

IMPLEMENTING THE NEW TECHNOLOGY CURRICULUM STATEMENT IN THE CONTEXT OF THE KNOWLEDGE ECONOMY

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Declaration

By submitting this dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

December 2010

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Abstract

The new Technology curriculum was included in the National Curriculum Statement (Department of Education, 2005) as part of the broader intention of serving as the vehicle for reconstructing our society and our orientation towards education for the 21st century. In this narrative I will start by exploring the congruence between the technology curriculum, globalisation and the knowledge economy, the related discourses and the expectations these create for technology education in the Further Education and Training and General Education and Training bands in secondary education in South African schools. I will continue by critically engaging with the discourses and school-based patterns of engagement that shape the technology curriculum as well as teaching and learning practices in a secondary school. By locating my arguments within Pierre Bourdieu's theories of habitus, field and strategies, as elaborated on by Lingard and Christie (2003), as well as Foucault's theory of power, this narrative will engage with the perceived gap in the policy implementation process. This gap consists of a myriad of contextually interrelated factors that interact with the achievement of the prescribed outcomes and ultimately the intention of shaping learners for meaningful participation in the knowledge economy.

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Chapter 1: Proposal

1.1 Introduction

The transformation of our education system is, apart from other aims, directed towards enhancing skills-based competencies to enable citizens to participate in the global community. The National Curriculum Statement (NCS) (Department of Education [DoE], 2005), with its emphasis on Outcomes-based Education (OBE), was launched in March 2007 with the intention of serving as the vehicle for reconstructing our society and our orientation towards education for the 21st century.

Judged by the proposed outcomes to be achieved by the new Technology curriculum, schools are fundamentally expected to shift away from being traditional educational institutions to become institutions whose aim it is to provide learners with “skills, knowledge, competencies and confidence that equip them to explore entrepreneurial initiatives which will enable them to contribute to South Africa’s social and economic development” (DoE, 2002:5). It is well documented that South Africa has a critical skills shortage, which hampers economic growth (Bhorat, 2007:10). The introduction of skills teaching assumes that it will be beneficial for economic and social development in the country and will equally distribute skills enhancement among all the citizens.

Technology education was introduced with the other learning areas in our NCS with the intention of equipping learners with the necessary knowledge, skills, values, attitudes, criticality and creativity to enable them to enter higher education which have to “ provide education and training to develop skills and innovations necessary for national development and successful participation in the global economy” (DoE , 1997:9). The Technology curriculum, it can be argued, is rooted in the discourse of economic globalisation and marketisation that orients participants toward meeting the demands of the industry. My preliminary contention is that the way in which Technology education in the general education and training (GET) and further education and training (FET) phases is situated within our schools and has been managed since its inception in 1998 is seriously challenging to the possibility of realising the goal of more equal participation in the global knowledge society in the near future. The purpose of this study is to critically engage with the discourses and school-based patterns of engagement that shape the

Technology curriculum as well as teaching and learning practices in a secondary school. As a practising Technology educator, I believe it to be of the utmost importance to engage with these discourses and how they shape the everyday practice of educators as they interact with policy intentions.

Firstly, I explore the congruence between the Technology curriculum, globalisation and the knowledge economy, the related discourses and the expectations they create for technology education in secondary education. Secondly, I explore the changing role of educators within the changing environment by exploring the ignored gap in the policy implementation process. This will be used to highlight the myriad of factors, which I categorise as ‘seen’ and ‘unseen’ that might influence classroom practice. I will then engage with four current practising Technology educators and interpret those interviews in order to form a more comprehensive idea of how other agents are experiencing the situation within their everyday practice. The information gathered in the interviews will be woven into the two organising categories as it resonates or conflicts with my own experience during the period of implementing the new Technology curriculum. I will conclude by highlighting and interpreting actions identified within the interviews from the perspective of Bourdieu’s notions of habitus, field, practice and strategy, as elaborated on by Lingard and Christie, as well as the Foucauldian notion of power as interpreted by Ball (1995) and Berkhout (2005).

1.2 Rationale

Policy implementation is perceived as a linear process that consists of the logical phases of the policy as text, the implementation process and the realisation of the aims or outcomes to be achieved. I argue that this linear process reveals ‘gaps’, especially between the policy as text and the outcomes to be achieved, that are important and mostly unexplored or ignored. On the one side, there is curriculum content that aspires to the ideals of the global knowledge economy and idealistically prescribed outcomes to be achieved, whilst on the other side, there are the everyday school practices or patterns of education delivery. By locating my arguments within Pierre Bourdieu’s notions of habitus, field and strategies as well as Foucault’s approach to power, this narrative will engage with this perceived gap between policy intention and policy enactment, in which there is a myriad of contextually related factors and interactions that influence the achievement of the prescribed outcomes.

Part of educational restructuring in South Africa was the introduction of OBE, which envisaged a major overhaul of the curriculum. This involved drastic changes in not only content but also teaching methodologies as well as new approaches to assessment. This came into direct conflict with the habitual patterns of teaching as well as the way many educators had been trained. Science, Mathematics and Technology, which form the basis of the national government's National Science and Innovation Initiative, are supposed to enhance economic growth through aligning participants with the 'Mode 2' means of knowledge production within a global context (Kraak, 2000:14). The Technology curriculum, according to the Revised National Curriculum Statement (RNCS) (DoE, 2002:5), envisages learners who are able to cope with the challenges of a technological society. A more skilled labour workforce is of critical importance to societies that want to compete globally (Muller, Cloete & Badat, 2001:154). This poses a major challenge for public schools, in comparison with specialist schools in the technical field, as a setting to introduce basic technical skills and competencies to learners.

The concept 'technology' encompasses a wide array of practices with a huge emphasis placed on information and communication technology as well as genetic engineering. Schools are considered as ideal sites for establishing an elementary or primary base to create a technological educational infrastructure in order to achieve the expectations as set out in the national policy document. The "underdevelopment of a Technology infrastructure", according to Muller, Cloete & Badat, (2001:157), poses a "major obstacle to development" throughout the world. Not creating an educational environment that focuses on both the ideals of adhering to market ideology and creating a favourable educational environment may contribute to the exclusion of possible competent participants from this technological infrastructure. The discourse of the free market ideology also features prominently throughout the Technology curriculum and introduces notions from the business world into the educational space. My narrative, however, will focus particularly on Technology in the GET band, which has a more general approach to the field of Technology, and Civil Technology in the FET band, which focuses on aspects within the civil engineering field.

In my experience, the implementation process of Technology in the GET and FET bands caused major confusion and frustration among the educators who were supposed to teach it. Teachers as the mediators between education policy and practice were expected to teach a new learning area

for which few were adequately prepared. The process of restructuring demanded change and adaptation from educators whilst the curriculum was not adequately integrated in existing school structures. This resonates with Heelas and Morris (1992) as cited in Ball (2006), who argues that there was too big an emphasis on the process of change, while the transformation of the local conditions, the prevailing values and cultures embedded within it as well as the formation of new subjectivities was neglected. Viewing policy implementations as a linear and rational process reduces educators to the role of implementers, which according to Brain, Reid and Boyes (2006:412) takes teachers' consensus for granted (or regarded as unproblematic), their task seen as being to fulfil the culturally prescribed roles as envisaged by policy.

This research arose from my personal struggle to comprehend and to make sense of the changes with which I as a practising educator had to deal with on a daily basis. This research was also born out of the desire to examine those changes and what they entail and to try to understand what my personal and professional shortcomings is in order to become a better educational practitioner. In this process of engaging with my experience and highlighting some aspects of the implementation of the Technology and Civil Technology curriculum, I also hope to contribute towards the understanding of this process, described by Ball (2006) as the policy gap, and the hidden dimensions that are often neglected, ignored or taken for granted in the process of policy implementation. The sub question I will be asking is to what extent the current process of implementing the Technology and Civil Technology curriculum is contributing towards the attainment of the aims as set out in the RNCS (DoE, 2002), namely the enhancement of skills-based competencies to enable citizens to participate in the global community.

It is important, in the interest of social participation in the implementation process, to establish how educators as the implementers of this policy are responding to and engaging with the policy text and the accompanying discourses. My own and some other teachers' experience pertaining to structuration patterns and our interaction with these patterns influence the achievement of the goals as set out in the RNCS.

I will attempt, from a personal as well as a professional perspective, to express some of the problems and challenges experienced in my practice as a Woodwork educator adapting to the new Technology curriculum. In this inquiry, and in the interviews with other educators, I will focus on the implementation or translation of policy text into school practice. In this inquiry, I

will critically explore the school and classroom space that the policy text enters. By exploring my own and others' experiences, I hope to contribute to highlighting local discourses and structural patterns that affect the ability of learners to participate equally within a global context. Exploring the mediation of the restructuring process in the Technology learning area might shed some light on the broader approach of facilitating these changes throughout the national curriculum.

1.3 Problem statement

This research project endeavours to highlight some of the contextually located interactions that pose challenges to the implementation of OBE. There is increasing contention that OBE has failed our education system and learners, with numerous claims made to substantiate those assumptions. The reasons given mostly relate to poorly prepared educators, the lack of well-trained educators, and an unacceptable or non-existent basic level of competencies in literacy and numeracy skills among learners at a certain stage of their schooling and a basic lack of resources. I examine and reflect on some of these reasons from a personal perspective, utilising my own experience, informed by Bourdieu's and Foucault's notions, to highlight some aspects that I perceive as important in facilitating a smoother implementation process as well as some underlying interactions that are normally ignored. Ball (2006) alludes to a policy gap that exists within the implementation process, which I perceive to be between the policy text and the implementation phase. I examine some of the underlying unseen effects and assumptions that may, when identified and addressed, contribute to the amelioration of some of the confusion and frustration in the educational environment.

This research will particularly focus on the implementation of the Technology curriculum in the GET band and the Civil Technology curriculum in the FET band. This narration will be based on an exploration of my personal experience and how it resonates or conflicts with the experiences of educators who experienced the same introductory phases of the new curriculum.

Very seldom is there sufficient communication and proper engagement with practising teachers on what the expectations of the new system are of them and, more importantly, what this system entails. The role and power of educators, one of the dominant agents in the implementation process, are thereby undermined.

1.4 Methods and methodology

My choice of narrative inquiry emanated from an encounter in one of our contact sessions in 2006 during the structured part of the Masters in Education Policy Studies course at Stellenbosch University when Professor SJ Berkhout, my current supervisor, mentioned that research could serve to transform personal experience in the academic field. A narrative inquiry is seen by Clandinin and Connelly (2000), as cited in Howe (2005:123), “as a qualitative method for unearthing teachers’ personal practical knowledge. It involves making meaning of experiences through stories that both refigure the past and create purpose in the future”. Against this background, the use of autoethnography as an approach arose. This would enable me to account for my experience as it provided for a detailed description of a specific experience that happened during a certain stage (and is still continuing), in practising my teaching profession. Autoethnography arises from autobiography, which in a literary sense means “the literary genre of accounts of people’s lives as recorded by themselves”, and ethnography, which consists of “a detailed description of the culture of a particular society” (Chambers Concise Dictionary, 2004:77, 396). Autoethnographic writing offers a suitable genre of representation to pursue my research project.

Large portions of this research will follow a “personal narrative” and an “autoethnographical” (Ellis & Bochner, 2000:733) approach in which my and the participants’ experiences will be reflected on to form part of the topic to be investigated.

Ellis and Bocher (2000:653–667) include the following elements as characteristics of “*heartfull* autoethnography”:

The use of systematic sociological introspection and emotional recall; the inclusion of the researcher’s vulnerable selves, emotions, body and Spirit; the production of evocative stories that create the effect of reality; the celebration of concrete experience and intimate detail; the examination of how human experience is endowed with meaning; a concern with moral, ethical, and political consequences; an encouragement of compassion and empathy; a focus on helping us know how to live and cope; the featuring of multiple voices and the repositioning of readers ‘subjects’ as co participants in dialogue; the seeking of a fusion between the social science and literature; the connecting of the

practices of social sciences with the living of life; and the representation of lived experience using a variety of genres – short stories, poetry, fiction, novels, photographic essays, personal essay, journals, fragmented and layered writing, and social prose.

Reflecting on my personal experience will allow me to express my “feelings, thoughts and emotions” and will allow for a “systemic sociological introspection and emotional recall in order to attempt to understand the experiences” (ibid. 737) I lived through. Autoethnography, the authors further note, is an autobiographical genre of writing and research that displays multiple layers of consciousness, connecting the personal to culture (ibid. 739). Interviews conducted will also be employed in order to determine whether my personal experience resonates or conflicts with the experiences of those exposed to the same situation and conditions.

Denzin (2003:258–259) regards autoethnography, or what he describes as performative ethnography, as the future of ethnography. He locates this in what he calls the “seventh moment”. The other six moments, according to him, are the traditional (1900–1950), the modernist (1950–1970), blurred genres (1970–1986), the crisis of representation (1986–1990), the postmodern or experimental (1990–1995) and the post-experimental (1995–2000). The future (2000–) constitutes the seventh moment. In the seventh moment, according to him, the dividing line between (autoethnography and ethnography disappears. He posits that reflexivity is critical to the ethnographic discourse because it allows for the ethnographer to become the guiding presence in the ethnographic text. In the seventh moment, critical social science comes of age and becomes a force to be reckoned with in political and cultural arenas.

Denzin (2003:268–269) continues by identifying three types of reflexive ethnography. In the first type, confessional ethnography, the writer refuses to make a distinction between self and other, creating the space for autoethnography, for feminist, racial, indigenous and borderland standpoint theories and inquiries (Foley, 2002:475, as cited in Denzin, 2003:269). The second type, theoretical reflexivity, which will be my choice for this research, is associated with the work of Bourdieu and Wacquant (1992), as cited in Denzin (2003:269), who advocate an epistemologically reflexive sociology and ethnography grounded in everyday cultural practices. The sociologist, according to these authors, works back and forth between field experiences and theory, cultivating a theoretical reflexivity that produces a detached, objective, authoritative account of the world being studied. Also grounded in ethnographic data, this reflexive approach

insists on recording lived experience while bringing that experience into a “productive but unfussy relation to ‘theory’ ... the criterion for relevance is maximum power in relation to the data for purposes of illumination” Denzin (2003:269). Such illuminations become a catalyst for “self-reflexivity and self-examination ... producing objective ethnographic accounts that are as rigorous as possible” Willis (2000:113-116) as cited in Denzin, (2003:269). Carspecken (1996) as cited in Denzin (2003:269), deploys a critical, reflexive epistemology that involves the collection of monological data, the generation of dialogical data, the discovery of systems relations and the use of systems relations to explain findings. In Carspecken’s model, truth is judged in terms of a set of regulative rules, including normative and intersubjective referenced claims that must be met in order for a statement to be judged truthfully. In the third type of reflexive ethnography, Viswesvaran (1994) as cited in Denzin (2003: 269), unsettles the notion of an objective, normative, reflexive ethnographic approach that presumes an observer and a subject with stable identities. Ethnography, according to him, “has little interest in developing a foundational scientific method” (ibid. 270). Hammersley (1990), Brewer (2000) as cited in Howe (2005:123), however, “contend that reflexive ethnography can be done with just as much rigour as any other method in social science”.

