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ABSTRACT

Education and, in particular teacher education, has been criticized for a lack of relevance to the needs of industry and the work place. These criticisms originated in the political and economic context of recession and a changing role for Australia in the global marketplace. Schools have responded to the criticisms in a number of ways, but teacher education has been slow to respond. This paper explores the relationship between teacher education, schools, and industry, the context of the criticism of the education sector, responses and proposals which have been made public, and alternative proposals. Some ideas about how teacher education might articulate and engage with industry and business and how the needs of teachers might be met by teacher educators are critically examined. Some of these ideas are: (1) requiring teacher educators to spend regular periods as teachers every few years to improve the relevance of their experience; (2) developing students' knowledge of particular aspects of regional businesses and industries; and (3) redefining the work and role of teacher educators. The view that teacher educators need to be in touch with contemporary educational policies is supported, but the criticisms and remedies proposed are not viewed as entirely valid or appropriate. (LL)

TEACHER EDUCATION, SCHOOLS AND INDUSTRY LINKS

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Abstract

This paper explores the relationships between teacher education, schools, and industry. Education, and in particular, teacher education, has been criticised for a lack of relevance to the needs of industry and the work place. Teacher education has been accused of lacking relevance to the needs of schools. These criticisms have had their origins in the political and economic contexts of recession and a changing role for Australia in the global marketplace. Schools have responded to the criticisms in a number of ways, but teacher education has been slow to respond. A proposal has been made that teacher educators should be required to spend regular periods as teachers every few years, to improve the relevance of their experience. This notion is examined critically. Alternative proposals to develop closer connections between teacher education and schools as well as industries and business are also examined. For instance, redefining the work and role of teachers educators requires some attention. Further, some subjects in teacher education programs could well develop students' knowledge of particular aspects of regional businesses and industries. In this paper, we therefore examine the context of the criticisms of the education sector, explore the responses and proposals which have been made public, and look at some alternatives.

Introduction

In recent years all levels of the education sector have been the subject of considerable criticism and subject to many reviews. The criticisms have largely centred on the role and quality of educational provisions in contemporary Australia, and have ranged from problems of adult illiteracy through workplace training to preparation for university. There is a perception among some in the community that schooling has lost much relevance to the world of business and industry, and so has become the object of micro-economic reform. At the higher education level, universities in general and teacher education in particular have been the focus of considerable criticism as well. If schools are not seen to be performing their appointed task in economic reform, the fault must lie, the logic goes, in the preparation of teachers. Aspects of teacher education that emphasise links to industry and therefore the economy are valued, and those that do not are devalued. Hence we see the recent trends in universities where studies of discipline knowledge are given greater emphasis in courses because of their apparent link to the world of industry, while studies of curriculum, pedagogy, teaching and education are integrated into the remaining elements of these programs. Teacher educators can choose to ignore such pressures and merely react to the actions of education policy makers - and these are largely business leaders, politicians, unionists and university administrators - or they can choose to be proactive in changing programs to articulate with and better engage the world of industry and business. Teacher educators need to consider the possibility that there is need to change the way we do things. It just may be that perhaps we can better prepare teachers for the world of teaching (in its widest sense) than we are doing at present. We therefore explore the background to this scenario, some ideas about how teacher education might articulate and engage with industry and business, and how the needs of teachers might be met by teacher educators

