DENISE MACGREGOR

10. TRANSFORMING IDENTITIES

The Process of Becoming a Design and Technology Teacher

INTRODUCTION

Learning to teach can be viewed as a process of becoming, a time of transition and transformation. It involves an examination of what one is doing and who one becomes, that is, one's professional identity (Britzman, 1991, 2003). This chapter presents one aspect of the findings of a longitudinal study of the influences that shape beginning design and technology teachers' professional knowledge and identity. The chapter analyses the stories of 20 teachers to explore the role of and interaction between personal and professional histories, professional knowledge and identity transition and transformation. It is concluded that personal and professional histories emerge as a strong mediating factor in shaping the professional identity and knowledge of beginning design and technology teachers. The chapter argues further that the boundary between professional knowledge and identity is not clear; one appears to be part of the other with neither being viewed as being fixed but as ever-evolving and transforming as a result of past, present, and future interactions and experiences.

The research was conducted in two stages over a 15-month period as the beginning design and technology teachers made the transition from their final year of university into the first year of teaching. The qualitative case study research adopted a narrative inquiry approach (Connelly & Clandinin, 1998, 1999; Clandinin & Connelly, 1995, 1998, 2000; Clandinin, 2007) to examine the influences that shaped the beginning teachers' perceptions of identity and the nature of the perceptions themselves.

The chapter commences with an examination of the literature associated with defining professional identity and, in doing so, provides a framework for investigating the interconnectedness of personal and professional histories and knowledge in shaping beginning design and technology teachers' professional identities.

DEFINING PROFESSIONAL IDENTITY

Understanding teachers' professional identity and the issues related to it can be difficult and complex (Beijaard, Verloop, & Vermunt, 2000; Beijaard, Meijer, &

H.E. Middleton & L.K.J. Baartman (eds.), Transfer, Transitions and Transformations of Learning, 133-147.

Verloop, 2004; Beauchamp & Thomas, 2009). Different meanings are assigned in both the general literature and literature on teaching specifically. For teaching, definitions of professional identity are related to images of how one sees oneself in the roles and responsibilities associated with teaching. It is the knowledge one has of oneself as a teacher (Kelchtermans, 1993). Lasky (2005, p. 900) states more specifically that it is the stories teachers tell to "define themselves to themselves and to others."

This narrative rendering of identity is also reflected in the work of Connelly and Clandinin (1999), who suggest that it is the interconnectedness of our experiences, place, and knowledge that merge to become our professional identity – our narrative or story to live by. This implies that rather than thinking about identity as a stable construct, we can instead think about an ongoing process of identification. It can be argued that from the beginning and during their careers teachers are engaged in creating themselves as teachers (Coldron & Smith, 1999).

Teachers' professional identity has emerged as an important area of research over the last 10 years. The relationship between professional identity and beginning teacher retention has sparked a renewed research interest in the transitionary period for beginning teachers (see, e.g., Ewing & Smith, 2003). For beginning teachers the development of a professional identity appears to be a central element in the transition from pre-service teacher to beginning teacher. Beauchamp and Thomas argue that, for the beginning teacher, this transition can be viewed as "An ongoing and dynamic process which entails making sense of and a (re) interpretation of one's own values and experiences that may be influenced by personal, social and cognitive factors" (Beauchamp & Thomas, 2009 p. 176).

As pre-service teachers commence their careers, their evolving professional identity is open to critique and question as they transition into new and varied contexts. Feiman-Nemser and Parker (1993), Tickle (2000), Flores (2001), and Feiman-Nemser (2001,2003) highlight not only the uniqueness and complexity of the early stages of transition, but also conclude that the way beginning teachers are supported through these early stages has long-term implications for identity formation, continued professional growth and, ultimately, retention in the teaching profession. It can be argued that few experiences in life have such a tremendous impact on the personal and professional life of a teacher as does the first year of teaching.

