Rethinking Approaches to Teaching with Telecommunication Technologies

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ABSTRACT There is a current trend saying that every student should know how to use the Internet and therefore Internet features, capabilities and services should be taught in schools, Technical and Further Education (TAFE) Colleges, Universities and even to young children. The real problem of the impact of the Internet on education is elsewhere; giving students increasingly powerful tools in the form of more and more sophisticated pieces of software will allow them to handle problems of a level of complexity well beyond what they are able to achieve today with pencil and paper. This is going to have a growing impact on the very content of curricula which are all based on the implicit assumption that the only tools students, and more generally people, have to solve problems are a pencil and a piece of paper. On the other hand, many adopters of telecommunication technologies, such as the World Wide Web have, as their primary focus, the features of the new technology. These features are then used to provide a learning experience that is often essentially the same as that provided using existing technologies, and there is surprise when the expected learning gains are not realised.

This article addresses the discourses concerning teachers, identifying their changing roles in the classroom as facilitators and managers of learning with the introduction of telecommunication technologies. For both technology-orientated and non-technology-orientated teachers, the challenge of the Internet offers much more than just a tool to be used in the classroom. Every piece of new software and every site of new information gives the teacher a new challenge, a new lift, something to really get interested in and get the enthusiasm going.

Introduction

Much has been written about the use of telecommunications technologies and the effects they have brought about in society, including the students
we teach. Efforts have been made to encourage teachers to use computers and their potential connectivity in the classrooms. This has had some effect, at least in the number of colleges and tertiary institutions connected to the Internet. However, very little has been written on how the use of the Internet in the classroom has affected the role/perceptions of the classroom teacher. Organisation, curriculum content, infrastructure and teaching methods are all affected. How have classroom teachers responded to these areas since their introduction?

Meredith (1965) refers to these points when he says:

The scope and depth of our educational intentions have been widened and enriched by every new communicative medium which an inventive technology has added to our repertoire. When the human voice was the only teaching instrument, all messages had to be conceived in verbal terms. But as man learned to draw, to paint, to write, to print, to make machines and models and instruments, to take photographs, to make them move, to preserve sound on disc and tape, to transmit sound and light over unlimited distances, and now with computers and oscilloscopes to mount flexible and controllable displays of images whose content can be varied at will, our educational intentions are tending to lag behind the power of our media for transmitting them. (p. 377)

Nunn (1992) goes as far as warning from the migration of old teaching practices: “We don’t want to use the new technologies to do just quicker what we have done in the past.”

How are teachers dealing with the influx of telecommunication technologies in educational institutions? How and why do teachers use these technologies? In what ways, if any, can technology help teachers do their many faceted jobs? Answering these kinds of questions is a complex, often frustrating task. Despite the central role of the teacher in educational applications of technology, there has been relatively little research on how and why Australian teachers use telecommunication technologies. Most research about educational technology has focused on the impact of these technologies on students; little attention has been given to its impact on teachers.

This article describes how telecommunication technologies can support, enhance and, in some cases, refocus the job of teachers. The issues raised are just starting points for discussion in a tertiary environment and the views in this paper are the author’s own views and should be seen as just that. The views presented in this paper are derived from multiple sources. These include observations and conversations with colleagues, administrators, and researchers at conferences, over electronic mail; reviews of literature and evaluations of local technology implementation efforts from around the State of Victoria in Australia. While much of the information is descriptive, and qualitative rather than quantitative, together these sources paint a rich, multifaceted picture of teachers’ experiences. And while the
examples in this paper are by no means all-inclusive, they indicate the varied ways that teachers around the state are using technology to carry out their jobs.

A Jungle of Teaching Models

There appears to be a trend requiring every teacher to know how to use the Internet and therefore that Internet features, capabilities and services be taught in schools, TAFE Colleges, universities and even to young children. The real problem of the impact of the Internet on education is elsewhere – giving students increasingly powerful tools in the form of more and more sophisticated access to information and pieces of software will allow them to handle problems of a level of complexity well beyond what they are able to achieve today with pencil and paper. This is going to have a growing impact on the very content of curricula which are still based on the implicit assumption that the only tools teachers and students, and more generally people, have to solve problems are a pencil and a piece of paper.

Teachers must carry out many tasks to make the learning experience a rich one. They must guide and encourage students, provide varied learning experiences, keep track of student progress, and evaluate student learning. In reality, this means they must regularly find and organise information, create lesson plans, grade papers, maintain extensive records, and deal with a range of administrative duties and, as with any profession, they must keep current with developments in their field as well as the classroom tools presented in the classroom.

