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TECHNOLOGY AND THE SOCIAL CONTEXT OF TEACHER EDUCATION

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Introduction

Following a report from the two Commonwealth education commissions (Report of the Joint Review of Teacher Education, 1986) teacher education in Australia is to undergo yet another national inquiry. It is to be hoped that any such inquiry will focus attention on the broad social context that inevitably influences the delivery of specific teacher education programs. The significance of social influences on teacher education was recognized, to some extent, in the Report of the Quality of Education Review Committee (1985):

(teachers must be able) to cater with greater confidence and competence for the educational needs of disadvantaged groups ... (paragraph 10.23).

An area of particular concern raised by the Report of the Joint Review of Teacher Education (1986) was the growth in technology which has deeply affected work and leisure activities.

Future students will clearly be influenced by this trend and the response of teachers and teacher educators will be crucial. The purpose of this paper, therefore, is to examine the impact of technology on social processes and assess their implication for teacher education.

Technology, of course, is by no means a new phenomenon - it has been around for as long as people themselves. This point was stressed recently by the Australian Education Council Task Force on Education and Technology (1985) in its report, *Education and Technology*. This report also provided a simple definition of technological change as *the invention of new products and processes, or new applications of older ones*. At the present time technology is exerting an impact that is forcing people to take notice of it as a significant part of the broader social context. The increasingly important role of technology has been highlighted in a number of recent reports. For example, a report prepared by the Department of Science and Industry, Commerce and Technology (1985) made the following point:

For many people, new (technologies) are a threat and present the spectre of an insecure future. Some see technology as unstoppable, inexorably generating new products and processes whose

development we cannot influence. Others feel overwhelmed by the sheer pace of technological change. They perceive technology in terms of job displacement, de-skilling and high rewards for a small number of privileged occupations. There is also a concern about the impact of new technologies on the physical environment, and their broader social and ethnical implications.

The report of the Australian Education Council Task Force on Education and Technology (1985), also highlighted the crucial role of technological change:

Technological change is a significant aspect of the major social and economic changes that are affecting all aspects of Australian life. Education is being challenged to respond to provide the confidence and skill needed to benefit from what new technologies offer, while at the same time developing the understanding and commitment to protect those aspects of our life style that are most valid. (page 2).

In the remainder of the paper the nature of this challenge will be explored and an assessment of the implications for teacher education will be made. In particular, predictions about the impact on the labour market will be examined.

Most economic commentators are agreed that unemployment will remain as the single most important feature of the Australian labour market as we head towards the year 2000. There is little consensus, however, regarding the impact that technology will have on unemployment. There is some evidence to suggest that the introduction of new technology into the workforce can lead to job loss yet this is not the main impact of technological change on unemployment. Rather, it has a more indirect impact when firms fail to introduce new technology, thus losing their competitive edge with a resulting loss of jobs (Departments of Science and Industry, Commerce and Technology, 1985). Either way, it seems, technological change has the potential to exacerbate the unemployment forecasts.

There is little agreement, however, as to whether this potential will be realised. It has been argued that while there will be a relative decline in the numbers employed in semi-skilled and unskilled white collar occupations as a result of technological change, there will be a consequent increase in highly skilled occupations associated with such change (Commonwealth Department of Education, 1984). This view is worth analysing for it suggests that labour market forces may well balance out on the unemployment issues with the main trend being changes in the pattern of demand for labour. Such a view suggests that future employment will require significantly up-graded skills to suit the requirements of a high-technology dominated economy. This is a view that has been seriously questioned by a number of researchers in the United States.

Based on 1978 figures provided by the US Bureau of Labour Statistics, a projection of employment patterns has been made until the year 1990 (Rumberger and Levin, 1983). The results have indicated that whereas there

will be significant job growth within high technology industries, the total number of jobs created will not be large compared with employment growth in other areas. Of the 20 occupations expected to generate the most jobs not one is related to high technology. Indeed, the five occupations expected to produce the most new jobs are in low skilled areas: janitors, nurses' aides, sales clerks, cashiers and waiters and waitresses. Some further examples help to underscore this point; while 200,000 new jobs will be created for computer systems analysts between 1978 and 1990, 600,000 new jobs will be created for janitors and sextons; while 150,000 new jobs will be created for computer programmers, 800,000 new jobs are expected for fast food workers and kitchen helpers.