DEFINING DESIGN AND TECHNOLOGY PROFESSIONAL KNOWLEDGE

In the literature it is argued that teachers derive their professional identity from both the subject matter they teach and their pedagogy (Beijaard, Verloop, & Vermnut, 2000; Staples, 2003). This is also evident in the field of design and technology education where many teachers directly associate their professional identity with the curriculum they deliver (Paechter & Head, 1996; Staples, 2003). Historically, design and technology education in Australia situated itself in the field of boys' craft, manual arts, and, until recently, technical studies.

As a consequence teaching and learning in design and technology education has traditionally been strongly focused on an established body of technical "know-how" or learning specific skills "through doing" (Williams, 2006). However, internationally and nationally design and technology education at a curriculum level has changed dramatically over the last 10 to 20 years, starting with a transition from vocational to general education through a series of curriculum reforms. The culmination of these reforms has witnessed a gradual but continued pedagogical shift from a didactic to a constructivist approach to teaching and learning (Middleton, 2006).

If, as suggested by Beijaard et al. (2000), teachers derive their professional identity from both the subject matter they teach and their pedagogy, then recent changes to the curriculum could be viewed as unsettling for teachers of design and technology. The move away from a transmissive approach to one which sees the teacher adopt a facilitator role has required teachers to question and reshape their professional identity (Staples, 2003). It is the nature of this subject and pedagogical knowledge shift as identified by beginning design and technology teachers that underpins the discussion in this chapter.

For the last two decades there has been considerable research (Grossman, Wilson, & Shulman, 1989; McNamara, 1991; Beijaard et al., 2000, Beijaard et al., 2004) into the forms of knowledge that teachers require to perform their role. This chapter draws on a limited number of studies (e.g., Leach & Banks, 1996; Moon & Banks, 1996; Banks & Barlex, 1999; Banks et al., 2004) that examine research into design and technology teachers' professional knowledge.

When devising a pictorial model of teacher professional knowledge, Banks and Barlex (1999) and Banks et al. (2004) draw on curriculum theory (Shulman, 1986), cognitive theory (Gardner, 1983, 1991) and McNamara's (1991) summary of different forms of teacher knowledge. In their model Banks and Barlex (1999) and Banks et al. (2004) suggest that pre-service and in-service design and technology teachers require the following professional knowledge:

> Subject content knowledge – this can be defined as a working knowledge and an understanding of specific aspects of design and technology education coupled with an understanding and implementation of curriculum documents.
>
> Pedagogical knowledge – this can be defined as subject application, knowing and understanding the ways in which students learn, as well as demonstrating the ability to formulate subject matter so that it can be understood by students.
>
> School subject knowledge – recognising that school-based design and technology education is different 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.

It is the active intersection of each of these types of knowledge that bring professional knowledge into being. Banks and Barlex (1999) argue further that

early career design and technology teachers also need to develop their own personal subject construct, which they 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" (p. 7).

An adapted version of the Banks and Barlex (1999) pictorial model provided one of the data collection methods for the first phase of this study. While the original framework provided the opportunity for collecting data related to professional knowledge, it did not facilitate the collection of data that related to the influences on the development of that knowledge and how those influences served to shape one's professional identity. As a result, the original framework was amended to address the identified limitations through replacing the school subject knowledge aspect with a question that sought to investigate the influences that had or could shape the development of beginning teachers' professional knowledge.

THE RESEARCH STUDY

The nature of the study was interpretive, in that it was characterised by a concern for the individual, and more specifically the interaction between the individual and their past and present social contexts, including the university and the school in which the beginning teachers commenced their first year of teaching. The paradigms (Lincoln & Guba, 2000), worldviews (Creswell, 2007), or beliefs that guided the research were based on the notion of social constructivism (Neuman, 2000; Lincoln & Guba, 2000; Schwandt, 2007). The beginning teachers were viewed as seeking to understand the world in which they worked and the individually constructed meanings which they made were seen as being subjective. That is, they were related to individual experiences in a particular context and formed through a process of interaction with others as well as "through the historical and social norms that operate in one's life" (Creswell, 2007, p. 8).