It makes no sense to talk about telecommunication technologies in education without focusing on the problems that teachers face when having to make choices on what to use in the classroom. A teacher with a well equipped toolkit can accomplish tasks of practical interest, which might otherwise seem impossible to non-wizards. Good tools expand teachers’ views of the possible. Although teachers have long accomplished the manifold tasks required in teaching without technology, some teachers who have learned to integrate telecommunication tools into their teaching have found them to be useful in ways they had not imagined (Alexander, 1995; Pennell & Deane, 1995). These teachers describe how technology makes it possible to meet current instructional goals or pursue altogether new goals. Some find that using various technologies allows them to teach in entirely different ways (Joint projects between RMIT Business Computing students in Melbourne and Singapore).

Telecommunication technologies can be a powerful tool for helping teachers with all the different parts of their job: enhancing instruction, simplifying administrative tasks, and fostering professional growth activities. The experience of some teachers further suggests that technology can help redefine the role of the teachers, in and out of the classroom.
In addition, some teachers find that technology can enhance their personal productivity. Perhaps the most exciting finding by these teachers is that technology can help support their professional growth and enable them to continue to learn and improve their teaching skills. Direct contact via Email with the world experts in their subject matter, and an endless source of new resources that can enable continuous change and improvement in the class activities are two examples.

“The Web will not only improve teaching and learning but, through better communication, break down barriers between education and industrial sectors” (Riddle et al, 1995). Against this, it can be argued that some of the telecommunications facilities now at the teacher’s disposal have suppressed his/her ability to use them effectively. In the hands of an enterprising teacher, a simple shareware educational software, downloaded from a new site, can be put to a hundred and one different uses so as to virtually transform an otherwise dull classroom routine. Why, then, is it uncommon to find such software and/or communication facilities put to their fullest possible use? Is it because the innovative teacher remains a rare breed? Is it because teachers are running out of time trying to keep up with the flood of tools presented to them? Is it the old award working conditions that provide around 30 hours per year for staff development? Is it the case of the carpenter who is trying to build a dinner table with so many tools that he/she can’t decide which one to use?

The accusation is uncalled for, surely. As a class, teachers have received insufficient training and practice in the use of telecommunication facilities: for economic reasons, among others, they have had too few opportunities for acquiring skills involved in manipulating them to realise what the possibilities are. As more and more avenues become available it may be anticipated that teachers will become more adept, but this is unlikely to happen if ‘more and more’ is to mean a multitude of tools each designed according to its own specifications to do this, that, or the other job. In a sense, there are too many aids as it is. The catalogue of telecommunication facilities and sources is bewildering in its diversity. Too often the convenience obtained at the push of a key is purchased dearly in terms of the teacher’s time. The facilities and tools come in bits and pieces, all shapes and sizes, and having procured it the teacher is often at a loss when it comes to trying it out.

Conservative versus Radical Teaching Approaches

We are only beginning the task of learning how to use telecommunications technologies in education. I worry greatly about teachers who feel they already know all the answers. We have a long way to go, and theoretical analysis will not tell us how to employ the Internet effectively. Hence, we
want to maintain flexibility and we should be prepared for years of trial and error while using the Internet in learning.

It is wise to retain all usage modes for computers and telecommunications in every learning situation. Traditional drill and practice, tutorials, simulatorial, computer control, data logging, and other modes (Internet, electronic mail, FTP, Telnet, etc.) may all prove to be of great importance in education. “The most unlikely professor for this new gadgetry turned out to be the most creative in using it” (Bower, 1995). Furthermore, a mode worthless in other disciplines may be valuable in other areas.

We should also continue to develop ways of learning independent of computers. Some areas and some students may profit from other techniques. Many powerful learning tools exist. Reading is still important for many students. Video conferencing can be used interactively with computers as a very effective learning medium. Furthermore, in some areas nothing competes in learning effectiveness with the student’s experience in discovering and working problems.

The secret of success in education is not so much about teaching, but about putting the students in situations where they learn from each other, and by themselves. To penetrate the student’s mind, the knowledge must interest him/her.

For the students, surfing the Internet is not a game – it is serious, it is entertainment, it is learning. It is their way to face the world, to reproduce it in their own terms. Most of the things that we do in life have an aim but do not always make sense. For the students the game is completely the opposite, it may not have an aim but it gives a meaning to life.