I find theoretical autoreflexivity a useful way of conveying my own experience as well as that of fellow educators in trying to make sense of the Technology curriculum (how we were informed, prepared and supported for these curriculum changes in our teaching practice) implementation process. Reed-Danahay (2002:421) posits that “the issue of representation and self-reflexivity is quite complex in auto ethnography, and depends on our understanding of what is ‘authentic’ or ‘real’”. She continues, saying that “in the realist convention of ethnological description, the self of the ethnographer is de-emphasized or hidden altogether”. ‘Authority’ in self-reflexive ethnographic writing, according to her, is established through the ethnographer’s ability to write sensitively and engagingly about (and, above all, to problematise) the border zones and sites of encounter between his or her life story and that of, as in this case, the participating educators.

My writing approach differs from what is called the ‘realist’ approach to writing in the sense that I am not detailing and analysing my colleagues’ experiences with the aim of ‘objectively’ describing these along scientifically conventions. The main aim is to bring out the human effect in the ethnographical encounter. I will present and relay ‘facts’ by reflecting on and socially

engaging with my experience during the implementation period. I required participant teachers to engage with their own experience through an open-ended questionnaire that required them to reflect on and recollect their experiences and emotions during the same implementation process over the same period. This piece of ethnographic writing as a genre of presentation is an expository document in which my experiences and emotions are expounded and mirrored against those of the participants. The open-ended questionnaire guiding the process developed in dialogue with theoretical notions from Bourdieu and Foucault and my recollections of the implementation process. I hoped to allow the participants the opportunity to reflect on their own experience and in the process to enable a dialogue with regard to my experience to enable a veracious, objective and perspicacious narrative.

Reed-Danahay (2002:424) warns, though, that care should be taken by the writer to ensure that he/she is able to make use of his/her own experiences as a way to teach us about our craft itself and/or the social worlds of the ‘others’ who are the participants in our research.

This research is furthermore positioned as a qualitative inquiry guided by the interpretive and the critical paradigms. According to Terre Blanche and Durheim (2002:6), the interpretivist perspective allows for the internal reality of subjective experience (oncology) as well as empathy and observer intersubjectivity (epistemology) to emerge. They further state that this methodology also accommodates an interactional as well as an interpretational approach and the reliance on the relationship between the researcher and the subject.

Critique and criticism begin in those spaces “where people actually live their lives ... where meaning is produced ... and contested” (Giroux, 2000b:170, as cited in Denzin, 2003:266). As a concerned citizen, working with others, the person takes up a position on critical issues of the day, understanding that there can be no genuine democracy without opposition and criticism (Giroux, 2000a:136; see also Bourdieu, 1999:8, as cited in Denzin, 2003). Critiquing, through giving meaning to lived experiences within a specific stage in our country’s educational transformation period, may contribute to a more critical understanding of the challenges facing the implementation of policy.

Apart from the account of my own experience, the methods employed were probing, semi structured interviews, using an open-ended questionnaire, which were conducted among a

selected group of educator participants who shared a similar process of policy implementation. Their responses are included as an appendix in the final thesis document. I interpreted these interviews in order to determine the subjective reasons and meanings behind the participants' social action. Terre Blanche and Durheim (2002:6) note that the methodology also allows for prove of how versions of the world are produced in discourses in order to demonstrate how constructions of reality make certain actions possible and others unthinkable.

The sampling group consisted of four secondary school educators who had been part of the implementation process since inception, both in the technology (GET) and the Civil Technology (FET) bands and who had to make the shift from being a woodwork educator to a Technology/Civil Technology educator.

The method of applying qualitative research analysis and interpretation after the interviews was within the framework as espoused by De Vos, Strydom, Fouché and Delpont (2002). After the collection of the data, it was transcribed, qualitatively analysed and interpreted in order to make sense of it. The content analysis was performed directly with existing transcribed interviews to extract the main themes from the individual responses on the questions.

The analytical process demands a heightened sense of awareness and attention with regard to the subtleness of the data and the tacit undercurrents within experiencing the implementation process by the educators.

Salient themes and recurring ideas or language were identified to determine/identify patterns of linking educators' experiences in different settings together in order to integrate their entire personal endeavour in the implementation process with my personal experience. Throughout, the analytical process was searched for internal as well as external divergences (resonance and dissonance), in order to seek and identify the salient meaning held by the different participants in their respective settings.

The data were interpreted in order to make sense of it through basing my insights on my personal experience and those of the respective participants. Grounding arguments within the theories of Bourdieu and Foucault allows for an alternative, critical explanation and for demonstrating how and why these arguments are plausible (Marshall & Rossman, 1995:116–117) as cited in De Vos et al., 2002).

1.5 Process of conducting the interviews

At Civil Technology cluster meetings prior to the interviews, I identified four educators with whom I had become acquainted during my years of teaching Woodwork. I approached them during 2006 to inquire about their availability for participation in my research because the sample group had to consist of educators with more or less the same background as I had. This meant that they were qualified to teach Woodwork and had been doing so for a long period, some between 15 and 20 years, which might contribute to rich, detailed feedback from them. Another requirement was that they had been part of the inception phase of the new Technology curriculum, grades 8–12. After the setting of my open-ended questionnaire, I called these teachers again and was very accommodative in allowing them to set a date and venue for the interviews. It was important that they were at ease in a familiar and relaxed atmosphere of their choice. The venue had to be an environment with an atmosphere conducive to eliciting an account of their authentic experience. I also explained to them the terms and conditions under which the interviews had to take place. After that, I either took or emailed the consent forms as well as the questionnaires to them. In order to obtain reliable data from them, I decided on this approach because this would ensure that the participants had enough time to reflect on the introductory process of the Technology curriculum since 1998. Respondents 1 and 3 opted to be interviewed at their homes while Respondent 2 opted for the luxury of his classroom after a normal day at school. Respondent 4 opted to be interviewed at my house because of inconvenient conditions at his. On the dates of the interviews, I explained the conditions again, completed the consent form, which they signed, and proceeded with the interviews. I encouraged the participants to seek clarity on questions that they were not clear on. I only interrupted when they mentioned something that needed to be elaborated on or when I felt that they had misinterpreted the questions. Some of them preferred to make short summaries to guide their response to the respective questions. In the process of answering, they just followed the flow of the questions and responded to them.

All the participants appeared to be relaxed and not to be intimidated by the presence of the voice recorder.

1.6 Relationship with the participants

When first approached, the identified participants were willing to participate in this research, which I ascribe to maybe sharing the same frustrations and emotional turmoil when being confronted with the new Technology learning areas as well as the relationship of trust and rapport being built over the years between us. I am an educator, qualified in teaching Woodwork since 1989. At the start of writing this thesis, I was still a Post-level 1 educator at a secondary school where I taught General Handwork standards 6 and 7, (now known as Grade 8 and 9, and Woodwork standards 8–10, now grade 10–12 until the stage when Technology (GET) and Civil Technology (FET) were introduced into the national curriculum. I have taught Technology (GET) since its inception (grade 8 and 9), as well as Civil Technology (FET) at Grade 10 level because we had a teacher with a Civil Technology background who was better equipped to teach the learning area in grades 11–12, relying on his previous knowledge and experience in the Civil Technology field. This protected me from the full impact of the Civil Technology implementation process. At one stage, this colleague of mine obtained a promotional post at another educational institution (FET College). I unwillingly had to deal with his Grade 11 classes for a big part of that year because my school could not find someone to occupy his post. Luckily, at that stage the FET college structures changed, which caused educators there to opt for school posts. We were lucky to find a very competent person to teach the learning area at my school, also giving me the opportunity to learn from a qualified person from the Civil Technology field. Since October 2009, I have held a promotional Head of Department (HOD) post at the primary school where I currently teach.

Respondent 1 at the start of writing this thesis was a deputy principal, teaching Woodwork and General Handwork at a secondary school. At the time of the interviews, he had 23 years teaching experience. At their school they did not have any intention of phasing out the learning area in the near future.

Respondent 2 was a senior educator at an Learners with Special Educational Needs (LSEN) school, with 33 years experience as a Woodwork and Metalwork teacher. He was very vociferous at cluster and information and training sessions, which persuaded me to include him in my sampling group.

Respondent 3 held an HOD position and had 30 years teaching experience at a secondary school, teaching Woodwork and General Handwork. His school was my neighbouring school and we had been liaising on Woodwork subject matters since I started teaching in 1989 because we belonged to the same regional school cluster. He was the convener of the Woodwork cluster in our region. His school also had no intention of phasing out the learning area in the near future.

Respondent 4 was a Post-level 1 senior educator with 28 years teaching experience, of which 20 years were in Woodwork and General Handwork. He and his colleague in the Woodwork department opted for Civil Technology and Engineering Graphics to replace Woodwork. Interestingly, at the time of conducting the interviews, his school had phased out Engineering Graphics in 2009 already. The school is currently considering the phasing out of Civil Technology in the near future.

1.7 Ethical considerations

The group of participants was selected from the group of educators I had become acquainted with on a professional level during Woodwork and later Civil Technology and Technology learning area cluster meetings. I believed that because we knew each other at a professional level, the atmosphere would be more relaxed, which would lead to an honest and meaningful, probing engagement. The respondents or participants were also made to feel relaxed and free to clarify questions if they did not understand them properly.

Permission or consent to enter the respective schools if necessary was obtained formally through the Western Cape Education Department (WCED) as well as from the appropriate schools and participants. The signed consent forms of the participants, their schools and the WCED were then submitted to the Ethical Committee of Stellenbosch University, in order to obtain ethical clearance to proceed with my interviews. Preventive measures were taken to ensure participants' confidentiality, their autonomy and their anonymity, especially with the procedures followed in using the audio recorder. They were informed beforehand of the purpose of the research, how the data would be recorded, stored, processed and published, and what their role in the research project would be. Participation was voluntary and to guarantee confidentiality, participants were requested to sign consent forms. Extra preventive measures were taken to ensure that I, as the researcher, would not be biased by controlling and manipulating the collected data to confirm my

assumptions with regard to the research question. I tried to identify and link ‘the conceptual evidence’ from the interview analysis and determine how it concurred or differed from my own subjective experiences and perceptions in order to find common grounds and give more credibility to it. Krathwohl (1993:271) posits that conceptual evidence links empirical evidence to concepts, theories or rationales. The views from the participants were be evaluated against my interpretation of the theories of Bourdieu and Foucault, on which I based my arguments. Generalisations without proven consensus on opinion might influence my research findings and thus undermine the validity thereof.

1.8 Chapter outline

Chapter 1 focuses on the background leading to this research. Chapter 2 looks at the congruence between globalisation, the knowledge economy and the Technology curriculum and the implications for it within the South African context as well as the developing world. In Chapter 3 I theorise Ball’s ‘policy gap’ within the implementation process. I then continue to explore the ‘changes’ expected of participants/educators within the implementation process by positioning my claims within Foucault’s theories of power and discourse and Bourdieu’s theories of habitus, field and practice, as elaborated on by Lingard and Christie (2003). Chapter 4 identifies and categorises aspects that I perceive as salient within the policy gap that is influencing policy implementation into ‘seen’ aspects, while the ‘unseen’ aspects are dealt with in Chapter 5. Throughout these two chapters, the analysis and interpretation of the interviews with the participants as well as their experience are integrated in order to show how their experience resonates or conflicts with my personal experience within the same implementation process. The final chapter is used to substantiate how the actions of the educators correspond with Bourdieu’s theory of habitus, field, practice and strategy, as elaborated on by Lingard and Christie (2003) , as well as the Foucauldian notion of power as interpreted by Ball (1995) and Berkhout (2005).

Chapter 2: Globalisation and the knowledge economy shaping the Technology curriculum in South Africa

2.1 Introduction

In Chapter 2 I will explore the convergence between globalisation, the knowledge economy and the Technology curriculum, as implemented in South African schools. I will start out by briefly unpacking some of the concepts of globalisation, network societies and the knowledge economy. Globalisation is a very broad phenomenon, and for the purpose of this discussion, I will only be focusing on it as it speaks to the knowledge economy and the Technology curriculum. I will also briefly allude to the introduction of Technology as an OBE learning area, the challenges it poses to the educator and how the outcomes in it inform the Technology curriculum. Reference will be made to the fundamentals within the Technology curriculum, which orientates itself towards a new mode of knowledge production: Mode 2. This new mode of knowledge production endeavours to produce a knowledgeable human capital base to eventually participate in the global knowledge economy or community. I will conclude by discussing the impact of globalisation on the developing world, as expounded by Manuel Castells, cited in Muller, Cloete and Badat (2001). Kraak (1998:5) posits that the substantive number of changes that is being initiated by a globalising economy is central to the focus of most education and training systems worldwide. The situation of South Africa as a developing country can be put into perspective by drawing on the experience of other developing countries where the effects of globalisation are evident in their societies and education systems. By doing this I will also attempt to highlight some of the challenges that are facing most South African schools when putting structures for teaching and learning in Technology education in place. The most daunting challenge will be the maintenance of these structures as well as making them accessible to the whole of the school population. Achieving this goal may ensure that every learner will have an equal opportunity to take advantage of the opportunities offered by the South African education system.

2.2 Convergence between globalisation, the knowledge economy and Technology education

2.2.1 Globalisation and the resulting knowledge economy

Globalisation, according to Muller, Cloete and Badat (2001:viii-ix), is usually associated with the diminishing of national boundaries with the intention of establishing a global village with an uniform value system. Olssen and Peters (2005:313) see globalisation as a form in which “domestic and global economics relations are structured” in a way that enables economic activity across international borders without any constraints. The globalisation phenomenon is not restricted to economic exchange relationships but is also visible in other forms, such as cultural, ecological and technological (Peters, 2003). Globalisation also applies to education and educational reform (Schriewer, 2003:271). Castells though, as cited in Muller, Cloete and Badat (2001:2) emphasised that this new economy is one of “all kinds of businesses and all kind of activities whose organisational form and source of value and competition are increasingly based on information technologies, of which the Internet is the epitome and the organising form”, but cannot be described as an internet economy. The development of Information Technology (IT), especially the Internet, enables more rapid interaction and exchange among nationalities. This leads to the formation of new social structures called network societies, made up of networks of production, power and experience (Castells, as cited in Muller, Cloete and Badat 2001:vii). These network societies are responsible for making information available to a broader global audience to be accessed, examine and improved on. In this way ideas may be challenged and improved on, leading to the creation of a pool of competitiveness in which new ideas become very quickly obsolete within this global village.

Globalisation is a sociological as well as an economic discourse. Deriving from globalisation are economic discourses such as a post-industrial economy, new economy, knowledge society, information economy, knowledge economy and learning economy, as economic ideologies evolve over the years. Underlying globalisation is the shift to post-industrialism, which signifies a technology-driven shift from a manufacturing industry to service industries and with it the emergence of the need for and the importance of knowledge in the new economic environment. Friedrich Hayek (1899–1992) was one of the first individuals who emphasised the importance of

knowledge in economic growth and advocated the organising of societies around the market ideology.