The first stage of the research was conducted on the campus of the Australian University in which the 20 pre-service teachers had recently completed four years of undergraduate study in either the design and technology education program or the Bachelor of Education, Primary/Middle (3-9) program. The pre-service teachers had majored in design and technology education and intended to teach design and technology in secondary settings. There were 6 female and 14 male pre-service teachers. They ranged in age from their early 20s to their late 30s. Six of the pre-service teachers had completed a major in design and technology education as part of the Bachelor of Education, Primary/Middle program. The remaining pre-service teachers had completed what equated to a double major in design and technology education as part of the Bachelor of Education Design and Technology Education program. Five of the participants studied courses in food and textile technology with the remaining 15 studying in the areas of advanced technology, electronics, and resistant materials, including wood and metal. All 20 participants studied design as a core teaching methodology. Data for the first stage of the study were collected through a questionnaire that included open-ended, text-response

questions, the completion of an adapted teacher professional knowledge framework (Banks & Barlex, 1999), and focus group discussions.

The second stage of the research was conducted in the school settings in which the pre-service teachers commenced teaching. A smaller group consisting of 10 of the 20 pre-service teachers were selected for this phase of the research. The group consisted of one female and nine males. The aim of this reduction in numbers was to keep the data to a manageable scale. Beginning teachers in this phase of the research were selected on the basis that they had all completed their study in the same area of advanced technology, electronics, and resistant materials, including wood and metal. The schools they were teaching in also represented a cross sector of educational systems located in both metropolitan and country locations. Three of the participants had completed a major in design and technology education as part of the Bachelor of Education, Primary/Middle program. The remaining pre-service teachers had completed what equated to a double major in design and technology education. For this stage of the research data were collected via three semi-structured interviews and reflective e-journal entries. Data collection throughout the first year of teaching enabled changes in thoughts and ideas related to the beginning teachers' perceptions of professional identity to be documented, reviewed, and elaborated upon.

The chapter presents data from both stages of the study as collated throughout the beginning teachers' pre-service to in-service transition. For stage one of the study, analysis focused on participants' written and verbal responses to the three open-ended text-response questions and to the teacher knowledge framework. Codes were used to identify broad meanings within the data; these codes were then reduced by merging those of similar meaning. In stage two, effort was taken throughout the analysis to build a portrait of both the individual and the collective (Creswell, 2007). Thus, when analysing the data in this stage, emphasis was placed on individual narratives, and finding meaning in these narratives. What follows is one aspect of this analysis, that is, the significance of personal and professional histories in shaping professional knowledge and identity.

THE SIGNIFICANCE OF PROFESSIONAL AND PERSONAL HISTORIES IN SHAPING PROFESSIONAL KNOWLEDGE AND IDENTITY

The Place of Professional Histories

When pre-service teachers commence their university study, they bring with them varied narratives about who they believe they will become as teachers (Knowles, 1992; Lortie, 1975; Smith, 2007; Groundwater-Smith, Mitchell, & Mockler, 2007). Cohen-Scali (2003) argues further that by the time pre-service teachers commence their study, many have developed a cognitive map of what they think it means to be a teacher. The narratives of professional identity that pre-service teachers hold have been shaped by a range of social, political, and educational constructs that reflect influences of the past, the present, and perhaps a vision for the future (Flores & Day, 2006). The literature suggests that these historical and biographical

narratives continue to influence pre-service teachers as they make the transition into teaching (Coldron & Smith, 1999; Kelchtermans, 1993).

Many of the pre-service teachers who commenced their study in the Bachelor of Education, Design and Technology Education undergraduate program brought with them a strong memory of how they were taught. Unlike other professions, it can be argued that people have a strong sense of what the role of a teacher entails through their own experiences as a student. Applebee states that "when we start to teach something new, one of the most powerful influences on what we do is our memory of how we were taught" (Applebee, 1989, p. 217)

It appeared that the opportunity to specifically study design and technology determined many of the pre-service teachers' decision to become a teacher. Many of the pre-service teachers cited the influence of past teachers, often a design and technology teacher, as a reason for their decision to become a teacher in this field. When asked during the first year of their study to provide an image of how they viewed themselves as teachers, the pre-service teachers often drew upon the professional characteristics of a past and well-liked teacher. These past teachers were identified by pre-service teachers as knowing their content, as being highly skilled, and having the ability to communicate well.