The Political and Economic Context

For over a decade or more Australia's Federal Governments have been increasing demands that the education sector articulate more closely with the needs of industry. The pressure to do so, and the basis for legitimising Federal intervention in this sector, is based on concerns relating to structural unemployment, the impact of changing technologies on the workplace, the crisis in capital associated with economic recession, and Australia's repositioning in the changing global economic structures. Beginning in the late 1970s, Australian society has had to face up to a series of overlapping and interrelated crises, of which structural youth unemployment is among the most important. At the time schools were not well equipped to prepare students with the skills and understandings said to be relevant to employment, or to reduce or limit the effects of unemployment on school leavers, or to change the curriculum to meet the needs of the increasing number of teenagers 'choosing' to remain at school. In November 1979 the Fraser Liberal Government announced the establishment of the Transition Education Program which was intended to meet these challenges (Kemmis and others, 1983). Similarly, in August 1983, the Hawke Labor Government announced the creation of the Participation and Equity Program to address these same said challenges, albeit in a different way (Rizvi and Kemmis, 1987). Both of the Federal Government programs focused on increasing school retention rates for those in the post-compulsory years of schooling as well as efforts to make the curriculum relevant and useful for those forced to stay at school due to the economic recession.

Government, business and union efforts to restructure the Australian economy have also focused on redefining and reconstituting the relationship between all levels of the education sector, with the economic rationalist agenda driving these micro-economic reforms (Pusey, 1991). Over the last five to ten years there have been increasingly earnest efforts to bind the education sector to national economic priorities. In universities the focus has been on articulating research and teaching with these economic interests;

likewise technical and further education are being linked even more closely to industrial training needs; similarly there is an on-going national effort to change schools to meet these economic needs. The Finn, Mayer and Carmichael reports are key illustrative texts informing these developments. It should be noted that efforts to constitute such relationships between education and the economy have a long history (Bessant, 1988). Economic concerns have always played a major role in shaping the curriculum, pedagogies and modes of assessment employed in the education sector.

The economic concerns which have frustrated Australian society for more than a decade have produced a situation in which economic issues are increasingly emphasised in the education sector. Ironically, these initiatives are not regarded as challenging any of the cultural and social functions served by educational institutions. Even government intervention programs such as the Transition Program and the Participation and Equity Program are caught up in contradictory tendencies as they seek to link education to the economy, as well as creating an inclusive curriculum. Part of the problem may be that the economic, cultural and social functions of schooling are mistakenly regarded as being autonomous, distinct areas of endeavour, rather than interdependent functions of all forms of education. In recent years, the calls for work education (of various types) in schools, although failing to recognise this has always been an important part of education, have given rise to a range of initiatives in schools. The possibilities and opportunities raised by these developments need further serious consideration in teacher education.

Criticisms of the Education Sector

We now examine some of the key criticisms that have been levelled against all sectors of education regarding the supposedly poor or non-existent articulation between the education sector and industry and the world of work.

Criticisms of schools

The economic recession has legitimised the press to more directly link schools to economic interests. Certain business people and industrialists value general education as a more appropriate preparation for work than technical, narrowly oriented forms of vocational training. There are others who now have the major influence on education policy making and want schools to provide job-related training that meets their specific needs. The "new vocationalism" (Bates and others, 1984) not only seeks to link schooling to the preparation of workers for given jobs, but is also concerned to prepare students for a life in which issues about economic production and consumption dominate. In this context, then, social and cultural issues such as language and cultural studies other than English and social justice are only of consideration in so far as they can be directed towards economic interests. For example, in Queensland the teaching of community languages like Vietnamese may be regarded as less crucial than the teaching of languages like Japanese given their economic importance within a neo-colonialist framework. The government and industry have expressed concerns that schooling, especially at the post-compulsory level, is "too academic" and needs to changed to better prepare students for work (although industry does not assure schools, teachers, students or parents that it will have the jobs even if these changes are made). It is important to note that in this context teachers have been criticised for being ignorant of the world of industrial work and in need of such experience in industry.

Criticism of teacher education

Criticism of teacher education has been two fold (Cusworth and Whiting, 1993). First, teacher education programs are seen to lack relevance to both schooling and industry. Second, teacher educators are seen as a group of aging people out of contact with schools.