Thus in the United States, employment growth will favour low and middle level occupations with high technology jobs being the preserve of a relatively small percentage of the population.

A further aspect to consider is the impact of high technology on existing jobs. The same report (Rumberger and Levin, 1983) is not optimistic. Rather than raising the required skill levels, it seems that the main impact of high technology will be to de-skill workers systematically and reduce their roles to that of machine-minders. The example is given of the new generation of office computers for which *no special skills* are needed. Such computers, it is argued, have taken over many of the tasks of secretaries and reduced the actual skills needed for office work. Word processors equipped with electronic dictionaries can correct typing errors so that letter perfect typing and strong spelling skills are no longer required.

To this scenario should also be added notions of constant job retraining since de-skilling in one area will clearly require significant proportions of the workforce to be retrained for other jobs. The notion of single life-long occupation may well disappear to be replaced by a series of jobs throughout a person's working life. People may move in and out of full-time employment to gain new skills to cope with new job requirements.

A final area to assess is the increasing use of information technology in all aspects of life. It has been estimated that in 1950 only 17% of the workforce in North America worked in information related jobs. Today, more than 60% of the workforce is involved in information processing and work as teachers, clerks, managers, lawyers, secretaries, stock-brokers, and consultants (Moynes, 1984). The information society has clearly arrived, so that today scientific and technical data doubles every five years and by 1990 will double every 20 months (Moynes, 1984). Seymour Paper in his book *Mindstorms* has predicted that by 1990, every student will have his or her own computer. Word Processors are now very much part of any modern office environment with all their attendant occupational health problems. Videotext makes the latest news available instantaneously and information co-operatives such as The Australian Bibliographic Network provide instant access to library held material across the country. Advances in technology

have allowed us to store, retrieve and manipulate information in ways that were previously unimaginable. The educational question is how to prepare massive amounts of information. It is one thing to know how to access information; it is quite another to know how that information can be best used.

In summary, then, it seems that technology can impact on the labour market in four broad areas:

1. Technological change will exert an impact on unemployment, especially in those firms that do not easily adapt to technological innovation.
2. High technology will not be a significant generator of jobs in an absolute sense.
3. For those already in employment, there is the possibility that technology will de-skill workers and lead to the need for retraining on a recurrent basis.
4. Information technology will exert an increasingly important influence on people's lives.

Those who will be most affected by these trends are young people. This is particularly highlighted when the incidence of youth unemployment is examined.

The current unemployment rate for 15-19 year olds is about 25 percent. In the mid 1960s, 70% of those aged 17 had full time jobs. The proportion is now 45%. Karmel (1984) has predicted that this trend is very likely to continue. Unemployment, of course, is not confined to young people yet it is perhaps a particularly poignant and devastating condition to confront them. It means they simply do not get to experience what for most people was a crucial transition from school to work that traditionally has acted as society's rite of passage from childhood to adulthood. In the future many young people when they come to the end of formal education will be faced with an uncertain and ambiguous future.

The implications of continuing youth unemployment for society as a whole are staggering. Young people themselves will clearly become disaffected and disengaged from the usual social processes. New ways will have to be found to involve young people in society. Prevented from contributing economically, they will need to be shown how they can best participate as members of society and identify with its goals.

The spectre of high levels of youth unemployment has obvious implications for schools. In the period from 1972-1983 the retention rates of students in years ten to twelve have increased considerably. In year ten, the rate has increased from 83% to 94%, in year eleven, from 48% to 64%; and in year twelve, from 32% to 41% (Quality of Education Review Committee, 1985). There is considerable evidence that retention rates will continue to increase, especially in light of the government's stated policy intentions to achieve a national participation rate for the senior secondary school of 65%.

The important point to keep in mind about the projected increase in school retention rates is the changed nature of senior secondary school populations. Traditionally, students in Years 11 and 12 have set their sights on tertiary education and the curriculum of these years has been very much oriented towards the tertiary bound student. The curriculum is very often shaped by the demands of external exams or school based assessment with high degrees of state-controlled moderation. Yet it seems clear that as the senior secondary school population expands, so too should the kind of curriculum that is being offered. For the many students who will not be heading towards a tertiary institution, there needs to be a curriculum that will be robust enough to provide them with a smooth transition from school to appropriate post-school activities.