Sixty per cent of the pre-service teachers who commenced study in the design and technology undergraduate teacher education program in the year in which this study was situated were mature age or "career switchers" (Richardson & Watt, 2006) and the memories they held of teaching were from some time ago. An implication of this was that a number of pre-service teachers were initially challenged by the changes with which they were confronted during professional experience placements. These challenges centred primarily on issues related to classroom management.

The research also revealed that the narratives of professional identity that pre-service teachers brought to their study were diverse – a result, in many instances, of the changing profile of those entering the field of education. Design and technology teacher education programs attract a high percentage of applicants who have trade or industry background from a field that is directly related to the content knowledge they will be teaching. The trade backgrounds of the design and technology pre-service teachers in this study included patisserie chef, boiler maker, textile designer, prosthetic manufacturer, cabinet maker, electrician, sheet metal worker, dress maker, and car mechanic.

The data revealed that the knowledge gained from professional histories, including past work experiences, provided both a positive and major influence on shaping professional identity. This was evidenced by Issac, who stated "My life experience and previous work does help my professional identity as a design and technology teacher because designing and making prosthetics was a big part of my life for about twenty years" (Stage one, focus group discussion).

The majority of pre-service teachers in the study were able to draw on their life experiences and on the knowledge developed through their technical and trades background to inform their teaching role during professional experience and once they commenced teaching. Neil, a tool maker, and Peter, a builder, both agreed that

their work skills had influenced not only their decision to commence teaching in the field, but also their professional identity. They both suggested that their past trade experiences had provided them with a level of confidence in their teaching ability. They felt they already had some of the specific practical content knowledge needed for teaching. Cathy, a textile designer, commented further that her personal and professional identity was shaped by her understanding of the subject-specific knowledge and the technical skills she believed would be required to be successful as a beginning teacher: "I see myself as someone who has in-depth subject knowledge and the skills to be able to impart these into the classroom in a professional manner. I like to work with fabrics; it is what I do" (Stage one, focus group discussion).

As a mechanic, Aaron identified his previous employment and life experiences as having provided him with the ability to manage time and interact with others, and some of the technical skills on which he could draw when teaching. For Damien, having previously completed part of an industrial design degree and having a professional (producing recycled timber furniture) and personal commitment to environmental sustainability enabled him to understand the process of designing and to focus on environmental and social justice issues when planning and teaching.

The Place of Personal Histories

The mature-age pre-service teachers who had children also cited their experience as parents as an influence on their professional knowledge and professional identity. Data from this study would suggest that through the role of parenting, pre-service teachers gained an insight into students' life-worlds or funds of knowledge described as the "historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being" (Moll, Amanti, Neff, & Gonzalez, 1992, p. 133).

Pre-service teachers who were parents of teenage children indicated that being aware of teenage interests, and knowing the type of behaviour to expect from students of this age, could provide them with an advantage in relationship building once they commenced teaching. Peter cited both his age and role as a parent as being instrumental in:

> Shaping your beliefs about society and how education is shaped by that society. You are hoping that you can set students up for success in life just like you want to do for your own kids. These are the beliefs that inform the sort of person I want to be when I am out there (teaching). (Stage1, focus group discussion)

Peter's comments, as did those of many of the beginning teachers, revealed that by reflecting back on their own histories and life events, teachers were able to deconstruct the influences and beliefs that shaped their identity. Once Peter commenced teaching he continued to draw on the beliefs about teaching that had been shaped by his role as a parent. At the conclusion of his first year of teaching,

Peter's final interview responses made strong and continued reference to his personal and professional history. He stated:

> My life experiences still shape who I am and my teaching. My own children, my daughter who is aged 15, the same age of the students I am teaching. I still think about what I want for my own children, the society I want them to live in. I work towards that in my teaching. In my Year 11 home group I talk to them as a former employer of a business, and as a father as well as a teacher. You talk to them about where they are heading in life. (Stage 2, Interview 3)

Peter's journal entries and interview responses revealed a sense of pride in being able to draw on his past experiences as both a parent and builder to inform his teaching practice and in turn to shape his professional identity. More importantly for Peter he felt that the experiences and associated skills that he brought to teaching were valued by both staff and the students he taught and, as such, they positively shaped his professional identity.