By and large people who become teacher educators have training and experience as preschool, primary or secondary teachers. The assumption is that this background and experience in classroom teaching is of unquestionable relevance and ensures the credibility of those working in Education Faculties in contemporary universities. Now despite most teacher educators having this background and experience, there are regular attacks on teacher education programs for lacking credibility and being irrelevant. The basis for these attacks include allegations that teacher educators do not keep up-to-date with the changing work of school education; because teacher educators are said to lack an understanding of the educational needs of contemporary school students, and because teacher educators are not familiar with current directions in school education. Newspapers sometimes report that teacher educators are 'out of touch' with school education because their experience is now obsolete, and dismiss them (us) for delivering student teachers irrelevant knowledge founded on ignorance. Students are reputedly critical of the content of lectures because they are not based on up-to-date theoretical, policy and experiential knowledge, and because they do not demonstrate an awareness of current challenges and developments in school education. Moreover, students also criticise lectures for being boring, superficial and incoherent presentations, as well as criticising teacher educators for the gap between what they espouse and what they actually practice. Here the complaint is about the deficiencies of teacher educators as university teachers. At the policy level these critiques have led to the enactment of "school experience programs for teacher educators" in England and Wales (Gilroy, 1992), and proposals for their implementation in Australia (DEET, 1992).

Student teachers are rightly critical of teacher educators who are obviously out of touch with professional practice in schools, and such obsolescence is evident in teacher educators' lack of awareness and understanding of contemporary school culture. Following developments in England, there have been the usual proposals to force teacher educators to spend X months out of every Y years in schools, ostensibly to ensure they have recent experience of life in classrooms (Turney and Wright, 1990). In other words, this amounts to a proposal for fieldwork or teaching practice to be extended to teacher educators, albeit with significant structural and operational differences.

Possible solutions

Here we consider some possible responses that the education sector is addressing, as well as proposing some alternatives.

The response of schools

It is not the intent of this paper to discuss this area in depth, but to very briefly indicate general trends. There have been two main responses from schools to the criticisms levelled against them. A wide range of non-academic subjects are being offered by high schools, including some TAFE courses. There are also programs to give teachers experience at working in industry.

With increasing retention rates subject provision at the post-compulsory level in schools have increased and diversified over the past ten years. To increase the articulation between schools and the world of paid work, many high schools in Queensland have begun to incorporate one or more TAFE units within their subject offerings, and in some instances students receive a TAFE certificate on successful completion (Driscoll, 1993). This also involves the accreditation of high school teachers to teach various TAFE courses within schools, and school-based cooperative programs involving the accreditation of TAFE subjects. These provisions have been made to give students a variety of 'pathways' on leaving school. The major areas of resource investment for the development of these initiatives seem to be manual arts, home economic, art, computing, and rural/horticultural studies. Driscoll (1993, p. 611) also reported that while some schools raised concerns that "Mayer might lead to dominance of vocational over general/liberal education", most seemed to be accommodating the 'key work-related

competencies' (as once known) in areas such as commercial studies. There are also concerns about the comparability of TAFE units and school subjects, given that they are not moderated between TAFE colleges, so that the standard of results obtained from different colleges (both private and public) varies substantially.

In the recent Wiltshire (1994) Review there is a strong recommendation for the establishment of local consortia which would see schools directly involved with industry. There are many examples of just such an initiative around Queensland, with particular schools forging specific links with business and industry. However, such efforts to link business and the education sector are not always unproblematic. For instance, although the business sector has been prepared to make public criticisms of education, it has not demonstrated the same preparedness to either find out what is going on in school education or to contribute directly to policy making in certain forums. It has to be noted that the business sector will not send representatives to such policy forums. For instance, in 1992 the Board of Senior Secondary School Studies conducted a symposium to which twenty-two industry representatives were invited, all expenses to be paid by the Board; not one came even after being given several reminders. This may be because the business sector regards education policy-making as a low priority relative to their workplace requirements; or because they recognise that such policy making requires a considerable amount of time, especially given the need to develop expertise in the area; or because they do not think they can change schools.