Even for those who do find work, traditional patterns of working life are in a state of flux. Karmel (1984) has made the point that there has been a consistent trend for some time now towards a shortening of working lives. Despite the fact that there has been increased participation of women in the workforce in recent years, the tendency for later entry and early retirement seems equally applicable to men and women. Added to these phenomena are such things as fewer working weeks on account of more recreation leave, public holidays, long service leave, maternity leave, paternity leave and fewer hours in the working week.

At the same time, there is now a greater life expectancy and all of these contribute to less and less time spent at work. Karmel (1984) has estimated that people today are likely to spend one-third less time in paid employment than their counterparts at the beginning of the century and this trend will continue. The issue that emerges from this in an educational sense has to do with what will fill the vacuum caused by less time devoted to paid employment? How will people be prepared to face this situation?

What are the implications of all this for teacher education? There would seem to be two broad implications:

1. The curriculum offerings of schools will change and thus teachers will need to be prepared to cope with these changes.
2. In particular, increased access to senior secondary schooling will mean that teachers will need to become more aware of the needs of senior students.

Each of these points can be dealt with in turn:

1. For what kind of curriculum do we need to prepare teachers?

In answering this question it has to be admitted that not a great deal is really known about the effectiveness of technology on the teaching learning process. It is known, however, that in the past the impact of technological innovation has been misjudged. For example, educational television was hailed as the great

saviour of our schools and yet its impact was minimal. It plays a marginal role today, largely as an adjunct to fairly traditional teaching methods and at times as a replacement for any kind of teaching at all. The ubiquitous overhead projector is another example of misplaced faith in technology. They are seen everywhere and when they are used they are used badly and act as substitutes for what used to be decent chalkboard writing. Most recently, of course, there has been the personal computer and to judge by some commentators it seems that yet another educational revolution is in the making.

Yet in curriculum terms, computers are important not because they can solve the world's problems but because they provide another way of problem solving. Computers can be used across the curriculum to provide data bases, simulation exercises, drill and practice exercises, process writing experiences and a whole range of other interactive activities. Yet the important thing to realise is that all of these are only a small part of the total range of teaching/learning activities that are possible in the classroom. Nothing will ever replace human interaction in the classroom as the main way in which students learn. Computers can certainly assist the learning process, but they cannot become a substitute for it.

Computers in schools also serve another function. They indicate that the school is not totally divorced from society. The clear task of the school is to take those things which society has to offer and use them for the benefit of the school. Thus computers clearly have a place in schools but it should not be a dominating place. They should serve the needs of the school, its teachers and its students. In particular, where schools have computers all students should have access to them as part of the school's curriculum offering.

There are a number of anecdotal tales about schools where computers are perceived by the boys in the school to belong to them and these anecdotes have been confirmed recently by empirical studies of computer use in schools (Groundwater-Smith and Sinclair, 1985). All students should be encouraged to use computers and ensure that they do not become the preserve of a few, especially if that few happens to be the boys in the school.

It does seem clear, however, that computer skills should not be seen as being essential ones for future employment. While a number of jobs will demand high level programming skills, this will not be the case for all students. Indeed, there may be a case for not having any computer science courses in the school curriculum at all since very few students will ever need to write computer programs and those that do will be trained as part of their vocational preparation. Computing in schools would be better to concentrate on the application of computers to problem solving situations as they are found across the curriculum rather than by setting up highly specialised computer courses. High degrees of specialisation in any area of the curriculum are questionable, given the employment prospects of most students.

Technology, of course, involves much more than computers and our curricula should clearly demonstrate this. While computers dominate the field of

information technology, some awareness is also necessary of the field of optoelectronics and fibre-optics technology as well as microwave technology with its implications for satellite communications. Then there is the whole field of biotechnology including advances in bioengineering. Another area has to do with advanced industrial materials where many new materials are in the process of replacing more traditional ones. Space technology is also taking on some importance for Australians with the launching of AUSSAT (Commonwealth Department of Education, 1984). Without going into details relating to these particular technologies, it does seem clear that school curricula will have to take notice of new technologies so that students can learn about them and be able to assess their importance. It is not so much that these technologies are the ones to provide the best employment prospects; rather they will provide the context in which our students will be living as adults and thus they need to be familiar with them and critical of them.

