

Bring it on... I am ready to teach! Identifying the Professional knowledge of beginning Design and Technology teachers!

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Abstract

For the last two decades there has been considerable academic research (Gossman, Wilson & Shulman, 1989; McNamara, 1991) into the forms of knowledge and skills that teachers, including beginning Design and Technology teachers (Leach & Banks, 1996; Moon & Banks, 1996; Banks & Barlex, 2000) require to perform their role. However, there has been limited research into the knowledge and skills that beginning Design and Technology teachers themselves, believe will be required to enable them to effectively and sustainably perform their role as they commence teaching.

This paper reports on the findings of one aspect of a doctoral study that examined the influences that shaped the professional identity of beginning Design and Technology teachers. Adopting a narrative inquiry approach, this qualitative research aims to provide insights into the content and pedagogical knowledge that pre-service teachers believe facilitates their professional identification as a Design and Technology educator.

It is anticipated that the findings of this study and the larger longitudinal research will support the development of a greater understanding of beginning Design and Technology teacher identity as connected to pre-service teacher education and in-service teacher practice, a gap that has been recognised internationally as well as locally.

Establishing Professional Location

Literature (Ewing & Manuel, 2005; Fetherston, 2006; Groundwater-Smith, Ewing & Le Cornu, 2007) suggests that when beginning teachers commence teaching foremost in their minds is the need to acquire the ‘*essential practical knowledge needed to function effectively in an unfamiliar environment*’ (Groundwater et al., 2007:178). Once orientated, the authors argue, beginning teachers can then ‘*focus on finding their place, consolidating their pedagogical knowledge and building a professional identity and voice*’ (Groundwater et al., 2007: 178).

Establishing a professional location through one’s practical knowledge as a beginning teacher is particularly evident in the field of Design and Technology, where many teachers directly associate their sense of self with the curriculum they deliver (Staples, 2003). More specifically, Banks and Barlex (2000) suggest that beginning Design and Technology teachers’ strive to acquire the following practical knowledge to perform their role;

- **Subject Content knowledge** – developing a working knowledge and understanding of specific aspects of Design and Technology for example, electronics, textile technology, resistant materials etc; coupled with an understanding and implementation of curriculum documents. Beginning teachers in this context are locating themselves as ‘subject matter expert’ (Beijaard, Verloop & Vermunt, 2000).
- **Pedagogical knowledge** – beginning teachers strive to know and understand the ways in which students learn; they formulate subject matter so that it can be understood by students.
- **School Subject knowledge** - recognising that school based Design and Technology Education is different on a number of levels to that as practised in the world outside of school; including aspects that may be specific to a site for example, resource availability, expertise of existing staff, budget constraints.
(Adapted from Banks & Barlex, 2000: 5- 8)

However, there is a need to recognise that professional knowledge and the role of the beginning teacher cannot be reduced to technical or instrumental action (Beijaard et al., 2000). Beginning Design and Technology teachers’ also need to develop their own *Personal Subject construct*, which Banks & Barlex suggest is,

‘a complex amalgam of past knowledge , experiences of learning, a personal view of what constitutes ‘good ‘teaching and a belief in the purposes of the subject and an understanding of students’ as learners’.

(Banks & Barlex, 2000: 7)

This view enables the beginning teacher’s role to move beyond that of transmitter of knowledge (Beijaard et al., 2000) to one of facilitator of learning. Pedagogical practice in Design and Technology education has in the past centred specifically on what the teacher is teaching and not necessarily on what, how or why the student’s are learning (Zuga & Bjorkquist, 1989). Learning in Design and Technology education has traditionally been strongly focused on an established body of technical ‘know-how’ (Williams, 2006) or ‘learning through doing’. A result, Williams argues of the development of Design and Technology education from vocational studies.

Barlow (2002) suggests that beginning Design and Technology teachers are being confronted by a situation where they are generally required to possess a significantly different and more expansive knowledge base compared to that of their more experienced colleagues. More recently a number of aspects signify good pedagogical practice in the field of Design and Technology these include; the type of project that students are encouraged and supported to undertake, for example student initiated projects (Staples, 2003); and the use of ‘open’ design briefs to enable students to engage in a process of design (Zuga & Bjorkquist, 1989).