According to Peters and May (2004:263), the concepts ‘knowledge economy’ and ‘learning economy’ can be traced to a series of reports that emerged in the mid 1990s by the Organisation for Economic Co-operation and Development (OECD). “National policies for encouraging knowledge generation, knowledge acquisition, knowledge diffusion, and the exploitation of knowledge have become the most pressing priorities in the science, research and education policy regime. The knowledge economy is seen to demands meta-cognitive skills that are broad and highly transferable, such as problem-solving and the ability to learn” (Peters and Humes, 2003:2). These changes in economic ideology led to the rethinking of the relationship between education and the industry, resulting in education policies being adjusted to serve the purpose of the markets. Firms are turned into learning organisations and are being offered incentives to develop research into their area of business and to invest in knowledge infrastructures by investing in transportation, the higher education sector, alongside broad policies to encourage investment in human capital development such as education, training and apprenticeships (Peters and Humes, 2003:2).

According to Danny Quay (2003) as cited in Peters and May (2004:265), the importance of knowledge can be found in examples of where the deployment of machines boosted economic performance, such as in the Industrial Revolution. This period was characterised by the invention of machines as a means to enhance economic growth. Since the Industrial Revolution, the emphasis has shifted to a new mode of knowledge production, which expects of participants to possess a broader knowledge base with an array of skills to cover the whole production process. Workers in this economy are referred to as knowledge workers, with skills that require a higher level of cognition than manual skills previously required.

2.2.2 The alignment of the knowledge economy and the South African context

As mentioned in the previous section, the knowledge economy is a direct result of the emergence of the globalisation phenomenon. Early references to the knowledge economy can be traced back to work done by great theorists and thinkers such as Popper, Wittgenstein, Durkheim, Marx, Weber and Heidegger. These theorists wrote from a wide variety of backgrounds, such as economics, philosophy, anthropology and sociology. Fordism, named after Henry Ford, is characterised by “assembly line production, economies of scale, deskilled, often pre-union massed workers, long-runs of standardised goods in protected national markets and bureaucratic, centralised management” This system was abandoned in favour of an economic system in which there is a major emphasis on the utilisation of knowledgeable human capital. Knowledge and information have come to be valued as just as important as financial capital and resources as a source of economic growth. The transmission and shaping of knowledge and information by nation states become an important aspect in the development of the global economy. One of the fundamental aspects of this economy is that information and knowledge can never be depleted when being used and can be shared through application. Knowledge is a broader concept than information and can be divided in terms of “propositional knowledge”, which embraces factual and scientific knowledge, and “tacit knowledge”, which is difficult to codify and measure (Peters, 2003:365–370). Ankiewicz, De Swart and Engelbrecht (2005:2) refer to “propositional knowledge” as “conceptual or descriptive knowledge”, which, according to them, relates to the links between knowledge items, which leads to the understanding of it by learners. “Tacit knowledge” or “personal or implicit knowledge”, they posit, cannot be taught but is gained through repeated practice.

As one of the major areas of public policy investment, governments around the world, in both developed and developing economies, restructured education systems to be in line with the knowledge economy template. This restructured template entails the development of knowledge infrastructures, the reform of knowledge institutions and a stronger focus on human resources who are constantly encouraged to upgrade their skills through continued learning in formal and informal environments (Peters & Humes, (2003).

Peter Drucker (1969) as cited in (‘Worldbank on KE\Knowledge economy - Wikipedia, the free encyclopedia.mht.) was regarded after his book, *The Age of Discontinuity*, as the person who

popularised, if not invented, the term ‘knowledge economy’. Powell and Snellman (2004:201) define the knowledge economy as “production and services based on knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advance as well as equally rapid obsolescence”. The key component of a knowledge economy includes a greater reliance on intellectual capabilities than on physical inputs or natural resources. Theoretical knowledge is seen as the central transferable commodity and source of innovation in a market-driven economy. The knowledge economy is characterised “in terms of the economics of abundance, the annihilation of distance, the de-territorialisation of the state, and the investment in human capital” (Olssen & Peters, 2005:331).

According to Joseph Stiglitz(1999), as cited in Olssen and Peters (2005:330), former chief economist of the World Bank, this transformation of knowledge production had a negative effect on education policies globally. Burton-Jones (1999) as cited in Olssen and Peters (2005:331), affirms that this “shift to a knowledge economy involves a fundamental rethinking of the traditional relationships between education, learning and work, focusing on the need for a new coalition between education and industry”. The developmental fundamentals of this new economy concentrate on communications and human resource capacity, with the emphasis on the development of a knowledgeable labour force to strengthen economic growth.

A knowledge economy, according to the World Bank (2003:2), rests on four pillars:

- A supportive economic and institutional regime to provide incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship.
- An educated and skilled population to create, share and use knowledge.
- A dynamic information infrastructure to facilitate the effective communication, dissemination and processing of information.
- An efficient innovation system of firms, research centres, universities, consultants and other organisations to tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new technology.

The South African education system prior to 1994 had all the characteristics of the industrialist or Fordist approach, which was aimed at producing cheap labour. With the dawn of the new democracy, South Africa was able to interact and compete globally. OBE, which invests in human capital, was introduced. This was in line with global economic trends. When evaluating the new South African curriculum outcomes, it is evident that these are in line with the demands of the labour market, which requires knowledgeable high- and multiple-skilled workers, investment in an information and communications technology (ICT) infrastructure, productivity, innovation and entrepreneurship. Also evident is the acceptance of the model of lifelong learning, which entails the recognition of non-education and training programmes that can take place anywhere outside the formal system, which was not previously recognised by the national education system.

The introduction of the Technology curriculum in South African schools, which differs from the previous vocational training initiatives, is also evident in the need for the turning out of engineers, technicians and skilled craftsmen. Technical training was previously confined to technical schools and institutions but is now being introduced in the broader public school spectrum. Technology and economic growth, according to the World Bank (2003:4), are strongly correlated in industrial countries with the rate of technology transfer, strengthening the link between education and economic growth. Pohjola (2000) as cited by the World Bank (2003:5), asserts that it is “only in more affluent countries, where the overall level of education is higher, that technology adoption is strongly linked to the education of the labor force”.

I will now explore how the Technology curriculum interacts with the template of the knowledge economy.

2.2.3 Globalisation, the knowledge economy, Technology and the South African context

The effect of globalisation on the restructuring of education in South Africa is evident in the accentuation of the discourses of “human capital development to meet the demand for a more skilled and educated populace” (CHEb, 2002:2, as cited in Waghid, 2002:25). Referring to the South African context, Katerina Nicolaou (1999) as cited in Motala and Pampallis (2001:55), posits that the neglect of a collective approach to investment in human capital by the previous apartheid government led to low structural employment and low productivity levels.

The DoE's White Paper 3 (1997:8) refers to this mismatch between the outputs in higher education in comparison with the needs of a modernising economy. The shortage of highly trained graduates in fields such as Science, Engineering and Technology is "a result of discriminatory practices that have limited access of black and women students" to these fields. Denying the working class and other communities, who comprise the majority of the South African population, access to education and training restricted them to the unskilled labour sector. This enforced the prevailing inequities and imbalances in our society. The current shortage of expertise in these disciplines proves to be detrimental to the social and economic development in the country. The White Paper, which outlines the challenges in transforming higher education, defines higher education as all the learning programmes higher than the current FET certificate in which the Technology curriculum falls. The Technology curriculum outcomes allow for earlier exposure of learners to the technical field, which will make the transition into higher education more effective.

The FET curriculum, intend to eradicate those shortages as referred to in White Paper 3 (1997), and give impetus to the transformational process of providing an inclusive, knowledgeable labour force with an emphasis on skills-based education that is directed at a much broader sector of the country's population.

By evaluating the underlying requirements in the South African Science and Technology policy (DACST 1996:1-14), it becomes evident that there is a congruence between the outcomes to be achieved and the ideology of the global markets, which relates to "freedom of commerce" or "free trade" (Olssen & Peters, 2005:313). More emphasis is being placed on the acquisition of entrepreneurial skills, which can be seen as a link with the industry and the business world. Education before the knowledge economy always had the underlying intention of equipping individuals with the necessary cultural capital to serve an economic purpose within a society, although there was not too much emphasis on this intention. The advent of globalisation caused nation states to adjust their education policies towards this new approach. The South African school curriculum pre OBE offered different subject streams, which consisted of a general stream, natural studies, commerce and a practical stream at most disadvantaged public schools.

The subjects making up these streams were predominantly discipline based. Learners at the end of Grade 9 selected their preferred subject stream from the groups mentioned above, basing their choice on what they perceived to be their stronger subjects or on the subject stream that was in line with their intended choice of career. Tertiary education was then pursued at institutions such as universities, technikons and colleges after completion of Grade 12 (previously matric).

The transformation process in the South African context involved the shift from “a closed or elite, to a mass, open Higher Education and Training system” (Kraak, 1998:7), which led to the growth in programmes being offered at higher educational institutions beyond the provision of discipline-based degrees, diplomas or certificate qualifications. The ‘elite’ system was mostly reserved for the few learners passing through the system who were academically strong and those who possessed the financial means to access these institutions and were able to attend tertiary institutions that offered those discipline-based degrees, diplomas or certificate qualifications programmes. Besides those few catered for by the elite system, the majority had to find employment with salaries far below those that could be demanded with qualifications obtained at the elite institutions. This system resulted in major class divisions and inequalities and social exclusion in our society, a tendency that Castells confirms is evident even in first world economies (Castells, 1996) as cited in Muller et al., 2001:16).

Most students after completion of their Senior Certificate (having matriculated) pursued career options that were far removed from their subject choice at senior certificate level, which meant that they had wasted valuable years of education by completion of their school career. After matric, learners were likely to pursue careers that did not correspond with or build on their selected subject stream at school level. I am not implying that they were not able to utilise any of their skills acquired in completing, for instance, their senior certificate in a commerce stream. However, it would have been so much easier to adapt to the working environment after completing the certificate in the practical subject stream, which consisted of Woodwork, Needlework and Domestic Science.

A valid critique that can be argued against the previous Woodwork syllabus is that it was not of any relevance within the modern production setup and was too discipline based. The techniques taught in the syllabus were irrelevant within the modern working environment. The emphasis in the work environment is currently on productivity and mass production, enhanced by digital

innovation, and does not make provision for the time-consuming processes that learners had to learn in Woodwork. Computerised machines have replaced the tools and techniques and processes previously utilised. The new Technology curriculum, contrary to the Woodwork curriculum, is more in line with producing knowledge capital to fulfil the needs of the new knowledge economy. It exposes learners at an early stage to the new requirements (Mode 2), which I will allude to in the following section. There is also a clear line of continuity from the GET band to the FET band and onwards to tertiary level.

Although Kraak (1998; 2000) writes about the higher education sector, it is clear how Technology situates itself within these changes and orientates itself towards equipping learners with the necessary skills to enable them to meet the demands and needs of our transforming society within the context of the knowledge economy. This leads to a new mode of knowledge production: Mode 2.

2.3 New mode of knowledge production: Mode 2

Gibbons et al.(1998) and Scott (1997), as cited in Kraak (2000:14), posit that this new Mode 2 way or tradition of knowledge production:

arises in the interstices of existing disciplines, and therefore is ‘generated in the context of application’ instead of being developed first and then applied to the context later.....it is organizationally diverse and heterogeneous because Mode 2 is the outcome of teams of knowledge workers with diverse backgrounds, who are in most cases employed in pursuit of innovation by networking firms - they include academicians, R&D designers, production engineers skilled craftsmen and social scientists. Mode 2 knowledge is heterogeneous because its solution comprises both empirical and theoretical components and cognitive and non-cognitive elements in novel and creative ways.

Mode 1 consisted of established disciplinary knowledge (sciences) associated with universities and other institutions of higher learning (Kraak (2000:15).

This new form of knowledge production is clearly visible within the methodology of teaching Technology in the Revised National Curriculum Statement (RNCS), which focuses on the enhancement and the nurturing of learners’ responsiveness towards participation within an

integrative environment (DoE, 2002). Evidence is the inclusion of three technological outcomes, namely process and skills, knowledge and understanding, and society and environment (DoE, 2002:11–28). Workers required for this mode of production “need to understand how new technologies can be optimally applied, how the entire production process unfolds, how environmental contexts shape the execution of tasks, and how unexpected factors arise” (Kraak, 2000:5). The technological process, which is central in Technology and Civil Technology education, adheres to the need for problem-solving skills in the production process. Through the application of knowledge in the ‘design process’, critical and analytical thinking, which forms the basis of the production process, will be developed (DoE, 2002:6).

The technological process is applied in each of the prescribed three knowledge areas in the curriculum, which are structures, processing, and systems and control. Communication, the fourth area, is integrated throughout the first three areas. By evaluating the contents to be covered in the curriculum, it is evident that it endeavours to gradually introduce learners to skills levels as required in the broader skills band needed in the economy. Crouch et al. (1999), as cited in Kraak (2005), distinguish between skills levels, namely high, intermediate and low skill bands.

The skills required in the different sectors of the South African economy are as follows:

- *High skills sector*: Petrol, gas, chemicals, dies, paints, pharmaceuticals and office equipment
- *Intermediate skills sector*: Engines, machines, tools, metal machine tools and non-electrical machines
- *Low skills sector*: Meat, rubber, leather goods and textiles

Additionally, Castells, as cited in Muller, Cloete and Badat (2001), identifies financial analysis, computer software engineering and professional football, among others, as occupations in which skilled labour is situated within global markets.

Technology is clearly orientated towards the acquisition of the much-needed technical skills required in the abovementioned skills sectors of our national economy. Apart from the skills required by artisans and technicians, Technology also concentrates on the development of the

skills needed in research, agriculture and the industrial and service sectors in both private and public concerns, which Tikly, Lowe, Crossley, Dachi, Garret & Mukabaranga, (2003:298) identified as areas with skills shortages, in a study done in two Sub-Saharan African countries.

OBE, with a curriculum that opposes rote learning, addresses some of the weaknesses within our education system with the dual aim of economic growth and poverty alleviation in the South African context. It signifies a shift away from the old contents-driven syllabus to an “educational pedagogy encompassing the development of critical thinking, interdisciplinary curriculum contents, learner-centeredness, participatory teaching methods, community involvement and a concern to link the focus of formal education with the world of work” (Kraak, 1998:2).

This restructuring of the education system intends to include and accommodate more learners in the system. It also wants to cater for those citizens who were previously marginalised by the inclusion of community initiatives and the recognition of vocationally acquired skills as a new form of knowledge production.

This major shift away from the previous curriculum proved to be very challenging because most of the educators who were expected to teach according to the RNCS had been educated and taught in a historically inherited pattern of curriculum delivery. The role of educators changed from teachers who previously had been “teacher-centred and textbook bound” to teachers who were now required to be “learner-centred and facilitators; and innovative and creative in designing learning programmes” (Kraak, 1998:30) within the guidelines prescribed by the state. Educators are currently expected to facilitate the educational process in order to allow learners to develop at their own pace and ability. Adapting to changing policies contributed a great deal to the prevailing chaotic state of our education system that is currently being experienced.