At one Queensland State High School students work with company "executives to solve a range of hypothetical problems", the aim being "to encourage students to become more aware of methods of problem-solving and learning within a business environment" (Bancroft, 1993, p.7). As part of this initiative students "dress appropriately for business, work business hours and are encouraged to show initiative and to think for themselves while still working together as part of a team". However, the "benefits are not one way" with the company using keyboard classes for executives, English classes for their employees, and the schools design and technology centre as well as "providing secretarial work for commerce students" (Bancroft, 1993, p.7). Teachers can also enhance their own skills through the school's Teacher Placement in Industry Program (Bancroft, 1993, p.7). Efforts to expand school-industry links in Queensland also include Grants to Schools of $1,000 being made by a British petroleum company to enhance student learning. This initiative arose from the company's "commitment and interest in improving the quality of education for Queensland students" (Education Views, 1993, p.3). The intention of the project is to enable the company "to develop closer, sustained links with schools, particularly in the areas where we operate". Students at only 17 Queensland schools, out of 215 applications, were awarded (tax deductible?) grants, thereby making possible improved 'quality education' in these few schools.

- The response of teacher education

As mentioned earlier, sending teacher educators back to school has been suggested as a means of improving relevancy of teacher education programs. Here we consider just how realistic this proposal is in light of a number of key structural problems.

There are a number of problems with this proposal, in addition to basic industrial difficulties and concerns, only several of which can be canvassed here. First, the proposal that teacher educators should return to the classroom to regularly update their experiential knowledge is based on the assumptions that schools are changing fast and that teacher educators are out of touch with school education. Elliott (1980), after having taught in schools in the early 1960s, found that schooling has not changed significantly and that he easily slipped back into the working life of a classroom teacher on his return to classroom teaching in the late 1970s. Elliot observed that there are considerable inflated expectations, in part arising from changes in government policies as much as from developments in the research and theoretical literature as well as published accounts by highly successful teachers, that would lead us to think that there have been massive,

widespread changes in schools. Elliot's "return to the chalkface" led him to conclude that this is not the case.

Hatton (1994: 20-21) has also detected two major problems with the proposal. First, there is a concern that the emphasis on classroom experience for teacher educators, may be to "bolster the tendency of teacher educators to use experience as the only plausible base for understanding and shaping teacher education." The consequences of this are such that taken-for-granted knowledge based exclusively on experience may deny the power of theoretical and empirical knowledge for informing the work of teachers, especially given the prevailing "tendency of teacher educators to favour experience over theory or research knowledge" (Hatton, 1994: 21). It is also important to recognise the political dimension to the argument that lecturers are out of touch with what is "really" being taught in schools. For instance, teacher educators who present lectures on redressing social injustice in and through schools, through such initiatives as anti-sexist education, may be told they are "out of touch" with the "real" situation in schools, both in recognition that schools are not engaging with feminist perspectives on Australian history, for instance, and as a strategy for forcing these issues off the agenda in Education Faculties.

As for her second point, Hatton (1994: 22) states that teacher educators "are likely to feel that the scheme does nothing to assist them in their present work and, in fact, is getting in the way of the research they need to do to improve their teaching." Many teacher educators are working hard to expand and upgrade the quality of their research and scholarly writing by strengthening its rigour and ensuring it has sound theoretical underpinnings, as part of their contribution to the teaching profession and education. Perhaps, more importantly, a universal prescription of work experience for all teacher educators is insensitive to both the fact that teacher educators perform different roles given their particular areas of specialisation, and the considerable contribution already made by a significant number of teacher educators to policy making and classroom practice.