The investigative telecommunication-based learning environment helps students gain a new sense of self-confidence. Students almost always end up building things that are different, but better than expected. This is particularly important for students who have never shown a strong interest in traditional school activities. Such an environment can help these students develop a new attitude about school in general.

The obedient nature of the machine, coupled with the non-threatening environment for making mistakes, benefits students because it leads them to study what happened, to understand what went wrong and, through understanding, to fix it. Many students are held back in their learning because they have a model of learning in which they have either ‘got it’ or ‘got it wrong’.

Neilsen (1989) sets out five criteria for the new learning environment that can summarise what this paper is about. These are:

- Easy to learn: the user can quickly get some work done with the system.
- Efficient to use: once the user has learnt the system, a high level of productivity is possible.
Easy to remember: the casual user is able to return to using the system after some period of not having used it, without having to learn everything again.

Few errors: users do not make many errors during the use of the system, or if they do make errors they can easily recover from them.

Pleasant to use: users are subjectively satisfied by using the system.

The environment provided by the World Wide Web, for example, satisfies these criteria to the extent that novice users such as non-computing students can quickly learn to use the tools, to allow them to develop projects which 'come alive' with the use of their imagination to prepare the presentation scenarios. As these students quickly become familiar with the use of the available tools, the tools themselves fade from the cognitive process, allowing the students to concentrate on the problem to solve, rather than the tool at hand.

Rethinking Your Teaching Approach

Your institution is rethinking its teaching approaches, or so it says. Is it the real thing or just the flavour of the month? Guess right, and your career could skyrocket. Guess wrong, and you could end up among the living dead. How to tell the difference?

The fundamental message of this paper is that technology changes more rapidly than predicted, but people change more slowly. Given new technology, teachers tend to do the same old thing they were doing before, just a little cheaper and faster. It will take teachers a long time to find new teaching applications using telecommunication technologies.

Rethinking our teaching approaches is not actually important because of what it is, but is important because of what it points to. I believe that rethinking represents only the first step on a ladder which will lead to a totally different kind of education, because first and foremost we are heading towards a totally different kind of education - an information rich education. The beginnings of such an educational environment are already with us, but many large institutions have been very slow to recognise it.

The profile of an information rich education system is not futuristic, it is already reality. If institutions can not accept that the national and global markets it operates in are developing in this way, then it would be better to forget all about rethinking the approaches and conduct the annual exercise of identifying cost cutting projects which destroy its infrastructure and the morale of its teaching staff even further (and remember an institution’s only real assets are its infrastructure and the skills of its people).

Rethinking teaching approaches is not an incremental change to current practices. Rethinking starts with an understanding of all the tools available and a clean sheet of paper; the design of an entirely new way of conducting the delivery of a particular course, subject, unit or module that
is important to your institution’s customers (students). Often, this exercise will result in more responsible teaching jobs and the people who participate in successful rethinking efforts have a much better shot at those teaching jobs, having helped to create them in the first place.

Telecommunication technologies are both an enabler of change and a constraint on change. Enablers come from the innovative uses in education, while inhibitors are the result of the presence of legacy teaching approaches. Rethinking the approach is concerned with uncovering technology, people, infrastructure and work related issues that need to be investigated and analysed with respect to management of teaching and learning. There should be no attempt in this task to resolve these issues, only to identify them.

Most of the tools that we use are mainly designed for commercial use. They do not fit our educational needs. The exercise of integration has often been the application of the educational strategy to the tool rather than planning for a tool to satisfy an educational objective.

Much software that is used in education is not designed with educational use in mind. Using telecommunication and Internet public domain software which is not designed with the education curriculum in mind requires the teacher to identify an appropriate focus and consider how the software could be used in the classroom. This may not be a simple task, given the need to consider subtle issues.

The selection of telecommunication tools for the classroom must be focused on the potential interaction of the tool with teachers and students. The selector often has to make an informed guess at likely realisable classroom tools. The ability to customise software to reflect varying content is important for incorporating material that is identified as being appropriate during selection.

Mediocre teachers with good tools and techniques will still develop mediocre systems, but good teachers, even when burdened with poor tools and techniques, can turn out damn good teaching and learning outcomes. This has been true in the past, and it will continue to be true for the foreseeable future. Better teaching tools may do nothing more than help you arrive at a disaster sooner than before.

