

# What prior experiences are perceived as useful to students following an ITT design and technology course?

## Abstract

The focus of this paper is the perceptions of a small group of student teachers of design and technology following a part-time initial teacher training (ITT) course offered by the Open University (OU). All the students considered in the study were over 30 and had followed or were then following employment in other careers. They were interviewed to discover which of those aspects of their prior experiences they considered useful to them in their role as a design and technology teacher. The aim was to investigate the students' perceptions of those prior experiences when they enter the pre-service course and to compare and contrast those opinions with the views at the end of their training. I draw some tentative conclusions in relation to how we view prior knowledge and experiences on ITT courses.

## Introduction

In an earlier article in this journal (Banks, 1996a) I outlined and attempted to classify the different types of professional knowledge which design and technology teachers draw upon. These were

- subject knowledge
- school design and technology knowledge
- curricular knowledge
- pedagogical content knowledge.

Discussions over the length and appropriateness of PGCE courses tend to focus on levels of subject knowledge. But as I argued previously, the other sorts of knowledge listed above are of equal importance. Rather than rehearse those arguments again, in this paper I wish to illustrate a little of the impact of that wider knowledge.

Applebee (1989, p217) notes that "when we start to teach a new subject, one of the most powerful influences on what we do is our memory of how we were taught." This is supported by Barnes (1989, p13) "Shaped by their years as 'teacher-watchers', beginning teachers believe that teaching is

a matter of telling". However, the relatively new subject of technology does not have a curriculum history long enough for those involved to have a common and shared "memory" of how the subject 'should' be taught as may be the case in science or mathematics. Indeed, when we consider the different approaches taken to technology education in other parts of the world (Banks, 1996b), it is clear that there is no unambiguous agreement as to what technology is. None of the students discussed below had ever studied a subject called "Technology" at school, and all have degrees in areas which may be considered only a sub-set of the broader school subject. Current teachers of design and technology often complain that PGCE students (in particular) have the depth but not the breadth of subject knowledge now required to teach the school subject adequately (See DATA, 1995, p10). But this possible mismatch of subject content knowledge is not the only issue. In a school's technology faculty there is a collection of different pedagogic styles developed from the several ancestors in manual training. The students, therefore, will also have different experiences and expectations of their teaching role in the classroom.

## Research design

Nine student technology teachers were followed through the 18 months of the OU's Technology PGCE course. The students came from two OU administrative regions, Wales and the 'South', and comprise all the students in those areas who were willing to participate in the study. The students were interviewed early in the course shortly after they had experienced three weeks school experience of a mainly observational nature. The interviews followed a semi-structured format in order to explore those aspects of their personal histories which the students considered would be most useful to them as a teacher but were quite wide ranging to, hopefully, allow the students to make explicit the taken-for-granted assumptions about teaching and children which they held. All interviews took place in the students' homes. Here the students felt comfortable and able to talk freely without pressure of time or being too intimidated by the data collection experience.

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Five of the students were visited during their subsequent school experiences and their mentors interviewed, school documentation collected, and the context in which the student was working observed. This observation confirmed the range of different curriculum structures which schools had established to teach the National Curriculum and consequently the different expectations of the kind and level of knowledge – subject, pedagogical and curricular – which mentors expected of the student.

Finally, at the end of their last eight-week teaching placement, seven of the students were interviewed again. They were asked, in the light of experience, what they now considered to be the most useful prior experiences.

The seven students who correspond to a full data set in this study were from different employment backgrounds and possessed subject knowledge in a variety of aspects of technology as explained above. All were graduates in a technological field at the beginning of the teacher preparation course. In brief summary:

June has a degree in building construction and planning. She is currently a 'housewife' and has worked in Britain and abroad in town planning.

Simon has an OU technology degree. He is a 'househusband', was once a trainee PE teacher, and does part-time work in the construction industry.

Jeff has an OU technology degree. He is a fire-fighter, but does construction and car mechanic work in his spare time.