Social and Political Influences

Subject content knowledge and pedagogy in Design and Technology Education is currently being strongly influenced by political, economic and industrial agendas. These agendas view Design and Technology Education as a means to address rapidly changing global and local economies (Grimmett, 2008; Webberly, 2003). Over a decade ago Layton (1994) warned of competing influences that would endeavour to shape and control both the content and pedagogy of Design and Technology Education. Layton identified seven competing influences as stakeholders. Central to the discussion in this paper are the following stakeholders; the Economic instrumentalists for whom Design and Technology Education and vocational education become almost synonymous, and the Professional technologists who view Design and Technology Education as a contributor to national economic growth.

At the time Layton questioned the ability of a curriculum to address the requirements of all stakeholders, but more importantly he questioned if it should. However, it is the influence of economic rationalists and professional technologists that are currently dominating the educational landscape as ‘Trade Training Centres’ in schools, Vocational Education and Training, and Engineering Pathways are developed to ensure student’s leave school with the skills to earn. ‘Learn to Earn’ has become the focus of many current educational debates (Department of Education, Employment and Workplace Relations, 2008). Such views I argue not only influence how Design and Technology curriculum is being shaped, interpreted and implemented but will also influence the role that many beginning teachers’ assume as they commence teaching in schools that are trade skills focused.

Educational Change

This study also recognises that the field of Design and Technology education is currently involved in a process of paradigm change (Smith, 2003). Central to this change is the move away from specific skilling or the transmission of subject specific know-how (Staples, 2003), known as Manual Arts or Technical Studies to a more holistic approach characterised by a core of transferable knowledge, capabilities and values that involve the development of cognitive thought processes.

As argued by Seemann,

‘Technological developments, solutions and education must increasingly be holistic and higher order in conception in the modern knowledge economy to meet the lifestyle changes ahead’ (Seemann, 2003: 253)

Fundamental to this change in South Australian Secondary schools has been the introduction of new curriculum policy in 2001; the South Australian Curriculum, Standards and Accountability (SACSA) framework (DETE, 2001a&b). The introduction of SACSA has facilitated the adoption of design- based methodology.

Participants in this study could be identified as the ‘new generation’ of Design and Technology educators. That is, through their recent University studies they have been introduced too and supported in developing the knowledge and skills that reflect a more holistic understanding of Design and Technology Education.

Smith (2003), suggests that beginning teachers are being increasingly considered a 'major force' for both the implementation of change as well as providing advocacy for the field of Design and Technology Education

While the literature identifies the forms of knowledge and skills required to commence teaching this paper investigates if these forms are analogous to those identified by beginning Design and Technology teachers themselves. It seeks further to examine if current social and political influences and educational change shapes the knowledge and skills that beginning teachers believe will be required to enable them to effectively and sustainably perform their role.

The Study

The aim of this study is to provide insights into the subject and pedagogical knowledge that pre-service teachers believed facilitated professional identification as a Design and Technology educator.

To achieve a rich and detailed portrayal of pre-service teachers' responses a qualitative orientation to the research is adopted. Berg (2001), Denzin and Lincoln (2003) identify a number of assumptions which underpin qualitative research: that reality is socially constructed and events need to be viewed from the multiple perspectives of the participants; that the researcher is an instrument of data collection who can have a close relationship with the participants but needs to explicitly acknowledge the value-laden nature of the study; that the detailed words of the participants are appropriate in reporting the study.

These assumptions are congruent with the circumstances and intentions of this study in that it will use narratives to focus on the insights of the participants and that the researcher has to some degree been a participant in the shaping of participants' subject and pedagogical knowledge, and so will need to acknowledge her own biases and values.

Participants

The participants for this study were twenty beginning Design and Technology pre-service teachers who were in the final weeks of a four year undergraduate Bachelor of Education program in the field of Secondary Design and Technology education. There were 12 males and 8 females, including 11 'career switchers' with an employment background in a field related to Design and Technology education.