We would also like to add two other problems with the proposal. Consider the following example: schools are currently being pressed into integrating, mainstreaming and including children with disabilities into their regular classroom operations. However, teachers are struggling to know what to do with these children. The Wiltshire report for instance, states:

> the Panel is of the opinion that many teachers in regular schools do not possess the requisite knowledge and skills to be able to deal adequately with these students [ie. students with learning difficulties and disabilities] in their classes. ... The Panel believes that teachers in regular classrooms need specialist training themselves or adequate specialist support in responding to students with either (i) specific learning difficulties which prevent them from succeeding to their potential in particular curriculum tasks or areas, or (ii) 'impairments' of intellect, vision, hearing, speech, and motor coordination (Wiltshire, 1994: 164).

So teacher educators working in this area, let alone student teachers who now have to be prepared to teach in 'inclusive classrooms', are unlikely to learn much about how school might make them better at what they do, namely teach about the integration of children with learning difficulties and disabilities. On the contrary, we would argue that it is the responsibility of teacher educators working in this field to help the profession address the issues of 'inclusive education', and to do so in a way which not only provides teachers with "coping strategies" of one kind or another, but also provides an informed and critical analysis of this universal approach to handle the educational needs of students with learning difficulties and disabilities. To do this we suggest that there is a need to consider the economic agenda driving this 'reform', as well as a rigorous critique of the way in which a selected reading of social justice has been appropriated to legitimise it. However,

their participation in the analysis of policy documents, consultancies, empirical research, scholarship and travel may provide them with the resources to address the very issues that teachers are struggling with but apparently do not have the knowledge to deal with adequately.

The second problem we see with this proposal arises from the context of the current movement to establish 'recognition of prior learning'. The proposal for school experience for teacher educators does not give teacher educators, most of whom come from the ranks of teachers, any significant cultural valuation for that experience, or for experience that is similar or related to that experience. This includes, for example, experience such as research, consultancy, policy development and analysis. However, at the same time as this is being denied to teacher educators, Education Faculties are being pressed to do so, as suggested by the recent AVCC survey of credit transfer in teacher education.

The value of the practicum

Some students describe their practice experience as an opportunity to try out new ideas, which begs the question of where they got these ideas, and did their teacher education program contribute in any way? But given the importance attached to the practicum in the education of student teachers, it would be interesting to explore the question of how teacher educators' own preservice practicum is being used to inform their current work. This would seem to be an appropriate means for testing the argument that such experience has intrinsic merits. One such teacher educator recalls that as a former student teacher, practice teaching was seen as a game for which she had to learn the rules so she could play the game well (Hatton, 1994: 25). The skills required to play the game involved being perceptive, and in particular knowing that schools and classrooms have a culture, and being able to read the culture of the school and classroom, which meant finding out the formal and informal rules and expectations. (One suspects, sociology of school and culture may enhance students' observational power in this context). Given the competitive assessment applied to fieldwork she also learnt that you had to keep knowledge of such rules to oneself, as well as practising them in order to win the game.

The first rule of the game covers the selection of school (eg. what schools are available? what happened on 'prac' in that school in the previous semester/s? what lecturers take what schools? ask other students about the lecturers, their biases and whether they are worthwhile?). Second, there is the submission of one's preference for a particular school, which involves giving credence to your preference to enhance your chance of getting it. Third, the student then arranges the initial visit to the school in the week before the 'prac', by first making an appointment to make arrangements. The student appears at the school wearing the "right" clothes so as to make a good first impression, and then "susses" out the teacher and her/his bias, because the student will disregard any preferences she/he might have during the prac. Finally, working in the school calls for "role playing" during the prac by doing your lessons according to what the teacher wants, doing all the "right" things, being on time or earlier, wearing the "right" clothes, and using the "right" language. This teacher educator uses this understanding of her practicum experience to teach "her students strategic compliance by cautioning them to withhold any reservations they have about the teaching situation and the student-supervisor relationship in the interest of surviving and maximising the chances of gaining good marks in their practica" (Hatton, 1994: 25). However, the issue for teacher educators in such circumstances is how to get beyond just helping students cope with the culture of schools, so as to provide students with a conception and the opportunity to practice things that take them beyond the status quo. Certainly, student teachers need to know that 'strategic compliance' is not the only strategy available to them.