SUMMARY OF FINDINGS

It is recognised that teaching is a profession in which who one is as a person is strongly interwoven with how one acts or the role one assumes as a professional, and it is difficult to separate the two (Loughran, 2006). As Loughran (2006, p. 112) argues, "it seems unlikely that the core of the personal will not impact on the core of the professional."

This study provided evidence that the practical content knowledge developed from past personal histories provided a knowledge base from which pre-service teachers drew and on which they continued to build as beginning teachers. Commencing university with a relevant practical knowledge base did not appear to present a barrier to change. In fact, it provided pre-service teachers with a sense of continuity, that is, an aspect of self (or identity) that remained the same over time (Erikson, 1989), and a sense of connectivity with who one is as a person. As a consequence, pre-service teachers whose past histories facilitated the development of deep technical content knowledge demonstrated a heightened level of competence and confidence during professional experience and as they transitioned into their first year of teaching.

Pre-service teachers with this technical knowledge also felt that the expectations of others, particularly mentor teachers during school placements, in regard to their technical ability could be met, thus providing them with the self-confidence to redirect their focus of learning to areas that were new or challenging. This finding is in direct contrast to the research findings of Flores and Day (2006), who found that many beginning teachers are confronted with negative school contexts and cultures that work to destabilise and challenge professional knowledge and positive concepts of identity.

The views on teaching and learning that had been shaped by pre-service teachers' historical and biographical narratives provided a starting point for

personal critique and reflection. Consequently, a foundation for connecting learning or making meaning was established as they moved through their teacher education program and into classroom teaching (Bullough & Gitlin, 1995, 2001). For a majority of the pre-service teachers there appeared to be a personal connectedness with the learning area that informed their initial decision to commence study in the design and technology teacher education program. It appears that aspects that shape one's personal identity also influence who one becomes as a design and technology teacher; that is, one's personal interests, one's level of technical skill, and the value that one places on the learning area ultimately shape one's professional identity.

In acknowledging past influences on professional identity, beginning teachers identified elements of their practice that they viewed as being important in shaping their effectiveness as an educator once they commenced teaching. These elements included possessing a body of practical content knowledge and a sufficient level of technical skill related to working with materials and equipment; and the ability to develop professional relationships with students. For many of the beginning teachers in this study the personal and professional dimensions that they brought to teaching were strongly linked to their professional knowledge and identity. What follows are the beginning teachers' responses to their perceptions of design and technology professional knowledge.

PARTICIPANTS' PERCEPTIONS OF PROFESSIONAL KNOWLEDGE – AN AMALGAM OF SUBJECT CONTENT KNOWLEDGE AND PEDAGOGICAL KNOWLEDGE

When identifying the subject content knowledge associated with teaching design and technology education, all beginning teachers stated that ever-increasing changes in technology made specific identification of this knowledge complex and dynamic. For example, Steve, who studied a design and technology major and maths minor, stated:

> I think one of the things that defines us (as design and technology teachers) is the range of topics that are now classed under the design and technology banner. I am not clear what other subjects have to do in regards to curriculum but we have to learn new things every day to keep up with our subject. I know maths changes but it is essentially the same mathematical processes. We have got to understand things like advanced manufacturing, electronics, and new ICT technologies. What we have to teach is continuing to get bigger and bigger and more complex. (Stage1, focus group discussion)

While acknowledging the diversity of subject content knowledge, Sue, who studied a textile and food technology minor, also indicated that beginning teachers need to continually expand their knowledge and in doing so they could facilitate moving the learning area forward. Sue elaborates further:

> Educators are not expected to be an expert in all areas of their subject, nor is it realistic to expect they specialise in knowing each and every piece of