Professional development and technical assistance often lag behind the adoption of advanced telecommunications tools. Even the most cleverly designed and implemented advanced techniques will not be used if teachers do not understand how to use them. Improving the ability of these teachers to interact with the students they serve depends upon their being trained and practiced to use the new techniques that are at their disposal. Failure to adequately train these teachers will obviate any improvements in services delivered using the telecommunication technologies.

Public organisations (universities and colleges) have sometimes valued adherence to procedures ahead of initiative and innovation, or been
constrained by legislation and policy beyond their control. The net result is an abundance of opportunities for improvement, but a culture which may make promotion of ideas difficult. Teachers’ goals might include ‘no involuntary redundancies’ or ‘same or greater decision making responsibility with regard to their teaching approach’. These goals need to be treated in the same way as productivity or education aims, as triggers for ideas, a guide to approaches and directions worth exploring, and a means of making a judgment on the best approach.

In some institutions, staff goals may be set so rigidly, perhaps through industrial agreements already in place, as to render rethinking processes impractical. It is better to find out and deal with it at the outset, than to spend money on infrastructure and designing approaches which have no chance of being implemented.

We would not dream of saying to a medical student, “Here, this device is a sphygmomenometer. We don’t know enough about it to tell you how to use it, or for what purpose it is best suited. Just use your own intuition and it will be of some help doing something.” Nor would we say, “We can’t give you any performance specifications. Just go out and use your intuition to cure the whole patient.” Yet this is exactly what we do with teachers. We give them very little technology training. We don’t give them the skills needed to use the world of media (telecommunications) to the best advantage. We don’t give them precise objectives, procedures or techniques (Deterline, 1965).

While there has been considerable interest in the rethinking of teaching approaches to increase efficiency and exploit new teaching opportunities, the most pressing need in many institutions is the redesign of the Information Technology infrastructure. The infrastructure is composed of all those components which are passive and do not perform an education function. Support and training services, computer networks administration, Internet service providers, and user interfaces belong to this category. The most serious mistakes in telecommunication technologies planning are under identification with components at this level. Components down at this level should be treated as important variables; it does not make sense to bet your teaching on something you have absolutely no control over.

Whether teachers’ adoption of telecommunication technologies should be viewed in the context of higher education as a growth market, or in the context of reduced employment for teaching staff has emerged as a lively topic. Will institutions have to reduce faculty size in order to finance telecommunications infrastructure investments, or can these investments be funded from the revenues associated with penetration of new markets, or, in the case of public institutions in Victoria, incremental appropriations from government?

While teachers tend by their nature to be generous with their time, I feel strongly especially in the current industrial climate, that an ongoing
training programm should not depend on good will; it needs to be provided by utilising and prioritising human and material resources, and not imposing an additional load on teachers who are already overloaded.

**Conclusion**

Telecommunication technologies are powerful teaching and learning tools. Hardware, software and connectivity are becoming cheaper and more powerful, and the quantity and quality of applications grows daily. The Internet is not only here to stay, but its connectivity is growing in numbers and its collection of shareware software and public databases is growing in cleverness and sophistication, invading progressively all human activities.

This implies a challenge to education. The contents of the whole of our education are based on the implicit assumption that the only things our students will have at their disposal to solve problems are a pencil, a sheet of paper, their brains and some books. This is becoming less and less true as a growing number of students will have at the tip of their fingers more and more sophisticated and clever software to help them in their research and problem-solving activities.

To connect universities, colleges and schools to the Internet is not an answer to the challenge except for service providers; to teach the use of the Internet is a solution, but not the solution of the right problem.

The real question is to know if we are going to stick to our pencil and paper method, eventually showing how they can be transported (as they are) to the new technologies or if we are going to introduce the teachers first to the powerful telecommunications tools which are already servicing each discipline and ask them to teach about the tools; how they work, their problems, their pitfalls, their advantages and drawbacks and then have the students use them with the corresponding and unavoidable changes in curricula contents.

The central question for a teacher has always been: how can this help my students? This is as it should be, and will not change as technology enters the classroom. However, although research on educational technology has consistently focused on how it may or may not benefit students, students are not on their own in colleges and schools. It may be time to rewrite the question and direct more research efforts to explore some answers for teachers. Helping teachers may, in fact, be the most important step to helping students. But we should not let the tree hide the forest; the real challenge of telecommunication technologies is not only much bigger than teaching or not teaching with the Internet, it is simply elsewhere.
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References


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