2.4 Impact of globalisation on the developing world

Weighing the advantages and disadvantages of globalisation, as elaborated on by Castells, brings me to the conclusion that it has more disadvantages than advantages for developing countries. Some of the disadvantages, as noted by Castells as cited Muller, Cloete and Badat (2001), are that globalisation leads to an uneven increase in the standards of living, resulting in polarisation in societies, which allows the rich to become richer and the poor to become poorer. Soludo (2000) as cited in Muller, Cloete and Badat. (2001:54), posits that an important feature of the

current form of globalisation is that “it allows valuable, productive assets (financial capital and high-skilled labor) to be mobile across national economies while the population/labor are confined to geographic boundaries”. African countries are, according to him, subsidising the development of high-skilled workers for developed nations instead of advantaging their own economies.

Globalisation also leads to social exclusion to such a degree that it creates an inability in nation-states to develop an autonomous livelihood in world markets. It further enforces a dependence on global markets through funding from multinational financial institutions, whose funding conditions decrease or limit nation-states’ decision-making power over their own economic and social life, although they still have some regulating power.

Castells as cited by Soludo in Muller, Cloete and Badat (2001:50) further reckons that more than two-thirds humanity, including Sub-Saharan are currently locked up in the black hole of informational capitalism, and thus excluded from this globalisation phenomenon. This exclusion is a result of the underdevelopment of technological infrastructure as well as the lack of sustainability in developing countries. Technology relies on resources such as computers, which require the accompanying human resources that must be capable of keeping up with the constant changes in technological advancement. The current pace of development in computer technology, which quickly becomes obsolete, poses a serious challenge to our situation where these changes have not reached certain parts of our communities. This will only perpetuate the inequalities between those communities where infrastructures are already in place and those where they are not. In order to keep up with the rapid changes, structures will have to put in place in less privileged schools to ensure that these facilities are utilised and maintained adequately and effectively on a continuous base. Although most schools do possess the necessary infrastructure and facilities, it still remains a challenge to make on-site exposure and accessibility to these facilities possible for every learner in the system because of the large pupil population at schools.

I tend to agree with Castell and Muller as cited above, that ICT, although only one aspect of the knowledge economy, has become an integral part of societies and is responsible for the reshaping of our economies and social construction. It is generally accepted that skills in ICT are a basic requirement for global participation within the knowledge economy. These digital

technologies change at a rapid pace and are definitely posing a major challenge for South African schools and are putting financial constraints on education policies to put technological infrastructures in place to make global competitiveness a true reality.

2.5 Summary

Chapter 2 dealt with globalisation and the knowledge economy and how these inform or shape the South African national Technology curriculum. It is of the utmost importance to start this thesis with the contextualisation of the new Technology curriculum within the discourse of globalisation in order to understand the intentions of the transformation process that is currently taking place. Understanding the underlying intentions of the curriculum will provide a basis for my argument in Chapter 3, which deals with the changes taking place within our education system as well as the challenges these changes pose to the agents who are responsible for the implementation thereof. I will discuss the implementation practices of educators within Pierre Bourdieu's theory of habitus, field, strategy and practice, as elaborated on by Lingard and Christie (2003), which addresses how social agents operate in ways that are compatible with their social behaviour, as well as the Foucauldian notion of power as interpreted by Ball (1995) and Berkhout (2005).

Chapter 3: Expectations of change, the established patterns of habitus, field, practice and strategy, and the notions of power and discourses.

3.1 Introduction

This chapter will explore, from a practising educator's perspective, some of the interactions imperative to the change process. The change process referred to in this context is the policy changes and the enactment thereof within the South African educational environment, specifically a classroom where the new Technology and Civil Technology curriculum was implemented. I will firstly pursue this by identifying where in the perceived three stages of policy seen as a linear implementation process, namely policy text, implementation and the policy outcomes, elements that may influence policy outcomes reside. I will then position myself within Foucault's notions/theories of power and discourses and Bourdieu's notion of habitus, field, practice and strategy to inform my narrative. In the following paragraphs, I will briefly unpack the identified policy gap in the abovementioned linear policy implementation process, as used by Ball (2006), and the practices I experience through interaction in the implementation process. Utilising the theories of these two authors may enable me to unpack the agent disposition within the implementation process, which is detrimental to successful execution.

3.2 Theorising the policy gap

3.2.1 The policy gap in the implementation process

Ball (1995:20), an authoritative writer on education policies, warns against "over-and-under claims" about how policies are solved in context and also against notions that policies are "coercive and regressive". He cautiously alludes to these tendencies as a possible prelude to what he calls "creative non-implementation" or strategies employed to avoid genuine engagement with the implementation process. In this chapter, I endeavour to identify this policy gap in order to highlight the aspects that pose as challenges to implementing the Technology curriculum in South African schools. The tendency of looking to external or practical factors for achieving equity through education within our society seems to occur as a natural pattern of looking for solutions to our challenges. In doing this we unwittingly ignore the possible underlying seen and unseen effects that may arise because of inherent factors and historical patterns of delivery in

schools, to which Motala and Pampallis (2001:4) also refer as the “non-observable elements which relate to the pressures of broader social and economic policies, the impact of particular aspects of globalization, and the power of particular educational constituencies and social groups on the determinations of the educational reform process”. They continue by alluding to the fact that most analyses fail to look beyond the quantifiable findings in order to examine the complex of exogenous factors that results in these quantifiable characteristics of the educational system.

Ball (2006) alludes to this as a policy gap in the policy process when it is assumed that policy implementation is a linear process within the logical phases, progressing from policy text to implementation, which will lead to the desired outcomes. Within those three phases or spaces there are, however, interactions or effects that are intentionally or unintentionally ignored. I intend to focus on the gap that exists between the policy text and the implementation phase. It is within this gap that underlying unseen effects and assumptions that can possibly determine the implementation process and the intended outcomes are concealed. The influential practices in this gap or space are mainly related to the actors, prior policies, local conditions and a variety of smaller aspects. Meighan (1986:32) refers to these determining elements as the “hidden curriculum”, a term that pertains to “those aspects of learning in schools that are unofficially, or unintentional, or undeclared consequences of the way teaching and learning are organized and performed in schools”. In concurrence with his view, Snyder, as cited in Meighan (1986:73) sees the hidden curriculum “as involving the selective negligence of the non-assessable or non-examinable aspects of the official curriculum”. Valens (1974), as cited in Meighan (1986), defines this hidden curriculum “in terms of the non-academic consequences of schooling that occur systematically but are not made explicit in the official rationales for educational institutions”.

The official curriculum, however, according to Holly (1973), as cited in Meighan (1986:73), consists of four aspects of schooling that he defines as “matters of organization, the contents of learning, teaching methodology, and the general values which are promoted.”

Curriculum or policy changes imply partial or complete structural change or restructuring of a system and are easily perceived as regressive and out of touch with realities on the ground because of their conflicting imposition on existing patterns of action. This conflict of new policies with the local realities or habitual fields that were shaped over years of practice as well

as local conditions challenges existing practice. Reactions to new policies are often regarded as resistance to these, totally ignoring the conflict these policies may cause with regard to existing practices. Exploring those interactions through critically reflecting on the implementation of the technology curriculum may provide valuable insight into aspects affecting the implementation process within this learning area in the National Curriculum Statement (NCS).

3.2.2 Foucault on the notions of power and discourses

This section will investigate the actor (educator) policy relationship within the process, in order to do an analysis by utilising the Foucauldian notion of power as interpreted by Ball (1995) and Berkhout (2005), in order to make sense of the effect of policy in local school settings.

“Policies typically posit a restructuring, redistribution and disruption of power relations, so that different people can and cannot do things differently” (Foucault, 1981:94 as cited in Ball, 1995:20). The intention of policies is to strengthen state control, to provide a framework or parameters within which action in an organisation/state can take place and to guide activities in the organisation/state. Power relationships are organised along vertical lines of authority from administration to faculty to students, which gives the agents control over their respective positions in the hierarchical social order (Bowles & Gintis, 1976 as cited in Meighan, 1986:74). Berkhout (2005:317) posits that “curriculum and assessment policies ... are one of the powerful, concealed centralised’ measures used by governments to strengthen a central steering system, in order to achieve their goals, in this case economic goals. This also, according to the author, results in “discrepancies between the public or official rationale for the (re)distribution of power and the probable or eventual effects on educational processes and learning outcomes” and somehow does not seem to deliver on its initial promise or intention. Valens (1974), as cited in Meighan (1986:73), refers to these concealed measures as the hidden curriculum, which serves as a ‘social-controlling device’ that can be used to make explicit but became hidden when the diversity of the demands of the industry helped to expand the official curriculum and thus became rephrased in terms of individual development.

Foucault (1981:94), as cited in Ball (1995:20), however, differs from this view that claims that power resides in hierarchical structures by pointing out that “power is productive ... and not in super structural positions, with merely a role of prohibiting or accompaniment, they have directly

productive role, wherever they come into play”. He claims that real power is rooted within relationships and partially in superstructural positions, such as management structures. It is within these relationships that govern personal interaction among actors that the terrain for contestations and multiplicity of opposing, conflicting views vying for dominance is manifested. Foucault (1977; 1978; 1980), as cited in Paechter (2004:468), elaborates by stating that “power is not a separate thing waiting to be mobilised or used, held by rulers or multinational companies ... and is often disguised as resources, so that those who appear to hold power are really those who have access to resources which they can mobilize to exercise power”. It is within the accompanying discourses or the “languages” (Van Dijk, 1997:14, as cited in Berkhout, 2005:318) and the way in which these are understood and interpreted within these contestations or social interactions that power exposes itself.

Foucault (1990:131), as cited in Berkhout (2005:319) posits that discourses can also be “a hindrance, a stumbling-block, a point of resistance and a starting point for an opposing strategy” in policy implementation. In other words, the lack of acceptance or understanding of the rationale behind the policy intention may lead to alternative practices resulting from the misinterpretation and distortion of the policy text, which may be counterproductive to successful policy implementation.

The South African context is complicated by the plurality of ethnical groups with their respective cultures and with groups competing for recognition and preservation of their own interests. The expectations are that policies will be inclusive, without privileging one individual or racial group above the other. This explains the tendency in the complex South African context where the “restructuring process is characterized by continued searches for patterned responses to reduce the complexity of it” (Berkhout, 2005:321). Evidence is how the curriculum that guided OBE had been adjusted repeatedly since its inception. In 1997 there was the Draft Statement of the National Curriculum. This was followed by Curriculum 2005, which was reviewed in early 2000 after identifying flaws in it and was again streamlined in order to reduce the curriculum design features. These features were streamlined from eight to three critical and developmental outcomes, learning outcomes and assessment standards. In the Final report of the task team for the reviews of the implementation of the NCS (2009), critical and developmental outcomes are also referred to as general and specific aims, terminology used in the pre-1994 curriculum.

Unpacking or exploring those powerful relations that exist in the policy implementation process from an actor's point of view may lead to what is mostly ignored within the implementation process: a better understanding of the practical observations within our everyday practice. Foucault (1981:94), as cited in Ball (1995), further posits that "policy texts enter rather than simply change power relations: hence, again, the complexity of the relationship between policy intentions, texts, interpretations and reactions". Exploring the more tacit effects of transformation discourse and the notion of the 'hidden curriculum' may shed some light on the engagement with policies in local contexts and reveal some of the forces intersecting with those policy intentions. Dominant discourses within our education policy context are those on restructuring and transformation within the existing setup as well as the discourse of the free market and globalisation, which gears structures to foster global participation.

Globalisation/knowledge economy is embedded within the market discourse, and "perpetuates the value of competition and the freedom and choice of the consumer" (Berkhout, 2005:323), which is one of the ensembles that we accept as a "regime of truth" (Ball, 1995:22), without realising the effect or influence it may have on our everyday practice. This is one of the dominant discourses that interact with the new Technology curriculum and its implementation.

Bourdieu (1998:3), as cited in Berkhout (2005:323), depicts the discourse of the free market as a "type of infernal machine, whose necessity imposes itself even upon the ruler". Our educational leaders tend to objectify those discourses dominating us by giving them moral weight and accepting them as the vehicle to achieve equality and justice through education in our society, without questioning the intentions behind them or the effect that they have in different contexts. Educators come to accept the introduction of new learning areas, such as Technology, in the new curriculum without any objections because these are perceived to be required by law through the government and also to serve the global competitive discourses. Discourses conceal the true intention of modern education systems, which is to "inculcate attitudes which correspond with those required to maintain a capitalist economy and a class divided society" (Meighan, 1986:76). The underlying intent is concealed within the prescribed roles of educators as the purveyors of moral precepts, the possessors of knowledge and skills, the providers of pastoral guidance and positive role models in society and to the learners (Meighan, 1986:39-40). This concealed intention will not result in achieving equality and social justice but only legitimises the opposite.

The neo-liberalist discourse is concealed or embedded within the concept or discourse of globalisation, which alludes to the shift towards global integration and entails a broad spectrum of elements that enables this network of cooperation across national boundaries. This concept is thus a symbolic construct of a myriad of activities that constitutes it. This concurs with Foucault's view that "discourses are not about objects; they identify objects, they constitute them and in the process conceal their invention" (Foucault, 1990, as cited in Berkhout, 2005:320). I will now continue by referring to Bourdieu's notion of habitus, field, practice and strategy to argue how it may influence educator engagement in the transformation of the education setup.

3.2.3 Bourdieu's notion of habitus, field, practice and strategy

Exploring the effect of some of the dominant policy discourses and actors' engagement with them may provide us with the opportunity to look at Bourdieu's notion of habitus, field, practice and strategy, as elaborated on by Lingard and Christie (2003), in order to investigate the subjective nature of policy discourses. Habitus, field, practice and strategy, from a Bourdieuan perspective, are embedded within the actor component and the existing power relationships, which might explain or provide an alternative perspective on what Ball (1995:23) calls the "struggles over the interpretation and enactment of policies". As a definition for 'habitus', Bourdieu (2000:138), as cited in Lingard and Christie (2003: 321), posits the following:

... that social agents are endowed with habitus, inscribed in their bodies by past experiences. These systems of schemes, of perceptions, appreciation and action enable them to perform acts of practical knowledge, based on the identification and recognition of conditional, conventional stimuli to which they are predisposed to react; and without any explicit definition of ends or rational calculation of means, to generate appropriate and endless renewed strategies, but within the limits of the structural constraints of which they are the product and which they define them.

The foundation of educator practice, within the subject context, is laid by the field in which educators are qualified and the repeated practice of it in a 'field' structuration. Bourdieu (1998), in Lingard and Christie (2003:322), defines field as follows:

... a structured social space, a field of forces, a force field. It contains people who dominate and people who are dominated. Constant, permanent relationships of inequality operate within this space, which at the same time becomes a space in which various actors struggle for the transformation or preservation of the field. All the individuals in this universe bring to the competition all the relative (power) at their disposal. It is this power that defines their position in the field and, as a result, their strategies.