> equipment or material. However a professional teacher does need to strive to understand the curriculum and continuously expand on their content/subject knowledge. This is how we can continually move our learning area forward. (Stage 1, questionnaire response)

These views concur with Barlow (2002), who argues that beginning design and technology teachers are being confronted by a situation where they are required to possess a significantly different and more expansive knowledge than graduates in the past. Additionally, several beginning teachers viewed new and expansive subject content knowledge as providing an opportunity to teach subjects that they wanted to teach in and to teach the content of these subjects in new ways. For example, Neil, who studied a double major in design and technology, stated that "Having the latest learning and knowledge of newer technologies would provide a little bit of political pull, to introduce new ideas and ways of teaching" (Stage1, focus group discussion).

Beginning teachers placed strong emphasis on technical skill development and workplace safety as aspects of professional knowledge. The responses were not unexpected and served to reinforce that this is a unique aspect of subject content knowledge in design and technology education. Steve's comment, as representative of these responses, was that "As design and technology teachers there is a need to understand the fundamental properties of materials and processes and this knowledge is essential to what we do" (Stage 1, focus group discussion).

While previous studies of science and chemistry teachers (see, e.g., Beijaard et al., 2000; Smith, 2007) identify specific subject content knowledge that is theoretically and conceptually based (for example, understanding scientific concepts) few studies have identified the significance of the procedural or practical aspect of subject content knowledge that are central to teaching design and technology. Not unexpectedly, views in regard to identifying the need to understand the nature of a range of materials, be multi-skilled, and work competently with a range of tools and equipment were aspects of subject content knowledge that were also clearly reflected in the majority of responses. These were also the aspects of subject content knowledge that beginning teachers appeared to transfer from their professional histories, as evidenced in the previous section of this chapter. Closely aligned to understanding the properties of materials and processes was the acknowledgement by a number of beginning teachers that possessing a thorough knowledge of safe work practices was a key aspect of design and technology subject content knowledge. For example, Travis stated:

> As D&T teachers we need to have a major understanding of safety, however, I think it is important that we develop ways of delivering that in a way that doesn't bore kids, so they understand it and we can make sure that everyone is safe. (Stage 1, focus group discussion)

The responses concur with Williams's (2006) argument that technology education has traditionally been strongly focused on an established body of learning specific skills through doing. Banks and Barlex (1999) and Staples (2003) also posit that

many constructions of professional identity for design and technology teachers focus explicitly on the teachers' functional roles, that is, the transmission of specific subject content know-how. However, the majority of beginning teachers in the study identified that possessing knowledge of design and design processes was an important aspect of their subject content knowledge. These responses represented a shift in thinking about subject content that moved beyond the transmission of subject-specific know-how as identified by Staples (2003) to a more holistic and student-centred approach to knowledge construction. For example, Peter, who studied a double major in design and technology, stated "We need to understand and promote design thinking; this gives us (teachers) the ability to cover the curriculum content in meaningful ways, so we can guide students to think and not just do" (Stage 1, focus group discussion).

This understanding also manifested itself through beginning teachers identifying the need to use different and innovative pedagogical approaches that catered for student diversity and open-ended learning opportunities. For example, Evan, who studied a minor in design and technology, identified the need to cater for a range of learning abilities when teaching:

> You need to know the level of student ability in your class and be able to construct design tasks to cater for a range of students. This could mean, for example, having a large construction project like a model of an energy-efficient house. You then break down the task which could push the most gifted students but support the student who is still developing basic design and technology skills. (Stage 2, Interview 2)

Beijaard et al. (2000) posit that teaching cannot be reduced to a technical or instrumental action, but involves ethical and moral aspects, such as knowing and understanding the ways in which students learn, formulating subject content so that it can be understood by students, and developing effective communications strategies. When asked to identify the pedagogical knowledge that shaped their professional identity, beginning teachers' gave diverse responses. As Sue stated: "Pedagogy is unique to each and every teacher as a result of personal beliefs and ideologies as well as experience and knowledge within a subject and curriculum" (Stage 1, focus group discussion).