Sally has a degree in 3D Art and Design. trained as a sculptor and has worked in the management of a small manufacturing company.

Matt has an OU technology degree with a background in telecommunications. He works as an industrial trainer.

Robert's degree is in marine engineering and he worked as a marine engineer and as an education officer in both the Army and the Navy. Now retired from the services, he too works in industrial training.

Patricia is an architect. She went to school, university and trained in her profession in Australia.

All the students, male or female, are specialising in resistant materials during their initial teacher training in design and technology.

### Analysis

Bird et al (1993 p 254) report on the different ways researchers have characterised student teachers' beliefs about teaching "as lay theories, constructs, images, metaphors, and webs". Of these Calderhead and Robinson (1991) in their study of relatively young BEd students pay particular attention to the students' images of the "good" or "bad" teacher as being of particular significance. The rather older students on the OU PGCE course did not generally make similar comments about remembered teachers. An exception would be Patricia who had a good school experience as a pupil and was surprised by the contrast:

I was one of those rare people that, you know, really loved school and I have been very shocked by my first school experience – in a Comprehensive school. – [...] children actually don't seem to enjoy or be really stimulated, or really want to learn [...] this was a general attitude, it was the first thing that hit me, as someone coming from the outside world and, I suppose, particularly from a professionally educated world, as well, ...where people do have high expectations, so it's been a big culture shock for me, a very big culture shock. (Patricia Interview 1)

Instead most students considered their post-school life experiences much more influential. All the students had observed some school teaching before interview 1, but none yet had much school-teaching experience (although two had substantial



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teaching experiences in other contexts). At the first interview all the male students initially focused on their "general practical background" as being very useful as an intending technology teacher, with academic aspects less so.

In my real life, all the jobs I've done have been practically oriented; I've done fire-fighting, part-time work as a mechanic, as an electrician and as a plumber, plus other bits and pieces. (Jeff Interview 1)

Well, I started off as an apprentice which I think isn't a bad start.  
(Robert Interview 1)

I've always been interested in technology from when I was a kid making things out of cardboard and now I've built my own extension on the back of the house, I've built my own car, anything I get I take it apart see how it works.  
(Simon Interview 1)

Initially when I left school I was an apprentice electrician but I didn't finish the apprenticeship although I had that kind of background. (Matt Interview 1)

The women's background in Art and Design, Town Planning and Architecture made them initially believe that the "design process" was more significant than "making skills" although they too recognised that, in the reality of school design and technology, a practical making ability was very important.

... in terms of skills, I mean, it's basically draughting, drawing, technical drawing, specification of materials... As an architect, it's much more theoretical, though. I don't feel that I've got the background in workshop and that's why I was really attracted to doing this because I've always wanted to do something that I could see through from idea to fulfilment, and I've always liked things like that as my hobbies.  
(Patricia Interview 1)

My initial degree was in Art and Design and obviously Design is something I see as absolutely core to the subject and it is

one of those areas which I feel most confident about. (Sally Interview 1)

Well I think my opinions are changing at the moment. When I first looked at technology, I thought the design process would be a very important part along with the design I have done in the past. But as I have been in school, I don't see the design process being as important as I thought it was going to be. In a lot of classes it's put on the back-burner and they're told what they are going to make and that's it. What I have seen is more skills based than design-based.  
(June Interview 1)

In a paper discussing teachers' thinking about classrooms Oppenwal (1993, p127) notes that:

"Both researchers and practitioners have questioned the usefulness of preservice teacher education programs. Many experienced teachers identify informal experiences, like working in schools and talking to fellow teachers, as contributing more to professional knowledge than their formal teacher education programs."

