

Problem based learning and internship: moving from industry to school

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Abstract

Professional experience during any form of teacher preparation is essential. Professional experience provides the opportunity for pre-service teachers in schools, TAFE colleges and other training organisations to gain invaluable contextual and cultural knowledge in the new workplace. This knowledge facilitates the successful transition from the culture and context of their previous careers to a school or other educational setting. This paper reflects on a model of professional experience in a program for students who have been recruited for their industry experience and expertise in food, agriculture, computing, engineering and other industries to become VET in Schools and technology teachers within a secondary school system. In terms of VET in Schools, the currency and vocational knowledge and experience these pre-service teachers bring to schools can provide a valuable asset within the school curriculum. At the same time, these student teachers may struggle with other aspects of their roles as new practitioners in a very different work context from the ones to which they have been socialised and acculturated. The students from the eighteen month intensive Accelerated Teacher Training Program (ATTP), central to this discussion spend a third of their teacher preparation program in schools, completing a problem based learning project which is followed by a ten week internship as a teacher in their new industry, education. A longitudinal research study into the experiences of twelve of these teachers during their first three years of teaching in regional and rural contexts provides some insights into the key issues of this shift in context from a trades and industry background to a school teaching career. This presentation will explore the data from this study in terms of the model of teacher preparation, which includes extended in-school professional experience incorporating curriculum studies and teaching, to examine some of the results of these practices in the field.

Introduction

The aging of the teaching profession, particularly in certain discipline areas, (Preston, 1997) prompted a collaboration between the NSW Department of Education and a small number of Universities. The innovative programs developed, including the one featured in this paper, involved drawing participants from non-traditional groups as a source of potential educators. The Accelerated Teacher Training program (ATTP) was developed initially to meet the demand for more Technology and Applied Studies (TAS) and VET in Schools (VETiS) teachers for mainly NSW secondary schools. This paper discusses a model of industry-schools mutual knowledge transfer in the ATTP at Charles Sturt University (CSU) using work integrated learning as the preferred pedagogy, with a special focus on the professional practice and problem-solving elements of the course. The themes include work based learning; acculturation in the new work environment; the development of critical reflection on site; authentic university assessment through professional portfolios; problem based learning and internship.

The keystone to success in the professional experience component of the ATTP course is collaboration between University staff, school staff who act as learners' mentors and ultimately as assessors of the interns, and the learners themselves. As graduates are frequently placed in rural and remote schools, they need to develop a good understanding of the multiple aspects of the role of a teacher in particular, the ability to organise and manage programming and curriculum requirements independently. New teachers, particularly in a sponsored program such as the ATTP, find themselves in 'hard to staff or remote areas' (McCormack, Gore & Thomas, 2006, p97). Schools benefit, particularly in vocational education and training (VET) subjects, from the influx of student-teachers with recent industry knowledge. The University benefits through constant monitoring of shifts in enacted curriculum in the school system, as well as being able to generate new knowledge through research into rather different models of education.

Literature review

The inclusion of increasing vocational options in post-compulsory years in the majority of secondary schools in Australia was the initial focus of the literature review. The reason for this is that the participants in the study were partially recruited as pre-service teaching candidates on the strength of their vocational qualifications and experience, although they were also being prepared to teach in other technology areas apart from the senior VETiS courses. The literature showed that there is considerable interest on the part of policy-makers in the topic of VETiS, although far less emphasis and discussion on the recruitment, training and orientation of teachers who can deliver in terms of industry expectations while still being adequately prepared in terms of general teacher education requirements.

Vocational education and training in schools is recognised by national VET policy documents such as *A bridge to the future* (ANTA, 1998) as a way of addressing the training needs of young people making the transition from school to work (Kilpatrick, Kilpatrick, & Bell, 2000). Other research points to the improved outcomes both in schools, and beyond school, for many students who have gained from their participation in programs involving VET traditional approaches and benefited from the affirmation and appreciation provided by learning experiences in the workplace (Frost, 2000; Malley, Keating, Robinson, & Hawke, 2001; Spark, 1999; Polesal et al, 2004, Teese, 2000). Although the efficacy of VETiS dominates in the literature, critical questions remain about changing school cultures and the changing roles of teachers (Shaw, McDonald, Childs, & Turner, 1999). Arguably, new teachers who have moved from an industry background to school teaching may be participating in a process of fundamental change to schools' culture and organisation. The issues include a fundamental 'incompatibility between traditional teaching culture and those supportive of work-related learning [which] needs to be addressed by appropriate professional and organisational development strategies' (Ryan, 1997), p.2), leading to an intersection or potential conflict of pedagogies.