It is within the interpretation and enactment of policies that the hidden curriculum plays out. I do realise that I will have to employ extra caution not to generalise my personal observations and the views of the respondents on their experience and not to uncritically apply these to other contexts. The application of habitus, field, practice and strategy, as used by Lingard and Christie (2003), may provide me with an alternative way of looking at the diverse way that individuals endeavour to understand and organise their practice within particular spaces of practice. Lingard, Rawolle and Taylor (2005) posit that Bourdieu's notions, as mentioned above, allow engagement with the emerging global field of education policy studies and the understanding of it.

3.3 Summary

Chapter 3 dealt with theoretical frameworks and the extent to which my research is positioned within and guided by these. The positioning of my arguments within the abovementioned theoretical frameworks might allow me to do a more elaborate and in-depth interpretation of my everyday practice and optimise my scope to possibly look beyond the objectified superstructural elements within the policy process. In the following chapters I will continue by interpreting Foucault's and Bourdieu's notions in order to demonstrate/substantiate how they may influence educator practice. By making a distinction between the visible or explicit dimension in Chapter 4 and the less visible, implicit or unseen dimension in Chapter 5, I will explore what normally goes unnoticed or is simply ignored within the implementation process. Throughout these chapters I will weave aspects of the data elicited from the interviews with the four respondents into the text in order to demonstrate how their experiences resonate or conflict with my personal experiences and opinions.

Chapter 4: Exploring the seen, visible or explicit factors or aspects

4.1 Introduction

In the following chapters the various aspects or practices that interact with education policy implementation will be identified and categorised. This may enable me to highlight some of those assumptions that portray the implementation process as a mere mechanical procedure in ‘fields’ already structured, ‘habitual’ patterns already established and ‘strategies to deal with existing conditions already in place. The importance of the recognition of agent disposition in the seen and unseen interactions is stressed throughout my arguments to emphasise how it influences and affects policy implementation, specifically as it plays out with regard to the technology and civil technology learning areas. I will weave the responses obtained in the interviews into the following two chapters. Steward (1998), as cited in Howe (2005:123), suggests that conventional positivist criteria for rigorous empirical research be replaced along the following lines: “Validity (excluding external validity) becomes veracity (power of conveying or perceiving truth); reliability (excluding consistency) becomes objectivity (alertness, receptivity to the views of others, empathy and open-mindedness); and generalisability becomes perspicacity.”

In order to position my arguments within Foucault’s and Bourdieu’s notions at the end of this thesis, I will now differentiate between influential aspects within the implementation process: firstly, the visible, physical, tangible or tacit aspects in Chapter 4 and, secondly, the invisible, hidden, implicit and difficult-to-measure aspects in Chapter 5.

4.2 Management

Capacity regarding proper management and planning seems to be the most curbing factor in implementing policies in schools and classrooms. Mentz and Mentz (2003) posit that because of the pressure being put on schools to perform in the field of Technology, the demand for leadership to facilitate this process increases. Proper planning would have led to the development of well-organised and functional technology education facilities in schools. The most important factor that should have been taken into consideration was the capacity of the school organisation as well as the physical space in which the learning area had to be introduced. A similar declaration to the Hobart Declaration of 1989 in Australia (Williams & Taylor as cited in

Williams & Williams, 1996:222–223), should have been devised, not only to facilitate what was to be taught in Technology but also to give guidance with regard to good school organisation and the physical facilities that should have been provided. The authors regard the following aspects as important elements that need to be addressed in implementing Technology education in schools: Consultation with practising educators to gain firsthand knowledge about their specific needs, especially with regard to Civil Technology, would have been a good point of departure. Important aspects or neglected areas that would have surfaced in those consultations would have been safety in classrooms, flexibility and the quality of work, and the classroom environment, even if a new facility was being designed or an existing one was being refurbished. Safety in Technology education is a major concern because of the use of dangerous tools and equipment. Technology educators, as the sole responsible persons for the safety of the learners, experience the added pressure of having to equip themselves and their teaching environment with the knowledge and infrastructure pertaining to the basic safety of learners.

Every Technology and Civil Technology laboratory/classroom should, as a basic requirement, have access to adequate electrical points, water services and drainage with chemical traps if required. This would avoid waste water contaminated with chemicals entering the community sewerage system. Provision should also be made for adequate ventilation for the fumes and dust being emitted because of the nature of the activities taking place in that environment. An important safety aspect that needs careful consideration is room layout, which must allow for the safe location of machinery and tools. Areas for mounted machines should have been clearly marked in relation to the walkways, work areas and other portable machines, as stipulated by safety requirements. Respondent 1 made mention of the absence of a blueprint or directive for what a Civil Technology classroom layout should have looked like in the introductory phase. In technology education it is generally perceived and advocated that technology in the GET can be taught in any school environment, which is far from the truth. With the introduction of Civil Technology, which more or less had the same strategic introduction into the national curriculum as Technology in the GET band, except for a few years later, it was clear that managers and those in authority had failed to learn from the mistakes made by the GET implementers of technology. They should have been cognisant of these mistakes, especially those aspects regarding capacity in the educational environment, for example the redesigning of physical buildings of facilities, the provisioning of resources such as tools and educational materials, and

some other salient aspects that will be highlighted and discussed more pertinently under the following headings.

4.3 Readiness of schools to include the learning area by evaluating their educator capacity (qualifications) to present the learning area meaningfully

A thorough assessment with regard to the availability of competent educators to teach the learning area should have preceded the implementation process. Technology education was implemented as one of eight learning areas in Curriculum 2005 for the first time in 1998 as part of OBE, according to De Swardt, Ankiewics, and Engelbrecht (2005:1). Because of little or no time available, the aspect of sufficient educator training or the improvement of their competencies to teach the new learning areas was neglected.

Technology and Civil Technology educators were briefed on generic documents and given the new policy documents of the new learning area that they knew nothing about. De Swardt, Ankiewics, and Engelbrecht (2005:1); Engelbrecht, Ankiewics, De Swardt and (2006:2) alludes to the unpreparedness of educators to teach Technology when it was introduced in 1998.

Continuous professional teacher development (CPTD) was applied through the cascade model as a means to inform educators of the new developments, with trainers from each province being trained by service providers at national level and then having to cascade their knowledge and understanding of the new developments to district officials who, in turn, cascaded the information to educators in their respective districts, according to Engelbrecht, Ankiewics, De Swardt and (2006:8). I will expand on CPTD with regard to educators in a later section.

The most suitable educators to teach Technology (GET) at the schools where the practical subjects were being phased out because of their exclusion from the NCS were those educators teaching practical subjects such as Woodwork, Metalwork, Needlework and Domestic science. The obvious choice of educators to teach Civil Technology (FET) was the Woodwork and Metalwork teachers because the perception existed that the new learning area was just another practical subject. Woodwork educators were during the first steps of the phasing out of the practical subjects offered the opportunity to select one or two replacement subjects from the practical learning area pool, which consisted of Civil Technology, Electrical Technology, Mechanical Technology and Graphics Technology. This was confirmed by Respondent 2. Most

of the educators who were qualified to teach woodwork opted for Civil Technology or Graphics Technology (some even both) because these subjects were the closest to their field of expertise or because of the availability of their existing Woodwork infrastructure. The content of the syllabi of those two learning areas, especially the carpentry section in Civil Technology, was perceived to be, to a certain extent, related to that of Woodwork because it included aspects concerning cabinet making, for example joining methods, finishing, the machines and tools needed, and the origin of the different types of timber. Graphics and Design Technology was confused with the drawing component in Woodwork, which mainly concentrated on drawings regarding cabinet constructions and partly concentrated on Technical Drawings that were executed manually with T-squares, triangles and a pencil.

Technology teaching, in the beginning, was more challenging than teaching the discontinued subjects because educators were accustomed to traditional instructional methodology in the manipulation of materials and the use of techniques within the contexts of their traditional practical subjects.

More challenging to educators was the fact that Technology (GET) education encompasses all the industrial arts or old practical subjects and requires educators to broaden their knowledge regarding the content of those subjects as well as the mathematics, natural science and social science learning areas. The lack of proper training and appropriate learning material made it difficult to explain the different knowledge areas, such as systems and control, which includes mechanisms, structures and processing, to the learners, Respondent 1 remembered. He resorted to his colleagues in the Domestic Science and Needlework Department to assist him in aspects related to their field of expertise. However, he found that their knowledge was also limited because of the broad scope that the Technology curriculum offered. More sources had to be consulted to compile lessons in comparison with the one handbook being used previously to prepare learners for examinations. “The change was difficult, because your first introduction to the content of the learning area was your first exposure to it, and the content was new” (Respondent 1). At that stage there were only the pacesetters, of which the content was absolutely foreign (Respondent 2). The pacesetter was a document which was provided to Civil Technology educators with a proposed year planner to assist in the completion of the curriculum. There also was no approved Civil Technology handbook for schools (Respondent 1), which

forced the respondents to consult sources aimed at technical schools and those used by other provinces. After a lengthy search for information, they had to decide on the relevance of the information, which then had to be translated into Afrikaans from English (Respondent 4). Respondent 2 at the LSEN school described this lack of appropriate learning material to suit his unique situation as traumatic. This highly theoretical and technical subject was impossible to teach in his circumstances and was beyond the comprehension of the majority of his learners who were struggling with learning difficulties such as long- and short-term memory problems, dyscalculia (the inability to do Mathematical calculations), inability to spell and read as well as to read with comprehension, short concentration spans and dyslexia. As a result of the learners' reading difficulties, he had to prepare his notes for them in ways that were suitable for unique conditions. He omitted sections in which he experienced difficulty in acquiring reading material and he set his tests and examinations in accordance with the general test sets provided by the subject advisors.

Accompanying this confusing new curriculum, which was very broad and vague, was the new approach to lesson planning, which was determined by pre-established learning outcomes and new assessment standards (Respondent 2), as required in OBE. It was difficult to determine what to teach and the level at which contents had to be presented. De Swardt, Ankiewicz, and Engelbrecht (2005:3) found: that most educators resort to selecting the aspects relating to their content and skills taught in their technical subjects by simply using a different approach, and in the process neglecting the procedural knowledge (Technological process) as an essential feature of Technology education. The technological process is the "rationale and driving force behind Civil Technology" learning programme guidelines (LPGs). In England the term 'capability', which is essential in the technological process, is regarded as the process of "combining designing skills and making skills ... with knowledge and understanding ... in order to design and make products" (DFE/WO, 1995:2 as cited in McCormick & Davidson, 1996:230).

Civil Technology education was introduced as a learning area option to accommodate learners who wanted to continue with technology in the FET band. This learning area was not part of the original 23 subject statements that were declared policy through the Government Gazette of 2003. Only after the revision of the NCS in 2004, seven learning areas that included civil technology were added. For each learning area LPGs were developed to assist teachers and

schools in their planning for the introduction of the NCS and so that all learning outcomes could be achieved in a progressive manner. The NCS further stated that the subject focused on concepts and principles of the built environment as well as the technological process.

Built environment refers to professions such as architecture, construction and quantity surveying, which are some of the professions responsible for essential services such as supplying roads, bridges, purified water, water-borne sanitation, railway lines, high-rise buildings, factories and housing in general to society. The learning area aims at creating awareness of the abovementioned aspects in learners and society.

Since January 2006, educators have been teaching Civil Technology from Grade 10 with only their knowledge of Woodwork as well as their informal or prior knowledge of the built environment at their disposal. Brief information sessions on the generic documents, learning programs and pacesetters (Respondent 2) were conducted after school, during which lesson plans, worksheets, assignments, and so forth were distributed to the relevant educators to serve as examples.

Certain schools, mostly ex-Model C technical schools where Technika Civil was offered as a subject, had teachers available who were equipped to present the learning area meaningfully. Their educators had done engineering and woodworking degrees as well as specific training to present this learning area, which was not the case with Woodwork educators (Respondent 4). At these specialist technical schools, subjects from the civil environment were already being offered. The exception was that all the different learning area components, which comprised the single Civil Technology curriculum for schools, were offered separately and not as a unit.

In my circuit, the introduction of the Civil Technology learning area was preceded by the following actions: The only information sessions prior to the introduction of the learning area were a weeklong contact session in 2005 (HTS Bellville). To my knowledge, the purpose of that session was to mobilise educators by signing a petition to put pressure on the DoE to retain woodwork in the national curriculum. These sessions were conducted by Woodwork subject advisors. At schools where the learning area was implemented for the first time in January 2006, more specific information sessions or 'exposure' to the different components of the learning area

(Respondent 1) for the knowledgeable and the less knowledgeable educators only commenced in July 2007, six months after the official implementation date.

That was less than 18 months before the first group of Grade 12 learners had to sit for their final examinations at the end of 2008, while learners taking Woodwork as a subject had had five years (Standard 6–10) of teaching time to prepare themselves for the same examination (Respondent 2). These sessions, if they could be described as training sessions, were merely information sessions during which administrative information regarding the learning area was disseminated to educators. The short period preceding implementation was characterised by changes in the general Handwork and Woodwork curriculum in an effort to structure the subjects in line with the pending new learning areas. This approach by practising subject advisors could be seen as an effort to vindicate the continued existence of their respective subject fields, in order to protect their jobs. In 2006, during the first week of the June holiday, at De Kuilen High School educators were guided with a participation manual through the LPG document. Some of the teachers' concerns were addressed and examples of how certain parts of the syllabus could be presented were demonstrated with video presentations. Certain techniques were demonstrated, assessment programmes in the different grades were discussed, examples of how work schedules and lesson plans could be completed were given, and learning support material was handed out. Again it was assumed that all those present were going to be motivated and happy implementers. In informal discussions during breaks, despondency among educators was prevalent, while most of them appeared to be compliant with everything during the formal sessions. Educators were assured that they would definitely 'grow', as one subject advisor put it, into this new learning area, which was according to the presenters/subject advisors a project that was still in its infant stage.

My assertion is that these kinds of information session were in no way adequate to address educator incapacity to present the new learning area. The feeding of learning area support material to educators did not guarantee critical engagement with it. Critical engagement would only be accomplished by comprehension of the course contents, which might lead to an authoritative presentation.

The promises of support by subject advisors were also empty because some of them, who were links in the cascading process, lacked the capacity to assist educators in a meaningful way in the

implementation phases. Respondent 1 posited that they had to keep up with learning area support services, subject advisors or inspectors who were not properly informed about this new phase that was entered. Their workloads did not allow them the flexibility to frequent schools that could experience problems on a regular basis. This resulted in educators with minimal ability having to present the learning area to learners who were very perceptive and in some cases even knowledgeable about certain areas of the curriculum. In the following section, I will evaluate the current physical environment in schools in order to the demands of the new Technology and Civil Technology learning areas.