One alternative

An alternative means of renewing teacher educators' knowledge of school education is through the involvement of teacher educators in such activities as research in school education, the provision of staff development and curriculum consultancies or the supervision of field experience and internships (Hatton, 1994: 31-32). There are several dimensions to this response. First, teacher educators can reject the view that they should aspire to be imitators of classroom teachers as a limited view of their role. Likewise, it needs to be recognised that such a response is inevitably self-defeating; they can never adequately fulfil such a role, given that it is not their full-time work. Further, teacher educators need to move beyond being simply reproducers of the research and scholarly knowledge produced by others. They need to take on the identity and role of university academics capable of producing knowledge which makes a useful contribution to the issues, concerns and problems facing the teaching profession (broadly defined) and education generally.

This involves undertaking on-going scholarly work which is subjected to peer review and published as a contribution to important debates within the profession and the field of education. In this way the ideas that teacher educators are presenting to their students in lecture halls are available for public scrutiny and accounting by colleagues who are able to judge the merits of their knowledge claims. Such scholarly work may involve teacher educators undertaking research in schools with principals, teachers or parents, and using rigorous research methods and leading edge theories from various disciplines to enhance the understanding of policy makers and teachers about what is going on in different educational settings. In this way, as Hatton (1994: 32) correctly observes,

> teacher educators' knowledge and experience can only become obsolete at the point where the teacher educators cease to do their work: that is, at retirement. ... part of the reason for student teachers' disenchantment with teacher education is their perception that teacher educators are ill acquainted with current research.

Hatton (1994: 32) goes on to argue that teacher educators

> who were active and vital researchers would at least have the potential to find new ways to engage both their preservice and inservice clientele in educational issues - specifically in ways which would allow them to demonstrate very clearly their scholarship, knowledge and understanding of the education system, the schools, the curriculum, the pupils and teachers and the social context in which they are all embedded. The very act of research should function as a source of renewal for many teacher educators.

We would also like to raise the possibility of a second alternative.

Another alternative

Based on the foregoing, it is argued in this section that teacher education needs to see itself as having a role to play in supporting business and industry in workplace training and professional development, in order to support their efforts to achieve international economic competitiveness. Given that education and training are essential to these industries achieving higher levels of competitive advantage, teacher education needs to support the preparation of teachers able to improve the skills and abilities of workers. For this to be realised, it is essential that a closer connection be developed between teacher education and industries and businesses. In addition, the Fieldwork component of teacher education programs needs to include opportunities for students to be placed in the broadest possible range of educational sites where teaching and training occur, including, in particular, regional businesses and industries. Provision needs to be made for students to visit these work sites to study the education and training programs used by

particular companies and students enrolled in selected courses be able to plan and implement education and training programs for interested companies. Further, some, if not all, subjects in teacher education programs need to develop students' knowledge of particular aspects of regional businesses and industries. There is a diverse range of industries applying a range of disciplinary knowledge, the foundations of which are established in the curricula which teachers are expected to work with in schools and other educational sites. Curriculum and pedagogic studies subjects in teacher education programs could be greatly enriched to the degree that they can concretely demonstrate to prospective teachers the relationship between education and the economy, schooling and work.

Some Possibilities

An area where some articulation between industry and teacher education might occur is in science discipline subjects in a preservice course. The traditional model for science discipline subjects is for them to be taught by science specialists, usually from the Science Faculty, using a combination of text books organised around science topics/concepts, lectures, tutorials and laboratory work. An alternative model would be for a science subject to be based around industry. Where this has been done or suggested in the past, it has usually been done after the student has learned the formal science concepts which might apply to the industry. Would it be feasible to do this the other way around? That is, use a local industry as a basis for extracting and learning the relevant science concepts.