Beginning teachers centred their response on the students they were teaching and on meeting their learning needs. Responses were also generic to teaching generally. Data did not reveal aspects of pedagogical knowledge that could be identified as being specific to design and technology education, such as teacher demonstration. Although three beginning teachers identified instilling safe work practices as an aspect of their pedagogy, reference to how this would be achieved appeared to be less transmissive than past research (e.g., Williams, 2006; Staples 2003) would indicate. As Issac, a double major in design and technology suggested, "There is a need to balance student-centred pedagogy with safe work practices in workshop settings without resorting to lock-step processes" (Stage 2, Interview 1).

For Cathy and Carrie, who both studied a double major in food and textile technology, aspects of effective pedagogy included: "Planning a variety of lessons and assessment tasks to enable students with different skill sets to be successful; this could include oral presentations, using ICTs, as well as written assignments: (Cathy, Stage 1, focus group discussion); and "Engaging all students, presenting theory and practical lessons that are interesting, relevant and challenging" (Carrie, Stage1, focus group discussion).

An aspect of pedagogy that was rated highly by beginning teachers was the ability to develop relationships with students. The development of positive professional relationships was identified as a means to ensure relevance to the content of what was being taught. For example, Aaron suggested that:

> The pedagogical knowledge that I will need to become an effective design and technology educator is the ability to develop relationships with my students so that I can produce and negotiate tasks that will motivate and benefit them in meaningful ways. (Stage 1, focus group discussion)

SUMMARY OF FINDINGS

The data revealed that design and technology subject content and pedagogical knowledge continued to be strongly connected to the teaching of technical skills, safety, and safe work practices, coupled with the need to understand the fundamental properties of materials and processes. However, beginning teachers also acknowledged the need to move beyond the transfer of specific skills and knowledge and develop and implement innovative pedagogical approaches that catered for student diversity and open-ended learning opportunities. Teaching through a design-based methodology represented a shift in thinking to a more holistic and student-centred approach to knowledge construction.

Recognition was also given to the ever-expanding range of professional knowledge with which beginning teachers would need to familiarise themselves as they transitioned into teaching. Beginning teachers in this study appeared to embrace and, in some instances, welcome the opportunity to bring new professional knowledge to the field, viewing it as an opportunity to take ownership as well as enabling the learning area to move forward. According to Lamote and Engels (2010), these are the teachers who actively contribute to whole-school development and change, and who seek new challenges for themselves and students. Lamote and Engels apply the term "extended professional" to teachers who associate creativity, innovation, and collaboration as integral aspects of their professional knowledge. In design and technology education, the extended professional could be identified as the teacher who moves beyond teaching familiar content knowledge and skill development and seeks new and relevant directions for the learning area.

CONCLUSION

This research revealed that personal and professional histories are strong mediating factors in shaping the professional identity of beginning design and technology teachers. Through drawing on their personal and professional histories, beginning teachers felt they already possessed some aspects of professional knowledge needed for teaching and, as a consequence, appeared to commence teaching with a heightened level of confidence in their teaching ability. The technical skills, subject content knowledge, beliefs, and values that beginning teachers had previously developed provided them with a sense of identity stability as they transitioned into teaching. This stability was further reinforced through the positive acknowledgment and acceptance of their skills and dispositions from teaching colleagues and school students.

A direct interaction between professional and personal histories, identity, and professional knowledge was evident in the beginning teachers' responses. Issac's response captured this interaction when he stated that:

> The design and technology learning area is quite vast so being an expert across all areas is virtually impossible. To be relatively competent across all areas that you teach is important. Material technology, understanding CAD, electronics and design are all important to me. I think realistically the learning area needs to be somewhat a reflection of who you are as a person so that you are naturally interested in gaining knowledge and skills. (Stage 1, focus group discussion)

In conclusion, the findings suggest that through making the connection between personal and professional histories and what happens in the context of schools, beginning teachers can be better prepared for any disjuncture or tension that they may confront once they commence teaching (Beauchamp & Thomas, 2009). More importantly, the process of "becoming" and time of identity transition and transformation can become a positive and professionally rewarding experience.

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