4.4 Capacity of the physical or Euclidean space to accommodate the learning area in the current school setup

Effective teaching in practical learning areas such as Technology and Civil Technology depends on efficient space to execute instructions adequately. “Space is commonly taken to be the inert juxtaposition of physical or material entities, sometimes described as Euclidean space, a passive container for social action” (Law, 2001 and McGregor, 2002 as cited in McGregor, 2004:351). Respondent 3 confirmed this by stating that “you cannot present a subject like Technology or Civil Technology in a classroom that is suited to any other practical subject”. A proper evaluation of safety conditions, required in any workshop, was not done beforehand. The physical space, or the way woodwork classrooms had been constructed at certain secondary schools, is adequate to accommodate Technology in grades 8 and 9 in the GET band. This is primarily because of the existing size of this space, in correlation with the current teacher-learner ratio, which is 1:35 in secondary schools. In most cases the total number of learners in Grade 8 and 9 classes exceeds the prescribed ratio. Respondent 3 continued, stating that “you cannot present technology grades 8 and 9 in a class with more than 50 learners because there are certain capabilities (practical) that have to be taught ... and you will lose 30 or half of the class (attention) along the way”. With proper planning with regard to the layout of classrooms, all the necessary requirements can be met. The requirements referred to are the allocation of separate areas for a fridge, a microwave, a stove and the appropriate utensils necessary to demonstrate the processing of edible materials. Woodwork rooms are equipped with the necessary machines and tools and proper storage facilities, as used in Woodwork. All the tools being used previously in Woodwork can be used in the presentation of Technology, while only some of these can be used

in Civil Technology. This will not be the case if the learning area is presented in normal-size classrooms, which is the current practice at most of the schools where Technology and Civil Technology are currently simultaneously being offered. The application nature of the learning area makes it difficult to accommodate classes of between 35 and 50 and even more pupils in a classroom. It furthermore has major safety implications, as well as leaving scope for diluting the curriculum in order to suit the physical conditions of the learning environment. At schools where Civil Technology may be a popular choice, learner totals may influence effective teaching if there is an absence of a policy regarding admission of learners that is prescriptive regarding learner totals.

A factor that will have a major impact will be the teacher-pupil ratio in our schools as well as the existing perceptions at schools about practical learning areas. The teacher-pupil ratio will have to be adjusted in line with the available physical space to make interaction between teacher and pupil as well as between pupil and equipment meaningful. Special ratios for practical subjects will have to be introduced, preferably a suggested 1:20 maximum that will improve the instruction as well as assessment of students, seeing that group work forms an integral part of this skills-based learning area.

The practical component, which is integral to Civil Technology, is done by means of simulating complete projects or smaller parts thereof, as the curriculum requires. Large practical projects are simulated, which means that they have to be completed on a smaller model/miniature scale. Simulations can be “formally defined as the process of designing a model of a real system and conducting experiments with this model for the purpose either of understanding the behavior of the system or of the evaluating various strategies for the operation of the system” (Shannon, as quoted by Day, 1986 in Williams & Williams, 1996: 151).

Besides simulated activities, educators also have to explain and demonstrate building procedures, for example the mixing of mortar and bricklaying techniques, to pupils as capability tasks. To do this, a specific area, namely a wet area, has to be allocated to demonstrate these and related procedures. The current physical setup is mostly suitable for dry building procedures and theoretical activities. The physical space and time available are not conducive to certain procedures in the current setup. The current physical layout limits the teaching of practical

aspects in the built environment to mere theoretical activities, which defies the purpose of the learning area, which is to expose learners to the built environment.

The next aspect to be discussed will be the extent of the types of activity to be completed in the curriculum in relation to the allocated time on the school roster.

4.5 Practicalities or implications of including the learning area in the current school roster (timetable)

Most of the theoretical content and some of the drawings and practical activities can be accommodated in the current school roster/timetable, which in most cases consists of period lengths of between 30 and 50 minutes, depending on the type of roster the school is running. Problems may arise with the completion of the practical component in the current setup, especially with regard to Civil Technology. Careful planning will have to be done by educators teaching these learning areas. Effective teaching time will be impacted on because learners in secondary schools normally move between classes at the end of each learning area. For Respondent 2, time played a big role because Civil Technology has more levels than Woodwork that have to be covered, which forces one to hurry through the different sections. He stated the difficulty in adhering to the prescribed time of four hours for Civil Technology per week. At his school they have only 3½ hours per six-day cycle, which is less than the prescribed time, which already is not adequate. Learners normally take around five minutes to move between classes, starting from the time the bell rings. Then they have to settle down in the next class and take out the appropriate materials, in this case the equipment and tools needed in practical sessions. That will consume another five to 10 minutes. The packing away of tools and materials as well as the cleaning of the work area also takes up another five to 10 minutes. The time left for the giving of instructions and demonstrations will be between 20 to 25 minutes effectively for learners to complete capability tasks or the bigger simulation activities.

More problems may arise with the graphics component because in Grade 10 pupils will have to be introduced to computer-aided drawing (CAD) programs, which will intensify in grades 11 and 12. More IT centres will definitely be needed because most disadvantaged schools only have one or two centres, which are mostly used in computer-related learning areas. Accommodating one more learning area in those centres will definitely put more strain on the school roster/timetable,

especially with the centres being administrated by educators with no or limited experience of network maintenance and experiencing other related disadvantages, which will be discussed in a later paragraph on access to IT centres.

If schools do develop their infrastructure to engage with the learning area meaningfully, alternative ways of planning rosters will have to be found to accommodate Civil Technology. If an educator wants to demonstrate the techniques of bricklaying, for instance, mortar will have to be mixed with the correct sand, water and cement ratio and it will have to be applied to the bricks. This process will have to be preceded by the process of preparing the foundation properly. The laying of bricks in the preferred brick-bonding method as well as the use of a level is just one of the aspects that have to be concentrated on. Learners will then all have to be given the opportunity to get a feel of the appropriate techniques as demonstrated, either to acquaint themselves with the process or for assessment purposes. I concur with Smeyers and Burbulus (2006) that just as rules apply to educators to be initiated into a practical subject, the same applies to the learners involved, to enable them to contextualise the relevant conventions and content. At the end of the process learners will have to clean up the whole area that was used as well as the tools and materials involved. Activities cannot be postponed until the next session because the allocated time is up because the mortar will set in the demonstrated positions and the tools will be left useless for future use. Demonstrating the building of a wall, for example, and leaving it in place after completion may have major repercussions for the school infrastructure, because this technique has to be demonstrated to other classes taking the learning area as well as those who will be taking it in future. All the above-mentioned elements will definitely impact negatively on assessment, which is the most important element in the education process. In paragraph 5.3 OBE assessment and the adjustments needed to adapt to the requirements of it by educators will be elaborated on.

4.6 Influence of ‘massification’ on classroom practice

Massification, one of the characteristics of the globalisation of education, according to Kraak, (2000:6) has arisen as a result of result of egalitarian pressures to reduce the gross social inequalities in a number of societies across the globe by making access to further and higher education more available to working class and other marginalised communities. The purpose of

massification is to make education inclusive and accessible to the wider population and not only to those who can afford it.

The National Commission on Higher Education (NCHE) envisaged that the 'massification' of students who had been denied access to higher education in the past would invariably improve students' chances to become better practical reasoners possessing enhanced cognitive abilities and skills to participate as democratic citizens in the new South African society (Waghid, 2004:33).

There is also increasing pressure to minimalise the huge number of dropouts among underage learners and accommodating them for a longer period, up to the age of 16, in the education system.

The realistic class totals in most schools exceed the national prescribed teacher-pupil ratio, which currently is 1:35 in secondary schools. A Woodwork workshop normally had 15 workstations that could accommodate 30 learners maximum at a time. The current strategy of retaining learners in schools will result in class sizes being the same in the FET as in the GET phase. In the 1980s, when Respondent 4 started teaching, the average learner total per woodwork class was 20, which was regarded as a big class, and when his learners reached Standard 10 (Grade 12), they were only 10–15 in total. "With Outcomes-based Education and the phasing out of the practical subjects, teachers were expected to teach bigger learner totals per class", which amounts to between 45 and 55 and sometimes more (Respondent 1). "At that stage, I did not have the capacity to handle big classes, because I was not used to it" (Respondent 4). Only Respondent 2's school had experienced no drastic increase in learner totals, seeing that this was an LSEN school.

The problem of class sizes also puts many constraints on effective classroom teaching. When Technology in both phases was introduced, educators were not acquainted with the learning area content and had no idea what equipment, tools and learning materials to buy. Respondent 2 recalled that "the biggest part of the work was unfamiliar and new" to him.

At schools, Woodwork workshops were only equipped with tools to complete the Woodwork curriculum. "The availability of physical resource material pertaining to Technology was naught in the inception years, and after four years involvement in Civil Technology, we only received a

second allocation since 2005, which allowed us to buy equipment ... which means the department had strategies and plans in place, but financial assistance only arrived four years later (Respondent 1). Respondent 4 claimed that the authorities had failed Technology educators because they introduced a new learning area without providing adequate equipment and resource material. He also recalled how he had to borrow building equipment from learners' parents to use for demonstrations during lessons.

The way in which the teacher-pupil ratio is being determined at schools is also one of the contributing factors to the abnormal class sizes at schools. Normally, members of the management team, who are entitled to fewer periods per week than the Post-level 1 educators because of prescribed measures, are included as Post-level 1 teachers when the broader school ratio is determined. This results in the fact that Post-level 1 educators have to contend with class totals way above the prescribed national ratio.

IT centres at schools are mostly able to handle a maximum of 25–30 learners per session, which means that in some cases learners will be forced to share workstations. The fact that Technology in both phases has a practical component is a challenge when it comes to effective teaching, class control, recording and determining whether learners have achieved the intended outcomes during a lesson, especially within the allocated teaching time. Implementation strategies should have been preceded by an evaluation of schools' capacity to handle the booming student totals in the FET and GET bands.

I must concede that the above mostly occur in densely populated community schools and may not be the case in school communities where there is a low learner enrolment because of various reasons.

4.7 Availability of resources/equipment

Zifferblatt as cited in Meighan (1986:75), on the aspect of 'environmental competence' alludes to the fact that classroom arrangements will have an impact on individual and group work and in this case on the performance of educators. Arrangements, according to him, inherited from traditional ways of operating pose a hindrance in achieving new goals by educators.

Woodwork classes were equipped with Woodwork machines and hand tools, adequate storage space in some schools and the appropriate furniture to present the subject meaningfully. All this equipment can contribute positively towards Technology education because certain sections of the curriculum allow for the usage thereof. Technology education, which is compulsory up to Grade 9, is normally where the most class groups and the largest teacher-learner ratio exist. This normally results in the division of the workload for the two groups, grades 8 and 9, between two or more educators, depending on enrolment totals. In some cases teachers have to teach outside a classroom suited to a learning area with a practical component while those with the availability of the practical or old Woodwork classrooms have to share space with Civil Technology in the GET band (approaches may vary from school to school). The educator teaching in an academic classroom (not a practical classroom) will lack proper working areas and surfaces. There will also be a lack of adequate storage space for tools and materials and completed work as well as a lack of enough space to complete activities as effectively as the educator in the practical room will be able to do.

Tools, materials and completed artefacts thus have to be moved between the classrooms, from those not suited to practical work to the better equipped classrooms. This aspect also contributes to difficulty in lesson planning. Normally, the Technology educator has to plan the lesson for the sake of standardisation and has to compromise certain activities to accommodate the situation of the other educator. Capability tasks or activities had to be include in lesson plans in order to enable learners in normal classrooms to complete the same activities as those in the better technological equipped classrooms.

I will now continue by elaborating on the prevailing conditions with regard to another resource, namely computers, that is important in adhering to the demands of the communications and research components.

4.8 Access to school information technology centres

One of the most notable characteristics of the globalisation phenomenon is competence in the use of computer technologies. It will, however, be some time before computers will be utilised optimally within our schools. Currently only pupils studying computer science and other computer-related learning areas have adequate access to school computers.

If schools were able to secure regular access to IT centres for technology and Civil Technology learners in their weekly roster, in most classes there would be learners who have to share workstations because most computer laboratories only have 25–30 workstations. Providing resources such as more computers centres will definitely contribute to the eradication of the already existing disadvantages in our system.

Almost all learning areas require that learners have access to computers as part of their respective curricula. In Technology (GET) and Civil Technology (FET), educators and learners need access to computers in order to gain critical skills in curriculum content such as research and communication, especially graphics communication, which forms part of the Technology and Civil Technology curriculum up to Grade 12 level. Technology educators are expected to possess competencies such as the knowledge and skills to present CAD programs, a part of the Civil Technology learning area, and also the ability to transmit those skills to learners in an environment that is not familiar to them. Formerly, Woodwork educators were only required to teach and evaluate drawings manually. Many individuals, particularly those from a pencil-and-paper engineering background, fail to develop efficient CAD drafting skills because they continue to produce drawings with their pencil-and-paper skills (Barlow, as cited in Williams & Williams, 1996:149).

Apart from mastering the CAD curriculum, educators will also have to equip themselves with computer presentation skills, which require giving instructions by using the main computer station, retrieving the completed work at a later stage and evaluating it.

Logistical problems such as the lack of network operating skills, the shortage of physical and human capital, the lack of research and presentation skills, and the insufficient number of computers available per centre at schools in comparison with the large numbers of pupils per class group are just some of the practical problems being experienced at schools. Emphasis is not being placed on supplying classrooms with the necessary equipment, maybe because of financial constraints as well as security reasons. Although there are structures in place to train educators in the usage of computers, it takes place at a slow pace and educators are expected to grasp all this new knowledge in a short space of time. In Civil Technology, educators are being given one week of training sessions in a CAD program, which takes place during school holidays. These sessions are facilitated by competent personnel of the program providers by following

instructions from a program guide. Course attendees are presented with a certificate of competence after completing a guided test in certain aspects of the course as well as the CAD program for usage at school by educators and students. This process concurs with Freire's (1972:54) "banking concept", only with the educators as the recipients. They are treated as "depositories" with the generic documents as well as the learning area content. This process takes no account of the educators' lack of background knowledge and impedes their professional authority and critical consciousness, in the process minimising their creative power. It is assumed that educators will, through repeated practice, be able to internalise this competence in order to transmit it effectively in a classroom environment.

CAD programs as well as the different disciplines that comprise the Civil Technology curriculum are, under normal circumstances, being presented at tertiary institutions in semester and year course modules, followed by lengthy internships. It is furthermore challenging and demanding for educators to, during a weeklong session, working through a massive instructional guide from 09:00 to 16:00 pm, be expected to go home and work through the day's completed work.

After completion of the course, educators are left under the illusion that they understand the course content and will be able to transfer it, only to be confronted by their respective teaching conditions as soon as they re-enter their working environment or field, as referred to by Bourdieu, as cited in Lingard and Christie (2003). It is also assumed that educators do have the computer facilities at home to fit in the required practice sessions. At school also, with a full academic programme to handle, finding time to practise these newly required skills appears to be extremely difficult. "I received my (CAD) training, but it means nothing to me because I cannot teach learners how to do basic things on the computer" (Respondent 4). It seems as if the DoE is just protecting itself by pretending that it did provide the necessary training opportunity to educators, disregarding the vital contextual issues being expressed here. These practice sessions provide misleading evidence that the transformational process is on track. What the authorities tend to ignore is the fact that "these new policies intentions land in environments already constraint by geological layers of prior policies and local conditions that may be hostile to the desired change" (Darling-Hammond, 1990 as cited in Darling-Hammond, 1998:647).