One point which ought to be clear from this discussion is that the curriculum ought not to be overly vocational. Technology will not be providing highly specialised jobs and it is likely that many of our students will be finding jobs in low skill areas. Appropriate curricula will be those that prepare students in a general way for a life that may involve not one fixed job but several over a lifetime. Students will need to be critical of trends in society that threaten to reduce their status to that of machine minders. They will need to be aware of the past so that they can better understand the present and the future. They will need to be able to contribute to the future in a meaningful way, whether they are in paid employment or not. General education would seem to be the best means of providing for students both in the present and for the future.

The crucial question for teacher education is how to prepare teachers to cope with these changes. Clearly it is a question of closely examining both preservice and inservice teacher education to assess the extent to which programs are capable of preparing flexible and innovative teachers who can transform the existing curriculum of schools. This is a very demanding task and means more than making cosmetic changes to existing curricula. It also goes way beyond ensuring that teachers have keyboard skills or are computer literate. Of course they should be, but they should have much more as well. They should have the capacity to assess new technologies and their implications for teaching and learning. They need to be taught to look beyond the classroom to assess the implications of technology for the world at large and these assessments should become part of the curriculum. Teachers themselves need to have a broadly based education in the humanities or sciences or both so that they approach the problem-solving task with an adequate data base.

The production of such teachers may involve a reconceptualisation of existing programs. While practical skills are of course the 'sine qua non' of teaching, so too are intellectual skills. Teachers must be able to think beyond the here and now to the future so they can prepare the best programs for their students.

A general education for all students means a liberal education for all teachers. Without such an education teachers will remain purely reactive rather than being capable of actively charting a future for their students.

2. How can teacher education best help teachers cater for senior secondary students?

Most schools would argue that entry to Years 11 and 12 is open to all members of the school who have the necessary prerequisites. Yet is this the case? Is the senior curriculum structured in such a way that only certain students really have the opportunity to proceed? On the whole, are the favoured students those that are proceeding towards tertiary education? If this is the case, how should schools respond to the increasing numbers of students who are staying on for Years 11 and 12 but who will clearly not end up in a university or a college of advanced education?

It should be realised that the current demand for senior secondary placements is a product of the social and economic forces that have been discussed so far. Students are choosing to stay at school because there are not jobs for them and, subject to the successful implementation of the government's traineeship scheme, this situation is likely to remain. Since this is the case, thought must be given to the ways that can best cater for all students who are demanding additional schooling. While the preparation of some students for tertiary entrance clearly has to continue, careful thought must also be given to the education of those students whose destinations are different.

This issue is being dealt with on a number of levels by state education systems. In Western Australia, for example, students are assessed for tertiary entrance on the basis of performance in three subjects only. This allows for study in much broader areas where both tertiary bound and non-tertiary bound students can take approved courses together. In other states, the requirements of tertiary entrance are much tighter and different solutions need to be found. In the next few years, however, there are likely to be significant changes in states like Queensland and Victoria so that all courses taken can at least count for the final certificate if not for tertiary entrance. Independent schools are also subject to certification requirements in the different States. Yet it is clear that the national trend is towards allowing schools more freedom in planning courses for senior secondary students.

Yet how might teachers be prepared for a senior school curriculum that is not dominated by tertiary entrance requirements? Teachers have generally felt comfortable with such an approach since they themselves have been the product of it. Increasingly, however, they will be confronted with a school population that will find an academic curriculum both irrelevant and meaningless.

In the first place, the preservice training of secondary teachers will need to be reviewed. While there will clearly remain a need for academic specialists there will also be a need for generalists. This may mean that science teachers

will have to become aware of the science of everyday living rather than the science of scientists so that students can see the relevance of science. English teachers may need to become aware of popular culture so that they can assist their students' critiques and analyses of it. All teachers will need to be aware of essential life skills that students will need to cope with the technological society. Our present academically oriented training courses are in no position to provide teachers with such skills.

What Kind of Teacher Education Program is Needed?