In a longitudinal study which similarly examined early career teachers with reference to their pre-service education, (Gore et al, 2006) argue strongly for an emphasis on pedagogy as an essential element of professional learning to ensure teacher retention and success. Two aspects of the research reported in this article resonate strongly with this researcher – the limitations to practical and personal issues in support from other

teachers with pedagogy being omitted from discussions and advice. The second point of similarity is the increase of professional responsibility in the school community, which was also observed in all participants in this study. Professional learning opportunities in rural and regional schools have been improved through the implementation of a mentoring program for first year teachers, but for the cohort in this study, the responsibilities and decisions were typically the province of those who were both teaching and learning to teach simultaneously with limited support.

To facilitate the shift from the prior work context to the new educational setting, significant part of the teacher pre-service education is undertaken in schools, which means the model involves workplace learning. In Billett's research (2001, 2004) the emphasis on the workplace behaviours, communication and learning, in which practitioners learn 'on the job' with a socio-cultural setting specific to that workplace, learning practices include following modelled behaviours, receiving feedback from more experienced practitioners and access to relevant resources. This potentially semi-tacit knowledge is shared in a way that is difficult to replicate in university course work and could arguably be more familiar and accessible to a cohort of students with typically limited academic experience. Billett (2004) concluded "that participation in social practice is synonymous with learning and that participatory practices offer a fresh way of considering workplaces as learning spaces that are reciprocally constituted" (p. 121).

Method

The researcher was part of the planning of the ATTP course as well as being teaching on the program from its first cohort through to the current intake who will complete their studies in 2008. The participants in the research began their studies in 2001 and graduated in 2003, their first year of teaching. Twenty four students volunteered to participate in the study prior to graduating. From this group, sixteen new teachers who were allocated regional and rural schools were selected. Four have since left the study. The decision to only include those appointed to country schools was to reflect both the regional university's interest and the researchers own experience in rural and regional schools. Data have been collected from interviews in their first and third years of teaching, school site visits including interviews with one other teacher in each school, emails and biographical data supplied by each participant and more informal phone calls and emails. Prior knowledge of the participants from their time on the course has been both a strength and weakness for the researcher – a strength in terms of the access granted through the continuing relationship and problematic in terms of impressing a former teacher. These and other effects of being a partial 'insider' have been taken into consideration during analysis.

Problem based learning

In the final semester of the eighteen-month program, the ATTP cohort experiences an innovative approach combining problem-based situated learning with collaborative teaching and mentoring by on-line university tutors and in-school mentors. Problem-based learning is a curriculum development and instructional strategy designed to challenge students (Fingle & Torp, 1995; Novak, 1996). Problem-based learning encourages and motivates students to "learn to learn" (Duch, 1995), and challenges students to take charge of their education (White, 1996). According to Barrows (1990)

learning is self-directed, and the emphasis becomes student-centred rather than teacher-centred. Problem-based learning promotes life-long learning, making knowledge relevant by placing it in context (Aldred et al., 1997). Hughes (1996) stresses that problems need to be ones that pre-service teachers are likely to face in their daily work at school. Fundamentally the problem must be of an authentic nature, firmly established within the school context. Gallagher, Stepien & Rosenthal (1992) suggest that the emphasis should be placed on “real world” problems so that they best stimulate problems associated with “real-life” situations. In such learning there is absolutely no “right” answer (Barrows, 1990), as the outcomes are embedded in each student’s interpretation of the initial problems which more than likely will change and develop as information is added and synthesised throughout the duration of the learning.

The objective of problem-based learning is to equip students with skills and information that will transfer from university to the professional life of the student. In the ATTP, problem-based learning is used both as a way of designing the curriculum and as a way to place students in the constructivist role of problem solvers (Green et al, 2004). Thus it is also a learning and teaching strategy which invites students to develop their knowledge, skills and abilities in ‘a situation (ill-structured problem) which reflects the real world’ (King, 1996, p3). The problem based learning component of the course consists of the amalgamation of three university curriculum studies subjects into a whole that covers and combines the outcomes of the three subjects. Students cover curriculum methodology in each relevant curriculum area, investigating solutions to problems about responding to school learners’ needs across three curriculum areas. All students cover Design and Technology as well as a VET in Schools Curriculum Framework subject such as Hospitality, Construction, Metals and Engineering, Primary Industries or Information Technology. They also complete an investigation of their own technology specialisation including Industrial Technologies, Agriculture, Food Technology and Computing. During the first twelve weeks of the professional experience phase, an in-school mentor and a University facilitator support the students in their problem-based learning. This approach is consistent with the notion of a learning community (Wheatley & Freize, 2007) as students, mentors and University staff share information and findings during the in-school experience.