Computer programs are continuously developed and updated at the same pace as the rapid changes taking place in the technological (IT) environment, which means that educators too will have to keep pace with all these changes. Struggling to master the programs and keeping pace with these developments will be a daunting task and will perpetuate the already lacking status quo.

By the time the intended effects of exposure to computers have reached the masses, the advantaged sector and also those in advanced countries would have widened the gap even further.

The situation at those schools where the interviews were conducted reflected all the negative aspects mentioned in this section.

The school of Respondent 3 is the only school that has partially structured its teaching space, with regard to drawings, to meet the demands of the communications component of the new technology learning area. With permission from his SGB, he divided his old drawing room into two parts, one in which to conduct manual drawings and the other part to contain 15 workstations. He agrees, however, that his situation is not totally satisfactory because learners still have to share workstations, which is not ideal. At the other three schools, regular access for Technology learners to laboratories is not a regular fixture in their school rosters. Preference is being given to other learning areas, such as Computer Application Technology (CAT), (CAMI, a Mathematics, Literacy and Science educational course compiler or computer program used by schools), Information Technology (IT) and literacy, which do not leave time for Technology and Civil Technology. Respondent 4 made arrangements with his school management team and school governing body to ensure access to laboratories for Civil Technology learners at least one period per week from 2011. With the intended inclusion of a full question on CAD in the Grade 12 final examinations, priority should be given to putting appropriate structures in place to prepare learners adequately.

Sadly, since the implementation of the subject, there has been a lack of a structured course at tertiary institutions that specifically concentrates on the needs of Technology and Civil Technology educators who have to deal with the complicated content of the learning area. Only when educators are involved in training sessions to organise their practice will confidence start to

develop. Proper guidance and leadership will lead to positive action and reflection in organising and objectifying practice, resulting in true commitment towards the transformation process. The subject advisors involved up to this point have failed to facilitate sessions where these concerns can be addressed and have left attainment of these competencies to the educators.

4.9 Summary

In Chapter 4 I examined, engaged with and illuminated elements within the perceived policy gap in the implementation process that appear to be detrimental in successful Technology and Civil Technology policy implementation. I categorised these identified, concrete contextual factors and referred to them as seen, visible, tangible or tacit, because of their measurable nature. These factors are normally taken for granted or totally ignored within the implementation process. In a broader sense, these aspects are questioning basic management capacities, school based as well as in the advisory services, which lacked seriously throughout this implementation process. In the following chapter I will engage with those factors less visible or tacit.

Chapter 5: Exploring the unseen factors or aspects

5.1 Introduction

I refer to the factors I have identified within the policy gap as unseen factors because of their intrinsic and difficult-to-measure nature. These factors deal with the educators' personal and professional engagement within the implementation process. OBE brought along structural changes that were challenging because OBE speaks to educator competencies that were acquired through formal teacher training and years of practising. In the last section of this chapter I engage with the principles of the new assessment framework as well as changes in the instructional approaches in the Technology learning area and how I and the interviewed teachers experienced the effects thereof in the teaching and learning process.

5.2 Shift to a learner-centred approach

According to Darling-Hammond (1998:643) change is one of the biggest constraints for educational systems because it poses new challenges and demands that require new capacities and theoretical knowledge on the part of the educator. I will continue by highlighting some of the demands that may have an influence on educator practice in the facilitation of the local changes. One of the challenges, as observed within the South African context, is the shift from a 'content-driven' to a 'learner-centred approach', the shift from a 'selective' to an 'adoptive mode' as well as the shift away from the 'transmission' approach to teaching. These challenges demand a shift from the fundamentals that already form part of educators' habitual strategies that they employ to perform their duties in their respective fields. In the content-driven approach, the emphasis was mainly on the completion of a prescribed learning programme with its respective content, viewing the learner as a receptacle, without including the most important element, namely the learner as an active participant in the learning process. The teacher's role was confined to that of the possessor and provider of knowledge while the learner was to be the receiver of this knowledge. The "traditional transmission educationalist" in comparison with the "radical educationalist" (Meighan, 1986:33) did not believe that pupils should be consulted and they were not regarded as competent to make judgments about schooling. It also assumed that attempts to gain the learners' view might lead to abuse of the educator.

The learner-centred approach, which is in line with the “radical educationalist” approach, implies that learning should be centred on the “conceptions, culture, interest, motivation and learning mode of the learners” (Darling-Hammond, 1998:644). This implies that educators will have to tap into the learners’ subjective perception of their environment and deal with them on their level of understanding the world. This approach demands meaningful and participative engagement in the learning process, even if it exposes and challenges the educators’ authoritative disposition.

Educators are subjected to the concept of ‘lifelong learning’, which forces them to base their preparations on the ‘adoptive’ approach, which implies the use of a wider pool of resources in order to make the learning process an inclusive experience. Glaser (1999) as cited in Darling-Hammond (1998:643), defines the “selective” approach as “the minimal variation in the conditions for teaching” in which a “narrow range of instructional options and a limited number of ways to succeed are available”. “Transmission teaching”, according to Darling-Hammond (1998:647), was a much easier approach and did not require intense engagement in the existing knowledge base of learners and the development of a variety of approaches to be as inclusive as possible in the learning process. Teachers have to diversify their classroom practice in order to facilitate the process of critical thinking, the ability to invent, produce and solve problems. Translated into classroom practice, this approach or strategy demands groundedness within it before it can be applied meaningfully. To me as teacher and facilitator it means a total overhaul of what I am used to in terms of teaching practice and methodology. This approach demands attentive listening and communication skills, as well as keeping up with teenage trends and being updated to what is happening within their domain. This timeous process further implies encouraging and instilling confidence in learners, establishing an environment where they feel confident to express their opinion and are not too afraid or intimidated to air it, as well as respecting their views. This situation also assumes that the learning environment is free of learning disabilities as well as disciplinary problems, normally a characteristic of the so-called slower learner. All this have to be accomplished without losing sight of the objectives of the planned lesson. Through this interaction with each other, learners will have the opportunity to learn from each other by sharing knowledge, working together, competing and negotiating meaning (De Swardt, Ankiewics & Engelbrecht, 2005:7).

Reddy et al. (2005:3–4) and Taylor (1999:258) in De Swardt, Ankiewicz & Engelbrecht (2005:7) allude to this approach as the “constructivist approach” to learning. De Swardt, Ankiewicz and Engelbrecht (2005:8), though, suggest that Technology education lends itself to both the constructivist as well as the behaviourist approaches. In Technology education two types of knowledge have to be transmitted. Firstly, there is the “know what”, which implies “instructional strategies grounded in cognitive science, attempting to transfer the self-regulating and monitoring of cognitive functions such as memory, process, control and thinking process, reflection, appropriate application, and the cognitive tools for thinking and learning from the teacher to the learning” (Killen, 2000 and Miranda, 2004 in De Swardt, Ankiewicz & Engelbrecht, 2005:9). Secondly, there is the “know how”, which lends itself to the behaviourist approach, which entails practical skills in Technology education, which promote psychomotorical skills, which necessitate practical drills (Royer, 1996 as cited in Johnson, 1997:49, in De Swardt, Ankiewicz & Engelbrecht, 2005:9). Psychomotorical skills are concerned with the manipulative or motor skills and hand-eye coordination. This approach is in total contrast to what Freire (1972:52) describes in transmission teaching as a “banking concept” whereby teachers talk of realities as if they were motionless, static, compartmentalised and predictable or expound a topic completely alien to the existential experience of the students. The aim is to bombard the students with contents that they have to memorise and that are detached from reality and the totality that engenders them and could give them significance. This approach is also characterised by the mechanical memorisation of narrated content by the learner.

The hidden intention in the adoption of this new approach is in line with the objections of participation in the knowledge economy, which is characterised by competition and constant changing and improvement in the technological field. The assumption is that being an agent of lifelong learning may foster or encourage corporate competitiveness by being in touch with the constant changes within economic developments.

In order to measure the degree to which outcomes have been achieved, an effective measuring structure has to be put in place. This poses another challenging adaptation in the form of a shift from traditional assessment to OBE assessment, which I will explore in the following paragraph.

5.3 Implications of the shift to outcomes-based assessment in technology education

Assessment should be seen as an integral part of teaching and learning rather than as an adjunct to these, while interaction provides guidance for not only the future participation of students but also the students and others involved in the learning community and provides educators and learners with the opportunity to develop a better understanding of the reasoning behind the decisions made in their practice (Compton & Harwood, 2003:7). This learning community then will provide opportunities for the enhancement of students' technological practice as well as for the enhancement of teachers' pedagogical practice and in the process will inform the development of a Technology subculture (Goodson 1985; Peachter 1991 as cited in Compton & Harwood, 2003:7).

The required changes in approach expected of educators with the introduction of OBE were very complicated to comprehend because the changes involved more than just instructional changes but also involved changes in the educational perspective/framework on which educator training was premised. Williams and Williams (1996:181) posit that traditional practical subjects with their emphasis on developing specific skills were dealt with within the behaviourist approach (doing model), which was characterised by lectures/demonstrations whereby tasks were broken down into smaller manageable steps that were copied and repeated until a certain skills level was accomplished. This behaviourist perspective was replaced by constructivism, a cognitivist theory that suggests that learning is a process of knowledge construction in which learners' unique individual development of conceptual understanding is recognised. In Technology Education, though, the two perspectives are utilised simultaneously because of the practical nature of the technological process.

Assessment, or evaluation as we first used the terminology interchangeably, refers to the process through which educators solely determine progress or growth within learners. According to Le Grange and Reddy, (1998, 3–19), the word 'assessment' is used when judgment is being made about a learner's performance through the gathering and organisation of information about a learner to make decisions about his or her learning. 'Evaluation', according to the authors, is used when judgments are being made about the wider elements that influence the learner's performance, such as learning aids, media, curricula and teaching methods. The authors further posit that assessment cannot take place without evaluation and that the new OBE system, with its

continuous assessment, brought along new instructional approaches as well as strategies that needed new forms of assessment as well as more than one assessor to understand the learning process and what it aims to achieve.

Technology teachers, specifically, were required to use a variety of instructional approaches and strategies, accompanied by a new assessment framework to complement the unique requirements of the curriculum and to enable learners to learn optimally (Reddy, Ankiewicz & De Swardt, 2005 in De Swardt, Ankiewicz & Van Niekerk, 2005:4). According to the planning, teaching and assessment in OBE is determined by four principles, namely the outcomes educators want learners to achieve, the content used by educators to help the learner to achieve the outcomes, the process educators employ to assist the learner in achieving the outcomes and the assessment of the learner (Killen, 2000:vii, xiv-xv as cited in De Swardt, Ankiewicz & Van Niekerk, 2005:1). Outcomes are divided into two subcategories: specific outcomes (what the learner should be able to do in the context of technology education at the end of the learning experience [DoE, 1997:89]) and unit outcomes (what the learner can demonstrate regarding a specific aspect of technology education (as cited in Van Niekerk, Ankiewicz & De Swardt, 2005:2).

The content of Technology must include conceptual knowledge ('knowing that') of technology as artefact as well as procedural knowledge ('knowing how') of the design and making of such artefacts (McCormick, 1997:149), which differs from the previous approach whereby the two types of knowledge (theory and practice) were not employed interactively.

Le Grange and Reddy (1998, 4–5) identified four types of term employed in traditional teaching to describe assessment: Summative assessment takes place at the end of a learning experience with the purpose of determining through tests and examinations how much of the subject content the learners know. The development of learners' ability to memorise content knowledge enjoys prevalence above understanding of the content. This summative assessment is always norm referenced and compares learners' achievements with those of other pupils but reflects little of what students have mastered or what they understand. Then there is formative assessment, which is the opposite of summative assessment and is conducted while the learning process takes place and at the same time influences and informs it. Then there is criterion-referenced assessment, which sets goals that students have to achieve in a particular grade and provides more information about a learner's competence in a particular area, compared with norm-referenced

assessment, in which “attainment is based on a comparison between the abilities of an individual and that of some other population on which the test has been standardise (Kraak, 1998:27). The authors posit that traditional teaching mostly employed summative and norm-referenced assessment while in OBE, formative teaching and criterion-referenced teaching feature more prominently and are concerned with the development of learners’ other skills, attitudes, values and levels of competence that have to be developed during the learning process on a continuous basis.

In previous practical subjects, more emphasis was placed on the completion of the artefact, disregarding the process and knowledge involved in completing it.

Conceptual knowledge relates to the links between knowledge items, which will lead to conceptual understanding in learners. There are three types of conceptual knowledge that are relevant to the development of technological artefacts, namely knowledge of the nature of the artefact, knowledge of the relationship between its physical and functional nature, and the knowledge process (De Vries 2003c:84; Broens & De Vries 2003:5-6; De Vries, 2003b:2, De Vries, 2003a, 13–14 as cited in Van Niekerk, Ankiewicz & De Swardt, 2005:2). However, the question arises as to whether too much focus on knowledge transfer before the knowledge skill is mastered does not result in constraining technological practice with resultant poor technological outcomes for students (Compton & Harwood, 1999a, as cited in Compton & Harwood, 2003:2–10). Procedural knowledge is frequently referred to as tacit, personal or implicit knowledge. Technological procedural knowledge is associated not with technical skills but with thinking processes and skills (McCormick, 1997:144).

This new assessment framework, consisting of different strategies, according to Van Niekerk, Ankiewicz & De Swardt (2005:2), made enormous demands on educators, who had to make major shifts from the traditional strategies employed. Firstly, educators had to shift their focus from being solely responsible for evaluation to providing learners with the opportunity for self-, peer and group assessment. This type of assessment provides for analysis of pupils’ technological practice in order to be acknowledged and validated through informed critique (Compton & Harwood, 2003:8). Secondly, educators had to move away from the custom to award marks for tests and examinations taken by learners and promoting them on the basis of these marks. Thirdly, educators had to shift from traditional tests and examinations to using other

assessment instruments, such as the national codes of assessment, which range from 1 to 7 on a sliding scale. This shift from traditional evaluation to assessing learners' gradual progression proved to be very difficult because the previous system relied on marks achieved for projects to determine the promotion of learners.

Compton and Harwood (2003) continue by highlighting the fact that in order to achieve outcomes-based assessment, different assessment instruments had to be used to provide meaningful feedback with regard to teaching and learning. Instruments that have to be used are observation sheets, to observe whether outcomes have been achieved, and rubrics, which consist of observable criteria that indicate which aspects will be assessed and on what level they will be assessed. Then there is a question-and-answer sheet that must consist of a series of relevant questions on a particular topic, providing learners with the opportunity to provide their answers (DoE, 2002:11; Owen-Jackson, 2002 as cited in Van Niekerk, Ankiewicz and De Swardt, 2005:5).