A number of principles can be outlined:

1. Education needs to be broad rather than narrow. It should be placed firmly in the Australian context.
2. Some elements of specialisation need to be retained in either the humanities or the sciences.
3. There needs to be a strong professional component in the education of teachers.
4. Intellectual as well as practical skills need to be stressed.
5. Teachers must be seen as problem solvers who can adapt and change in new contexts and situations.

These principles need to be embedded in a model that recognises the importance of both liberal studies as well as professional studies. This may mean a 3 + 2 + e + model in which three years are spent in a liberal studies program and two years in a professional program with awards similar to a BA/BSc and a BEd. A period of years teaching plus an additional year of study would lead to the award of a master's degree. In this way the benefits of a liberal education plus a concerted period of time in professional preparation could be guaranteed with the expectation of further study recognized.

There are of course a number of barriers to such an approach, not the least of which is financial. Teacher educators would have to convince policy makers that the product of such a program would be capable of making a real difference in the nation's schools. There would have to be benefits that could be counted in real terms. For this reason, a 3 + 2 + e + 1 model would need to be trialled and evaluated before it could be fully implemented. This in itself would be a unique achievement since in the past teacher education has adopted operational modes largely for pragmatic reasons rather than on the basis of what has been tested in practice. It also would provide the opportunity to evaluate existing practices.

Conclusion

Clearly technology will be exerting considerable impact in the future although it is not possible to be exact about cause and effect. There is a relationship between technology and unemployment but it is not always a direct one.

Nevertheless, structural unemployment will be a part of the broader social context in the years to come. Technology will certainly influence the workplace of the future but not all workers will be involved with complex pieces of technology in their day to day work. The nature of working lives themselves are likely to undergo change, with periods of retraining being quite natural. Amidst all of this, students are likely to be staying on at school longer, and much thought needs to be given to the kinds of curriculum they should be offered. Teachers in the 1990's must be capable of responding to these social processes if their students are to be prepared adequately. Current practices in teacher education must be examined to assess the extent to which they are capable of preparing flexible and innovative teachers who can respond to rapid societal changes. This may mean moving beyond a view that sees it as an intellectual activity as well. Above all teachers must be prepared to analyse new contexts, plan relevant programs and implement meaningful activities. Needs may change from year to year and teachers must be prepared to change as well.

The concept of an initial period of preparation in a subject specialisation may be no longer viable for secondary teachers. Broad-band specialisation may be a more appropriate way to provide teachers with a range of skills and an ability to move into areas where they have not received special training.

It is up to teacher educators to ensure that the programs they provide are capable of producing teachers who can cope with the social processes that will influence students in the future. This may mean drastic revision and rethinking of existing programs. Yet it is important to keep in mind that any such changes will reflect not merely personal views but rather national needs. It is thus in the interests of all Australians that teacher educators review their programs to ensure that they are capable of producing teachers who can contribute to the future in a meaningful and relevant way.

References

- Australian Education Council Task Force on Education and Technology. (1985), *Education and Technology*, Australian Education Council, Melbourne.
- Commonwealth Department of Education. (1984), *The Environment for Education to the Year 1990 and 2000*. Unpublished paper prepared for the Australian Education Council Task Force on Science and Technology.
- Departments of Science and Industry, Technology and Commerce. (1985), *National Technology Strategy*. Revised discussion draft.
- Groundwater-Smith, S. and Sinclair, K. (1985), 'Is that all you're doing?' A case study of girls and computers in education. Paper presented at the Annual Conference of the Australian Association for Research in Education, Hobart, November.
- Karmel, P. (1984), 'Education and training for work and living', *The Australian Journal of Education*, 28(2), 191-192.
- Rumberger, R. and Levin, H. (1983), *The Educational Implications of High Technology*, Project Report 83-84, Institute of Finance and Governance, School of Education, Strandford University.
- Moynes, R. (1984), 'Metatrends and education's future', *Education Canada*, 24(3), 5-7.
- Quality of Education Review Committee. (1985), *Quality of Education in Australia*, Report of the Review Committee, Australian Government Printing Service, Canberra.
- Report of the Joint Review of Teacher Education*, (1986), Commonwealth Schools Commission, Canberra.