Data Collection Instruments

The use of focus groups for this study reflects a view by the researcher that such a method can provide a dynamic in which participants learn from each other and develop ideas together (Jackson, 2003). This process will be greatly aided by an existing history of cohesion and group discussion as all the participants have undertaken their study in the same cohort. Focus groups were also implemented as they may lead to discussions that provide points of commonality, agreement or possibly raising of issues not previously considered by the researcher. In addition participants were asked to complete a written response using a *Framework of teacher professional knowledge* (Banks & Barlex, 2000).

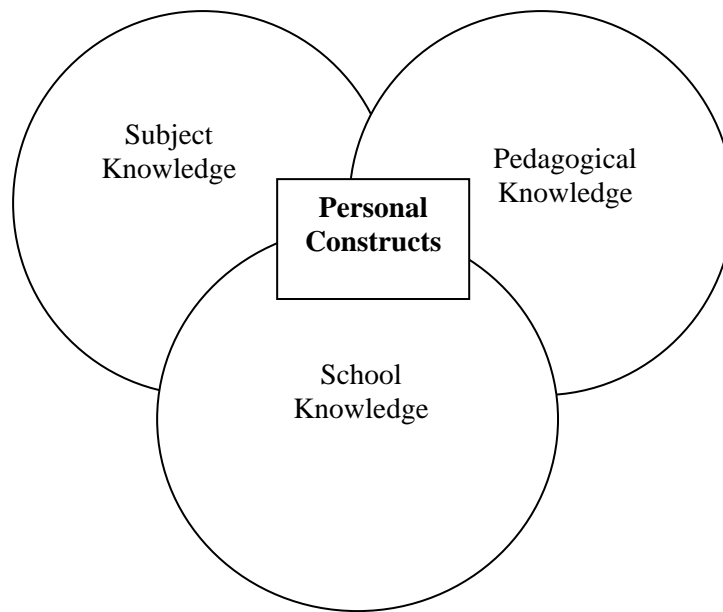


Figure 1: Framework of Teacher Professional Knowledge (Banks and Barlex 2000)

The study asked participants to participate in one focus group interview session of an hour in duration. Almost the entire cohort of students in the final year level (20 students) agreed to participate in the focus group interviews. Two focus group sessions each with ten participants were organised. Participants brought their documented responses to the *Framework of teacher professional knowledge* to the focus group sessions for further discussion and analysis.

Focus group discussions were transcribed from the audiotape. Written responses were collected and collated. The discussions and written responses were coded and patterns and themes were identified.

Data Analysis and Findings

As individuals, pre-service teachers engaged with the Framework at a reflective level. These reflections included, revisiting course content, professional experiences and their professional beliefs and identifying the subject and pedagogical knowledge they believed would facilitate professional identification as a Design and Technology educator. At the focus group level, when individual responses were shared, they encouraged debate, discussion and further reflection.

Data from the written responses and from the transcribed focus group discussions were analysed to identify both common and disparate responses, and as themes and categories emerged these became the responses that were documented and reported as findings.

Subject Knowledge

All participants acknowledged the need to have a comprehensive understanding of the curriculum (South Australian Curriculum and Accountability framework- SACSA) . Several participants suggested that their “*up to date*” curriculum knowledge could be identified as a professional strength. They felt the curriculum would be central in shaping both what and how they taught. For instance the design process was identified as an important aspect to engage students and to make learning relevant. However it was evident from the discussions that several of the participants were concerned that their colleagues in schools may not share a similar view. As one participant explained,

“I am confident in my understanding of the place of design in the curriculum but I worry about how this will be perceived by others, will they recognise the need to explore the impact of technology with students, will they let me interpret and present the curriculum in an authentic and relevant way?” (P5)

Participants also recognised the need to have an understanding of the broad range of subject content that makes up the Learning Area of Design and Technology. They felt they needed to be multi-skilled to be effective. Participant two suggests that,

“Whilst all elements of subject knowledge assist us in being a professional, a solid understanding of curriculum and subject content is necessary. You can’t expect us as beginning teachers to be an expert in all areas of every subject, nor is it realistic to expect us to know how to use every piece of equipment...however I will strive to continuously expand on my content knowledge”. (P 2)

Many participants had already identified areas of personal strength or preference when teaching specific aspects of the Design and Technology Curriculum. Electronics for instance was a subject that several participants indicated they did not want to teach, they did not feel confident in their level of subject knowledge or in their ability to teach it. Responses clearly indicated that having a good level of subject content knowledge facilitated confidence in one’s role as a beginning teacher.