While in the school, the ATTP students seek their own individual solutions to prepare a professional portfolio which will contain analysis of the curriculum and assessment processes, needs and problems, using the school, their mentors and the school community as a primary source of information. The University group facilitator supports students during the problem solving activity by providing further materials, direction and questions to assist in the study. Assessment of student performance in the curriculum subjects is based on the portfolios prepared by students.

Course design

In planning the structure of the course, much thought went into examining the essential elements of a teacher-training program. The overarching design had the intention of ensuring that the students developed both theoretically and practically within an accelerated time frame. The combination of the following elements in one program makes this course unique in its composition, theoretical underpinning and

support mechanisms. The course is offered by *distance education*, which means students who would not usually be able to access teacher education in traditional on-campus programs can be included. This also means that some of the cohort are from, and will remain in, *rural and isolated areas* which are difficult to staff. *Problem solving methodology* in the curriculum subjects through the development of *portfolios* is designed to encourage students to investigate the intersection of curriculum theory and practice in the school workplace where their internship will be completed. *On line support* encourages students to discuss their learning experiences both with the lecturer and each other as they form communities of learners. This is a crucial element for providing learning support in the problem solving activities in schools.

The selection of a school site as a learning site for teacher training means that students are learning about curriculum while having a significant time for enculturation and completing assignment activities (Green, 2004). The change of attitude and direction for the ATTP students takes time, which is the underlying intention of basing the problem-based learning activities in the same school where students will be teaching for ten weeks, using materials prepared during their professional practice time. In problem based learning, the problems are genuine and both universal and individual, as they are firmly established within each school context. The outcomes are embedded in each student's solutions, critical analysis, with the products of the process being only a part of the learning. The objective is to equip students with skills and information that will transfer from university to schools without other teachers in their discipline – as this is often the reality in rural schools, and also to form networks of support for their future professional lives. As a study of early career teachers professional learning found, the most valuable support came from 'informal unplanned conversations and sharing of ideas and concerns' with colleagues (McCormack, Gore & Thomas, 2006, p108). By situating learning during pre-service training on site in schools, this model of learning from other practitioners is encouraged.

Students and experiences

The students selected for the ATTP course come from a diverse range of backgrounds both culturally and academically. To complement their trade knowledge, these students need systematic preparation in the classroom. By offering the maximum time in schools, supervising teachers work collaboratively with the intern student as they provide support, models and experience to contextualise the learning of the novice. The ATTP program depends on forging partnerships with other education and training providers and recognises that teachers can come from a multiplicity of backgrounds. As teacher educators, the ATTP team endeavours to facilitate the crossing of boundaries building on experience and expertise to offer teacher preparation in a culturally and socially sensitive way. Potentially, these new teachers with such diverse backgrounds may contribute to a profound change in school cultures as 'communities of practice are a powerful route to large-scale change' (Wheatley & Freize, 2007, p3). The preconditions for successful outcomes include student determination and growth as learners and teachers; the supportive learning community built through both virtual and real discussions, debates and knowledge sharing; the excellent advice, nurturing, modelling and encouragement provided by the in-school supervisors and mentors; the introduction to the possibilities of theoretical knowledge and research through academic study; and the efforts of the ATTP teacher educators

who have developed and implemented the program. The following comment from a student, reflecting on learning from the portfolio task, supports the reality of this set of goals. “One of the main things I have learned is the vast differences in how programming is tackled in schools. This project has allowed me to experience the dilemmas faced in programming, meeting the syllabus requirements, and ensuring students obtain a satisfactory level of knowledge” (Cited from unpublished data, doctoral research by the author).

Discussion

What are the effects of an industry background and an accelerated teacher-training course on the orientation to teaching and learning of teachers in VETiS? Is the approach these teachers have to students, the curriculum and the culture of senior secondary school significantly different from other beginning teachers; or do they adjust to the dominant cultural ethos of the school to become similar to other beginning teachers? Are they operating as agents or signifiers of change, or are they ‘made safe’, socialised into the way things are? These are the questions which underpin the study as a whole. Using Giddens’ definition of agency, (1976, p79) practices are founded in ‘the construction and the sustaining of frames of meaning that supply interpretive schemes whereby everyday experience is handled’. This research into the ATTP graduates is designed to explore what the experiences and discussion from the data are saying about the reality of beginning teaching from a very different background from what is considered traditional or ‘normal’. A combination of interviews with graduates of the ATTP and some of the principals and teachers they work with in their appointments after completing the program as well as emailed conversations, site visits and on-line discussions provide some insight into the approaches to teaching adopted by the graduates.

