies, structures and understanding of appropriate content to a time when modern forms of information technology, for example the Internet, were not available in schools or indeed in the wider community. While I am not in any way advocating technological determinism, it would be strange indeed if a technology that has had such a fundamental impact on the way we live our lives, conduct our business and organise our societies were to have little or no impact on the way we understand education. If the integration of information technology, or the Internet specifically, into teaching and learning is to result in any fundamental or lasting educational change a different model of professional development is required.

Taylor (1998) identifies the necessary stages of orientation, adoption, evaluation, innovation and institutionalisation for professional development programs with ‘re-forming’ intentions. At the orientation stage, teachers consider approaches to the integration of information technology into teaching and learning that are consistent with current school expectations, technology availability and program requirements. In the adoption phase teachers adapt current intentions and practices to teaching and learning to a technology rich environment. They then evaluate the strengths and weaknesses of those practices. In the
following stage, innovation, teachers re-develop their practices based on their experiences with the technology-rich environments and student reactions to them. At the institutionalisation stage teachers and managers develop strategies to ensure that the new teaching and learning practices are sustained in the medium to long term, and thus become ‘traditional’. Each of these stages requires different approaches to professional development including allowing time for reflection, providing specific training, discussion; considerations of alternative practices and re-design of adopted practices.

5. Conclusion

The need for professional development to address teachers’ concerns at practical, control and belief levels and a few strategies for doing this were then addressed. From there the paper turned to looking at the broader issue of the intention behind professional development models.

It is clear that most current models of professional development have a ‘re-tooling’ intention, that is they seek only to provide teachers with the skills to ‘add-on’ information technology to existing curriculum and schooling structures. While this intention is laudable in itself, this paper has advocated that the ‘re-tooling’ intention represents an understanding of information technology that ‘sells it short’ and is out of step with the impact of information technology in the wider community. However, the paper also warns that professional development with any ‘re-forming’ intention to fundamental and long-lasting change in education is complex and multi-faceted with different actions required at different stages of professional development.

Thus it is hoped that this paper has stimulated thinking about the importance and methodology of professional development in any meaningful integration of the information technology more generally into teaching and learning.

No technology is ever neutral, its values and practices must always either support of the organization into which it is placed and the failures of technology to alter the look-and-feel of schools frequently result from a mismatch between the values of school organization and those values that are embedded within the contested technology itself.

6 References