All participants placed a strong emphasis the need to have an in depth knowledge of Occupational, Health and Safety (OHSW) and Safe Operating Procedures (SOP’s) with many stating that it was their ability to reflect this knowledge during their professional experiences that enabled them to be seen as successful in their school placement. These expectations continued to be reflected in the responses of participants who were concerned with being ‘*able to perform*’ to the expectations of their colleagues in schools once they commenced teaching. Similarly all participants believed they needed to demonstrate practical problem solving skills, to facilitate this, participants indicated that they needed to have a sound knowledge of the materials they worked with. Participants also stated that this knowledge would need to be continually ‘upgraded’ as new technologies and materials were introduced into the classroom.

A number of participants also identified the need to have an understanding of budgets and ordering of equipment and materials, particularly if they were intending to teach in a rural location where they would assume total responsibility for this aspect of teaching.

Pedagogical Knowledge

Responses from participants in the study indicated that they did strive to know and understand the ways in which students learn. They believed that the ability to engage students in interesting, relevant and challenging tasks was central to them being an effective educator. Such a belief indicated that they did not view their role as transmitter of knowledge but as a facilitator of learning (Beijaard et al., 2000). Such a belief is reflected in the following comment,

“My role is to engage those students who are not interested, I want to work towards guaranteeing some level of success for all students, and especially those who lack confidence...these are the skills I want to build on when I start teaching”. (P8)

Several participants felt they could draw on life their skills, including past employment, and their role as a parent to support implementing the curriculum and to engage student’s interest. As one ‘career switcher’ participant explained,

“It is really my life experiences, and the fact that I am the father of a 15 year old, that really informs my pedagogy. I see how my own children respond to their teachers, I think about how I want their teachers to teach them, to respect them as individuals...for example I try to give reasons why we have rules, to encourage kids to think about where they are headed in life...”. (P7)

All participants acknowledged the value in building relationships and developing a rapport with students. As one participant explained,

“To be an effective educator I need to develop relationships with my students so that I can negotiate tasks that will motivate and benefit them in meaningful ways...who would want to teach if the students don’t enjoy coming to your classes?” (P1)

Through building relationships and knowing the students in their class participants believed they would recognize the academic level of each student, this inturn would inform the planning of content and the range of assessment strategies implemented.

“If I really know the students in my class I can construct design tasks that cater for a range of students, some will be able to work on a large project others may need to break the task down. I need to extend the gifted and support those who are still developing their understanding and skills”. (P10)

Coupled with the need to develop positive professional relationships, participants also identified the need to adopt effective behaviour and classroom management strategies. As one participant stated, *“you need to establish class rules and to have clear management strategies to ensure everyone’s safety”*. Such a response reiterates the views of Groundwater et al., who suggest that when beginning teachers commence teaching foremost in their minds is the need to acquire the *‘essential practical knowledge needed to function effectively in an unfamiliar environment’* (2007:178).

Conclusion

Evidence would suggest that participants in this study are establishing a professional location through their practical knowledge, and that they do directly associate their sense of self with the curriculum they deliver (Staples, 2003). The curriculum identified by beginning teachers does appear to be holistic, with an emphasis on design based methodologies and students initiated projects. However, several participants expressed concern that their colleagues in schools may not share a similar view. There was an underlying belief that implementation of participant's current content and pedagogical knowledge would be influenced by the support (or lack of) from colleagues in schools. Further research in this doctoral study will reveal whether the level of collegial support becomes a major contributing factor in enabling this cohort of beginning Design and Technology teachers to develop effective and sustainable teaching roles.

This paper also exposed the deeper beliefs that participants held about their role as educators and it was these beliefs that informed and guided their pedagogical practice with the aim of maximising student engagement and learning. For instance, all participants stated that to be an effective educator they needed to build professional relationships and develop rapport with students. Furthermore, this paper revealed that participants acknowledged the need to continually critique their own beliefs about teaching, to be open to new ideas, and to be flexible if they are to develop effective and sustainable roles as educators.

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