In their study exploring who is choosing teaching as a career and why (2006), Richardson and Watt found that the three main motivations were the belief students had that they had skills which that were worth passing on, they had altruistic ideas about teacher’s social contribution and value, and they wanted to be part of shaping the future for young people. In the data collected for this study, these motivations have emerged strongly. In the participatory process involving collaborative attempts by both the participant beginning teacher and the researcher to become reflective practitioners (Schon, 1983), these motivations were explored further. They are diverse and intricate to analyse as individual and shifting perspectives require a more constructivist orientation in order to consider the complex and evolving nature of teacher development.

One of the first significant themes which recurred in many responses is that these new graduate teachers are drawing on their life and work experience prior to teaching and their teacher education learning. Already, and during their studies, these participants see themselves as very different from teachers who have followed the traditional pathways of school, university or college then back to school. This difference may be in style, approach, culture or even in the beliefs about the purposes and intentions of secondary education. However, both this different background, combined with the shorter teacher education program, can lead to confrontation with other teachers, which was mentioned in most interviews. Some interviewees were critical of the cynicism of more experienced teachers, with one commenting that ‘they shouldn’t be

teaching because they've lost the spark'. This leads to a very rich vein of potential exploration, of interest in its own right, while the researcher is attempting to avoid emphasis on direct comparison or value judgments. "I believe my past experience allows me to see beyond school. Unlike many teachers I had at school, (and still appear to be around), I am not interested in educating the students only to pass exams. I want them to learn things that will help them all their life, if they pass an exam it's a bonus. It is a bit like a driving instructor. They can teach you to drive, or they can teach you to pass the driving test. My aim is to instil in the students a work and social ethic that regardless of what career path they follow, they will be useful members of society" (Industrial technology teacher, former electrician). Another aspect of their industry background which many trade on is their knowledge of the world of work, including 'horror stories' from the field, which appeal to many adolescents, as well as more daily aspects of work life. As a female former chef said – "they want to know what it's like out there". With policy in Australia emphasising the importance of transitions from school to work (Smith, Brennan Kemmis & Woodland, 2007, p21) this attitude may enable informal career advice and recognition of opportunities and pathways beyond school.

Rather than discussing their discipline areas specifically, in most cases the interviews have been characterized by examining the whole student and their engagement with the teaching and learning process, which one participant, in his second year of teaching, believed to be "more important than fulfilling the needs of the syllabus" at times. Practicality, relevance, authenticity and encouraging positive attitudes have been mentioned many times as the most important aspects of planning and programming to meet student needs. One interviewee said, in discussing what he called the "intricacies of programming" that he "develops programs in a reverse manner", starting from the individual students, moving up to class groups and then working back to the curriculum document. Through reflection, these programs are constantly evolving and changing, although he is worried that they may not be as officially acceptable as those written more traditionally.

Teacher preparation

Another commentary theme which has recurred through the interviews with ATTP graduates is the teacher preparation they experienced during their accelerated program. Many had experienced teaching through working with apprentices and one, a former chef, had taught at TAFE. However all perceive secondary school teaching as having virtually nothing in common with these earlier experiences as the intensity, the level of control over classrooms and curriculum and the professional responsibilities of teachers are far more demanding and challenging. Interestingly, it was experiences with on the job training with apprentices and other workers which sparked the initial decision to change careers for many of those interviewed. One of the main criticisms of the University course was that it lacked information on the "practical...realistic side of teaching" (Industrial technology teacher, former metal worker). Most would have liked more work on curriculum areas, particularly on how to read and interpret the syllabi and very pragmatic assistance with realistic and relevant programming. Despite having spent over twenty-three weeks in two different schools during their eighteen month program, some would have liked further work in schools. One interviewee, another former chef, who is working in a larger school in a regional town, felt that this problem was alleviated by the fact that during both of his

first two years of teaching he has had an official mentor who has really developed this professional aspect with him. Unlike those in the more remote schools, who typically have no other teachers in their discipline area, he was also in a well established and collaborative faculty with four teachers working in food and hospitality with him. His comments were the most positive in terms of the support given which he asserted enabled his confidence and practice to develop very rapidly.