An example may help us explore this idea. In the sugar industry, a crucial aspect is the actual sugar yield per hectare of cane. A student might be able to explore this through an association with the industry - say, the Sugar Research Institute, Department of Primary Industry, and a sugar mill. There are many factors which could be subjected to investigation, such as, sugar extraction and processing, plant type, and plant husbandry. These would relate directly to science topics such as chemistry (eg solutions, sugars, crystallisation, molecular structure of sugars, herbicides & pesticides) and biology (eg genetics, biological engineering, cells, plant physiology, photosynthesis, plant & animal hormones, biological pest control).

Such a program could be set up if the university had a close relationship with a particular industry. However, no one industry site could cater for more than one or two students. Therefore, each student's learning program would need to be individually tailored to fit with the industry and site they were working in. The curriculum would emerge from their work alongside scientists in the industry, and would be pursued as project work using both industry and university as a resource. The actual content of the curriculum would differ for each student, and would have to be subject to negotiation between the university, industry site and student. Laboratory work as traditionally conceived would be unnecessary, except perhaps for some particular training in techniques or specialised equipment which the industry could not offer. In this case the training would be for a "real life" context rather than a contrived one characteristic of many traditional science programs. In practical terms, each student would need to be assigned to a lecturer who would work with the student and industry to plan the curriculum and act as mentor. The content could well be drawn from several disciplines, and may be covered at a greater depth than in traditional science programs. There may well be a corresponding lack of breadth. Assessment would have to be based on the work completed by the student, in the content areas identified in the negotiated curriculum. Written examinations may well be replaced by projects reports and oral examinations.

There are two major considerations emerging from such a scenario. The first is whether the program would be feasible in terms of student numbers. At present, the number of students bound for a science specialisation is relatively small, so the demand on industry would not be high. If student numbers increased, the program would not be a feasible route for all students.

Secondly, the proposal would put extra demands and therefore costs on the participating industries. Consequently, they would want some benefit from participating apart from the altruistic motive of helping the university or the future generation of children. There could be two benefits in kind to the industry. Having a student working with their scientists would give them an extra unpaid helper. Their productivity should therefore be higher, even though they might have to spend some time showing the student particular things. Another benefit could accrue to the industry if the student were to also do a practicum in the industry. This is a related but separate issue, so will be looked at more closely.

Doing the Practicum at an Industry Site

All industries are now required to spend money on staff development by government legislation. If a student working in an industry was also assigned to that industry for a practicum, the student could assume responsibilities for conducting some staff development for the industry. Again, a university lecturer would need to be assigned as mentor for the practicum. The student would be familiar with the industry and the staff development needs, so would be well placed to offer a professional development program. The student would also benefit, as he/she would have a practicum in a non-classroom but real learning situation which would be at the same time demanding and rewarding. Obviously, the type of professional development which a student could offer would be constrained (for example, upgrading scientists' discipline knowledge would be inappropriate) to areas of available expertise, but could be of great value to an industry. For instance, the student might develop an instructional program to teach people how to use a particular item of equipment which she/he has just learnt to use.

The scenario described above is at this stage a concept being considered. It is fraught with problems of implementation, but offers the promise of exciting developments.

Conclusion

We strongly support the view that teacher educators need to be in touch with contemporary educational policies and the work and issues undertaken in various educational settings - whether they be childcare centres, preschools, primary and secondary schools, colleges of technical and further education, universities, industrial training sites and other places of formal, institutionalised teaching and learning. What we have tried to do is to take a positive view of how teacher education in particular might respond to the demands being placed on it by industry and government. We do not agree that the criticisms and remedies that they have proposed are entirely valid or appropriate, but recognise that as teacher educators we must respond in an adequate way. We have therefore proposed some alternative responses which might go some towards addressing the criticisms. We support those who argue for a flexible range of alternatives to address this issue, in order to protect the need for diversity in teacher education.

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