The sometimes confused conceptualisation of the design and technology curriculum means that students can still receive contradictory messages. The ITT course itself and the experience of certain aspects of technology teaching may give one view of the role and expectations of design and technology teachers, but some of the ways the subject is actually played out in schools sometimes contradicts this rhetoric. Harrison noted the following:

"D&T teachers have been that only since September 1990, having previously been CDT (and, before that, woodwork, metalwork or technical drawing) teachers or HE (and, before that, domestic science or needlework or cookery) teachers or Business Studies (and, before that, shorthand and typing) teachers, and so on. All of them had a confidence and competence associated with particular ways of doing things needing particular familiarity with specialized equipment. And all were



surviving with their own support structure" (Harrison, 1993, p273-275)

Such a curriculum history is very robust and means that skill-based work is still valued, and rightly so, but sometimes at the expense of teaching designing properly. This mismatch was noted by some of the students early on. June mentioned the lack of designing (see above) and Matt also articulated the problem at interview 1:

I am not sure that the people who drew up the curriculum orders know what technology is for. So I am still uncertain. I can see the importance of imparting skills but I would have thought that the main reason is that people firstly come more aware of the technology around them and secondly to appreciate design to fit a particular purpose. And I am not sure how you do that and still facilitate the teaching of skills. (Matt interview 1)

Patricia also found a contradiction between what she considered important in the subject and the classroom reality of putting that into practice:

I mean for me, designing and understanding about design is just through experience of doing it and going through college and design being my major subject there, it was always the big mystery of what made the good designer. In many ways just being aware of as many constraints as possible and having the confidence of thinking that you could come up with some solution, and I think that comes with a lot of experience. That's why I think that when we are dealing with Year 7 there is a great difficulty with coming to terms with the notion of designing. I think they're not brought up to it. It doesn't figure strongly in our education up till then and I think it's very hard to introduce it to them. (Patricia Interview 2)

A clear plea for the continuation of Key Stage 2 design and technology post National Curriculum moratorium!

At the end of the course (18 months later) the students were again asked about what

in their previous experiences had been most useful to them as a teacher. The students frequently mentioned that they could not remember their earlier responses. Jeff and Matt once again first think of their general practical experiences as being most valuable, to which Patricia, somewhat disillusioned, now adds her voice.

Since leaving school I have done everything that has been practically based. I've been in the Fire Service but I've also done electrical work, I've also done mechanics – all that's helped with some of the skills required. (Jeff Interview 2)

I think really the quite wide range of jobs I have done since I first left school, so that although I haven't got expertise in a range of areas covered by technology at least I have got a smattering of understanding and familiarity with a range of areas. (Matt Interview 2)

In some ways I'd probably say the practical work of refurbishing a house which I did in London prior to moving here and prior to having children, because I think it's having practical skills which I feel I need more confidence in than I have got at the moment and which I see to be the sound basis to be a real authority as a teacher in workshops; a real understanding of materials and the craftsmanship required to work wood and feeling comfortable working with metal. These are the things I look to now – and wiring as well; the fact that I've done electrical wiring. Much of the work I do now is introductory electronics and that was something quite new to me. (Patricia Interview 2)

However, with the benefit of hindsight, many of the students now consider other aspects of their life history to be significant:

I think the most valuable thing I found when teaching was the ability to organise things. After working in an office, and working as part of a group as well, I found that being able to do a few things at a time you know, run a few things along together, with your mind on



different things was more useful sometimes than the subject knowledge that was going on. (June, Interview 2)

And Sally reported:

I think first and foremost being a parent. Knowing what children are made of. I think the fact that in my working life I have had to put on different hats if you like. I've not always been myself. I find it hard to explain. For example, I have been managing director of a business and I've had to carry out some pretty tough things at times, like I've had to sack people, and that would be very much like putting on the managing director's hat. And I think that, in a way, has been a good training. It has given me that ability to take on that slight objective stance.

Interviewer: Why has that helped you as a teacher?