Culture

Many participants commented on ‘teacher culture’, a complex area which is difficult to discuss without veering close to prejudice and negative commentary through difficult comparisons. The following comment exemplifies this idea: “I fear I am being programmed into the ‘school way’ of doing things and as my confidence grows as a teacher, I am rejecting it. I get bored just watching the kids do the same projects I did twenty-seven plus years ago. They were boring then and still are. I thought it safer to change the world slowly, for the time being anyway. Although new to teaching, I think my past experience and age gives me the confidence to question the system, and hopefully the skills and diplomacy required to actually do something about it” (Industrial technology and Construction teacher, former builder). What this participant was encountering on a daily basis was a clash of cultures with differences in the construction of discourses and pedagogies. Others clearly relate, in their comments, to their own experiences at school. To exemplify, one of the participants who moved to Australia during his primary school years commented that “Teachers failed to see the problems that I experienced. In high school a couple of teachers understood and concentrated on my problems with English (thankfully) and developed some self confidence and belief in my ability” (Industrial Technology and Metalwork teacher, former telephone technician). Further investigation is required in future data gathering to see how the context of their lives, including past school and learning experiences, influence the decisions and reflections these teachers are making about their practice. “Reflective teaching entails a recognition, examination, and rumination over the implications of ones’ beliefs, experiences, attitudes, knowledge, and values as well as the opportunities and constraints provided by the social conditions in which the teacher works” (Zeichner & Liston, 1996, p.33).

Some of the comments show appreciation for the opportunity to engage in a new career, and all indicate an enthusiasm and belief in the beginning teacher’s ability to really achieve positive outcomes with students, as this quote illustrates: “But for me, a bloke who had to leave school at 14 and 11 months because of financial restraints following the death of my father, who has tried throughout his life to learn and get ahead to be allowed the opportunity to be on this adventure through the six plus years I had been doing UNI and now to be involved in youth in such a positive way is great” (Computing teacher, former mechanic and IT specialist). For the researcher, the rewarding aspect of these interviews is the excitement, even during the exhausting end of year requirements as the end of their third year of teaching draws to a close, that all of these teachers express about the decision they made to change careers, re-engage with on-going learning, and try to inculcate their students with confidence in themselves and the desire to keep re-engaging with learning.

Conclusion

Learning to teach is a difficult and challenging journey for any education student. However, in the past, for most education students, school was immediately behind them and the models and images they had of what a teacher is or should be were based on immediate and recent experiences. However, these ATTP students come to the learning from a very different place, as do about a third of the students in the teacher education programs in our Faculty, who are mature students. School was at least a decade in the past, and was not necessarily a valuable experience for many of the participants in the study. They have also taken a giant leap of faith in moving from one world to another. To move from an extensive career in an industry context to the world of school, and to participate in a transformative journey involving beginner or apprentice status requires many personal and professional accommodations. In some ways, these teachers mirror or reflect the changes in the senior schools system, as well as being part of a response to implement these changes. 'VET in schools ... brings divergence of experience and cultures into a reasonably rigid system, with change as a natural consequence of this diversity' (Green, 2000, p1).

Researching their teaching journey will add to the knowledge collected about other types of beginning teachers, as they construct a teaching identity (Danielwicz, 2001). To complement their trade knowledge, ATTP students needed systematic preparation in the classroom. By offering the maximum time in schools, supervising teachers worked collaboratively with the intern students as they provide support, models and experience to contextualise the learning of the novice. The ATTP program depends on forging partnerships with other education and training providers and recognises that teachers can come from a multiplicity of backgrounds.

As teacher educators, the ATTP teaching team endeavours to facilitate the crossing of boundaries, building on experience and expertise to offer teacher preparation in a culturally and socially sensitive way. This research aims to investigate these new teachers whose backgrounds and teacher preparation may contribute to changes in school cultures. The process for successful outcomes included student determination and growth as learners and teachers; the supportive learning community built through both virtual and real discussions, debates and knowledge sharing; the excellent advice, nurturing, modelling and encouragement provided by the in-school supervisors and mentors; the introduction to the possibilities of theoretical knowledge and research through academic study; and the efforts of the ATTP teacher educators who have developed and implemented the program. The first graduands, when they returned to collect their testamurs in April 2003, were inspiring in their discussions of the challenges being faced in isolated, remote and city 'hard to staff' schools. This longitudinal study of their approaches, attitudes and values over time should demonstrate the effect of these factors on the teaching identities these educators construct. All data has been collected, but the analysis of that data and the conversations are far from over.

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