Because there are times as a teacher when you are not just reacting to the child but you have to bear a lot of other things in mind – about the school policies, the way the school works as a whole – and where that child then fits in as part of that whole rather than as an individual. I think as a parent you can deal with a child better on an individual level. From my working life I learnt about working as part of a team (Sally Interview 2)

And Jeff, too, thought that his employment history had an influence:

Some of the promotional exams in the fire service require you to project your voice, use authority, control and command. So yes that has, but controlling half a dozen firemen, or a dozen firemen even is going to be different from controlling a class of 16 to 20 children wielding hammers! (Jeff Interview 2)

Robert and Matt worked as industrial trainers and thought that such a background was useful, but both commented on the

difference between teaching pupils and teaching adults. Robert thought his mentor was useful in interpreting the classroom:

What goes wrong with my lessons (as I say, I have taught for five years, so the actual... planning a lesson, controlling a lesson, logistics and all that sort of thing is second nature to me) where I need his advice is where he's said... He'll come and say, "Rob, they didn't understand what you were saying then", and I said, "Oh!" "You may have thought they did, but they didn't", and that was vital information for me because I was simply oblivious of the problem. Problems that are organisationally obvious, I probably don't need too much advice on. It's the subtleties that I need because I'm really adjusting a fair amount of experience to a new environment. (Robert Interview 2)

Matt took time to adjust too:

...obviously there is a big difference teaching in a secondary school than training adults. The biggest shock was in the amount of energy and verbal energy in class management. That took time, but by the end I felt at home there. (Matt Interview 2)

### Conclusion

In common with many beginning teachers (see Calderhead and Robinson, 1991 p 7) these mature intending design and technology teachers start their training with many different ideas about teaching and a very diverse range of personal histories; different prior experiences of schooling, higher education, communities and employment. The few case studies described here cannot prescribe many strong messages for initial teacher training in design and technology, but they do provide evidence that we should be cautious about the emphasis given in some preparatory courses. The history of INSET in this curriculum area, reinforced by HMI comments, has greatly emphasised subject content knowledge. This is very important, but it has often been at the expense of pedagogical strategies. This has been sometimes true of pre-service courses too as they have attempted to rectify skill and knowledge deficiencies as a major



priority. The evidence here is that such knowledge is perceived by students to be important but often subsidiary to other life experiences.

An appreciation of school design and technology knowledge was "something quite new" to Patricia, and it was "the subtleties" of curricular knowledge which Robert found difficult. Matt found new aspects of pedagogical content knowledge helpful with the "big difference teaching in a secondary school than training adults", but due to a lack of such knowledge Patricia thought that in "Year 7 there is a great difficulty with coming to terms with the notion of designing".

Most significant from the study was the way in which these students drew on their experience of other communities of practice such as office workers and fire-fighting teams, or knowledge of employer/employee relationships to help them come to terms with the requirements of their work as teachers. The induction into the working methods and routines of their mentor and other colleagues in the same specialist area is crucial to the success of the mentee. It is plain that these mature students, of which design and technology probably has a disproportionate share on most PGCE courses, have an approach to the role of a teacher mediated by their prior vocational and other community experiences.

A PGCE course is only a preparation for teaching and perhaps in-service development of content knowledge will always be greater in this subject than in others. Pre-service courses should not lose sight of the need to balance the range of types of teacher knowledge (see Banks, 1996a). We all no doubt recognise that complete confidence in the subject content (even in a sub-set of the subject such as 'resistant materials') may be an unattainable holy grail. It would be a pity if in our attempts to achieve it we forget to

- recognise that in entering the community of practice of design and technology teachers, students have experiences of other work-based settings which can ease or hinder the transition.

There's an enormous amount to encompass, it seems to me, and, you know, I was a technical apprentice and I've been in engineering all my life but there's not a great deal of that which is directly applicable to the Syllabus.  
(Robert Interview 2)

*Note: Pseudonyms have been used throughout for student names.*

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- develop a full range of teaching strategies, appropriate curricular knowledge and appreciation of school design and technology knowledge while drawing on the wide experiences of mature students;