Moreland and Jones (2000) as cited in Van Niekerk, Ankiewicz and De Swardt (2005:6), highlight one of the biggest results that emanates from educators' lack of adequate training and the lack of fundamental knowledge in Technology education. The authors allude to the fact that educators rather focus on specific activities such as capability tasks (summative assessment) and in the process neglect the selection of and adherence to the Specific Outcomes (SO). Learning outcomes should be predetermined at the time of the unit planning prior to unit delivery and are based on the requirements of the curriculum, the resources available to the teachers, the teachers' conception of their students' current understanding and the competencies to be attained in the unit. Learning outcomes should also be negotiated during delivery in response to students' specific learning needs as based on their actual practice (Compton & Harwood, 2003:10), which is not the case in the South African context where the determining of unexpected learning is not always taken into consideration. OBE assessment requires of educators to alter and vary teaching methods or learning activities if specific outcomes have not been achieved in the learning process (Le Grange & Reddy, 1998:9). This demand is one of the aspects in teaching that is silently being accepted without thoroughly applying it because of the unattainable nature of it.

To my understanding this ideal form of assessment is unattainable in most schools where, as I stated in the previous chapter, educators have to deal with unmanageable learner-educator ratios

of 1:35 and higher in some cases. The total number of assessment tasks multiplied by the total number of learners makes proper assessment highly improbable to attain, according to Arnold (2005). Nobody, not even subject advisors, pays much attention to this aspect, and proper assessment will only be possible once assistant teachers are being provided who can work with and evaluate those learners who did not achieve the stated outcomes of a learning unit. This means that in order to keep up with the pace at which the learning programme has to be completed, those learners who do not fully understand or achieve the stated outcomes have to keep up with the pace of those who have achieved the outcomes. If pupils are expected to develop at their own pace, structures have to be put in place to cater for their unique needs.

This, and I agree with Van Niekerk, Ankiewicz and De Swardt (2005:6), is the result of the fact that educators, especially those with the traditional practical background, habitually fall back on an approach better known to them and that they feel comfortable with. In many cases educators in the technical subjects (Woodwork and Metalwork) and domestic science continue the instructions of Technology education in the traditional way and are not aware of or motivated to make the adjustment required by OBE (RAU Report, 2002:60, as cited in De Swardt, Ankiewicz & Engelbrecht, 2005:3). Some educators also tend to regard Technology education as the designing, making and testing of artefacts (Moreland & Jones, 2000, as cited in Van Niekerk, Ankiewicz & De Swardt, 2005:6). Because the emphasis previously was on the completion of the artefact, educators neglect the appropriate conceptual content (know what) to inform the making (know how) of the artefact. The lack of a coherent learning area planning approach in the inception phase is one of the factors responsible for the fact that learners fail to grasp how information from different learning areas correlates. Here I refer to the fact that after individual learning area planning, educators neglect to sit together in order to identify the areas where the respective curricula overlap. This coherent approach will also lead to the eradication of duplication of curriculum content (Le Grange & Reddy, 2002:11) over grades and across learning areas and will allow educators to take responsibility for areas that they are more acquainted with than their colleagues, and vice versa.

Potgieter (2004:210) argues that the absence of a recorded best practice experience and a history of technology education that can be drawn on in its inception years is an obstacle in Technology education. The availability of resource/subject material currently as well

as continuous tasks of assessment that were completed over the past years do address the abovementioned shortcomings and make preparation a more pleasant prospect.

5.4 Effect of new policies on established habitual patterns in teaching environments

Changes within our transforming society are guided by new policies in our education system, which had to replace the old ones in order to facilitate the process of transformation. My contention is that these prior policies and teachers' translation of them into practice contain already-established habitual patterns that form the basis of enactment within the existing group of education practitioners. The conflict between the existing patterns and the new policies exposes what may be perceived as the lack of capacity to deal with the intensive engagement with ideas and the people required to enact these policy changes and appears to be a major stumbling block in the process of successful or meaningful implementation. Education agencies are not being prepared adequately to foster an understanding to deal with the conflict that these new policies are posing. Fullan (1994) as cited in Darling-Hammond (1998:650), posits, and I tend to agree with him, that "it is only when greater clarity and coherence is achieved in the minds of the majority of teachers (and education managers) that we have any chance of success".

Darling-Hammond (1998:654) continues by stating that in order for teachers to succeed in this new kind of teaching, they must understand that "the process of teaching requires time and opportunities to reconstruct their practice through intensive study and experimentation", which means that educators first need to have learning opportunities and not merely brief information sessions before being expected to implement new policies. Currently, learning opportunities are being provided for (forced upon) educators in our education system through short informational sessions during the course of the academic year and over holidays. It is assumed that educators will internalise this new teaching methodology without taking cognisance of the fact that this new approach will have to be understood before it can be internalised and applied. Freire (1972:45) contends that to teach a subject without the means to teach it leaves a feeling of 'self-depreciation' and 'inferiority' and a lack of confidence. Responses from the respective interviewees confirm this theory. The fact that educators do not have the required expertise to present a subject causes low self-esteem, unnecessary pressures and many frustrations (Respondent 1). These feelings traumatised Respondent 4 to the extent that he even considered committing suicide. The knowledge that learners might be able to pick up the educator's

incompetence in presenting the learning area left Respondent 4 disempowered, feeling inferior and considering himself a failure with no confidence at all.

The provision of aims and objectives, which always was a directive in lesson plans, is now being accompanied by prescribed outcomes or units that have to be adhered to when constructing or designing learning programs (lesson plans). Meighan (1986:47) summarises the purpose of aims, objectives and outcomes as a strategy for preparing learners for society, the way it currently is organised, to enable them to change society through research and innovation, to adapt to changes that might occur in an uncertain future, to develop as persons, to function in the economy as workers, to live as consumers and to enjoy leisure.

I tend to agree with the “centraliser’s” approach (Darling-Hammond, 1998:655), which holds that our current transformation process should have, in the introduction phase, been preceded by “a tightly specified curriculum that outlined in great detail what needed to be taught each year”, until teachers have achieved the necessary level of understanding of subject matter in order to teach a subject meaningfully. In the initial implementation stages, the curriculum outlines were specified too broadly, leaving enough space for educators to engage with a wider array of content but posing a challenge for those who were still operating within the mindset of preparing learners for the completion of an examination paper, which is an element of the content-driven approach. Suddenly educators were confronted with a new learning area with no approved textbook at their disposal, according to Respondent 1. The databases that educators had compiled over the years of teaching Woodwork had to be disposed of because they did not serve the new Technology learning area. Preparation or lesson planning, as explained earlier in the adoptive approach, entails the time-consuming process of working with and sifting through stacks and stacks of notes handed to educators by the subject advisors, as well as a variety of other sources (Respondents 4 and 1), without exactly knowing what to teach and what to omit. This problem was compounded by the fact that all the reading material was only available in English and had to be translated into Afrikaans (Respondent 4). Besides selecting appropriate learning material, educators also had to work through the content in order to understand it, enabling them to present it meaningfully. Besides this, the educators had to familiarise themselves with the respective learning outcomes and assessment standards, which were alien to them (Respondents 1 and 2). This process is in total contrast to what Darling-Hammond (1998:654) elaborated on earlier.

A tightly specified curriculum poses a serious threat to educator freedom and criticality but nevertheless would have provided much-needed guidance and the time to achieve some level of coherence and continuation to embrace the challenges of the new policies. This would possibly have created a platform for improvisation and critical engagement at later phases of the implementation process.

The existing perception about Civil Technology I am referring to a previous paragraph is one of the hidden assumptions of school management causing them to refer all the so-called ‘slower’ or ‘less intelligent’ students to their practical departments. The prevailing perception when Woodwork was still part of the curriculum was that the subject was more suitable for the ‘not-so-bright’ learner because of the practical nature of it, that it was a ‘stop’ or ‘fill-up subject’, as referred to by Respondent 1. Civil technology will definitely be more challenging than woodwork, which at the moment serves the purpose of accommodating the ‘problematic/not-so-bright’ pupils because they are better suited to ‘working with their hands’. The perception also prevails that the practical component of the subject, which is evaluated on the basis of the completion of an artefact as part of the yearlong curriculum, provides the non-academically gifted performer with the possibility of passing the examinations.

One of the concepts embedded in the NCS for Technology is the application of scientific, applied mechanics and mathematical principles, which will prepare students for a career in engineering. At most schools, justice is not being done to Civil Technology because it is grouped with Mathematics Literacy and not with pure Mathematics and Natural Science, which should be the case. For a career in engineering, learners are required to have Mathematics as a subject and not Mathematics literacy.

Engaging with these changes, brought along by OBE, allows for a clearer perspective on what aspects may have been addressed first in the process of reskilling educators. The lack of a clear instructional directive is one of the factors, if not the biggest, that contributed towards the confusion that nearly derailed the implementation process, especially with regard to CPTD, which will briefly be discussed in the following chapter, after narrating how I personally experienced the implementation process in the GET as well as in the FET bands.

5.5 Continuous professional teacher development in Technology education in the GET and FET bands

The introduction of OBE in South African schools placed new demands on educators who required new competencies and skills. The Technology curriculum (GET and FET), unlike other learning areas, requires more than just a shift in approach and lesson planning. In my opinion, one of the mistake that was made was to apply a ‘one-size-fits-all’ approach when it came to the upgrading of the educators’ capacity, regardless of their individual interests and motivation (Collinson, 2000:124). Collinson further stresses the fact that the upgrading of educator capacity cannot be conducted in the same mode as staff developments workshops, which make use of the ‘inquiry model’. She suggests, and I concur with her, with specific reference to the Technology learning area, that the traditional training model would have been a logical an efficient choice for the upgrading of educators who had been identified as the implementers of the capacity of the Technology curriculum. Instead, educators were being briefed in short sessions by people who were also unsure and unconvincing. It was also expected of them to acquire these skills and knowledge in afternoon sessions and holidays, while their counterparts at technical schools were properly trained over three- to four-year periods (Respondent 1). Coetser (2001:89) as cited in Lessing and De Witt (2007:53), is of the opinion that the implementation of new policies such as OBE will only be effective if teachers are adequately prepared and equipped by means of initial retraining and if they realise the importance of improving their practice by means of CPTD.

CPTD refers to activities aimed at enhancing the knowledge and skills of teachers by means of orientation, training and support (Coetser 2001:78 as cited in Lessing & De Witt, 2007). CPTD not only requires informal and spontaneous learning of teachers from one another (Bunting, 1997:30; Day, 1999:148; Kaagan, 2004:3 in Lessing and De Witt, 2007:55–56.) but also relies on the prior knowledge (Bedeson, 2003:9 in Lessing and De Witt, 2007:55–56), wealth of potential and experience of each participant, which can be built upon and incorporated into further initiatives (Early & Bubb, 2004:17; Greenberg,1998:31 in Lessing and De Witt, 2007:55–56).

Teacher development in Technology (GET) basically utilised the in-service training of teachers (INSET) model. Potgieter (2004) gives the following chronological account of how the in-service training of teachers developed since the subject’s inception in 1998. The first period

since 1999 was characterised by two-and-a-half-day workshops and seminars as part of a science outreach programme ran by the School of Education of the University of South Africa. The purpose of this programme was to expose teachers who did not have formal technology training to what technology education was all about Potgieter (2004:206). Besides the fact that some practising educators did not have any experience in some of the concepts, processes, content and methods associated with Technology education, they also lacked in-service training in the new outcomes-based educational system in general, (Potgieter 2004:210), which required of them to develop their own learning programmes and gather their own resource material (Potgieter 2004: 212). This lack, Potgieter posits, should be addressed by exposing in-service teachers to teaching practice and internships. It was also found that more than 80% of teachers at about 30 000 schools across South Africa at that stage required in-service training to phase in the learning area effectively (Potgieter, 1996:18, as cited in Potgieter, 2004:211). This was because teachers having to teach Technology did not have the relevant academic background, especially with regard to the content of the design process, energy systems and control, structures, materials, processing, data processing, data communication and tool handling (Potgieter, 2004:12).

With regard to the lack of proper resource materials, I can confirm that the situation has improved immensely since 1998 regarding the availability of relevant resource materials to assist in the development of learning programmes. Education districts do offer, as in the case in the Western Cape, via nongovernmental organisations weeklong courses in technology and other learning areas in which educators who volunteered through their Education District Offices, are skilled in course content and the methodology in teaching Technology within the outcomes-based approach. With regard to formal training in technology (GET), most of the institutions of higher learning involved in teacher training present structured programmes in their respective teacher training programmes, full time (diploma and degree courses) and part time (Advanced Certificate in Education: Technology Education), to assist teacher development in technology education. UNISA also currently offers a distance teacher education programme, especially to cater for in-service educators teaching in remote areas with limited access to institutions of higher education. Educators teaching in remote rural areas were also assisted through a sponsored community outreach programme (1999–2002) (Potgieter 2004:215).

Comparing strategies followed to employ CTPD in Civil Technology (FET) to those followed in Technology (GET), one witnesses vast discrepancies that cannot contribute to swift and effective implementation. The introductory phase of the Civil Technology learning area was preceded by sessions during which educators were briefed on and supplied with administrative information about the learning area. Most of the educators involved did not have a formal academic background regarding the content and the methodology of this totally new learning area. New elements included knowledge about new tools, materials and safety regulations oriented towards the different disciplines from the built environment (Respondent 1). Dissemination of information, standardisation and planning sessions during which educators were coached on or exposed to (Respondent 1) certain challenging sections of the curriculum and the distribution of resource material were up to 2009 the only means of assistance in teacher development.

Educators involved in the teaching of the learning area are mostly those who taught Woodwork in the old curriculum. Currently, no institutions of higher learning offer a structured skills development course for practising educators. These courses are also not included in current formal teacher education programmes at those institutions. The implications are that schools offering the learning area will have to rely on the scarce availability of competent human resources in order to maintain the existence of the subject in the school programmes. Unless these institutions introduce a structured Civil Technology course in their programme, the subject will have no chance of continued existence because of the lack of educators to teach the learning area. Educators themselves will have to be creative in order to equip themselves to achieve the outcomes and intended competencies that the learners should possess after completion of the learning area curriculum.

5.6 Summary

In Chapter 5 I unpacked the methodological changes, what they entail and the implications for OBE assessment in Technology education. After that, I focused on the effects the new policies may have on established habitual patterns. The last section dealt with the CPTD strategies employed to train or prepare educators for the new Technology learning areas. The concluding chapter will be used to locate school-based patterns of engaging with the implementation of the Technology curricula within the framework of Bourdieu's and Foucault's notions, as explained in Chapter 3.

Chapter 6: Conclusion

6.1 Introduction

As an Afrikaans-speaking Woodwork teacher, I found writing this narrative of my own experience, employing the preferred methodology of autoethnography within a normative academic framework extremely difficult. This thesis was written over a three-year period in which I experienced tremendous tension between my own Afrikaans life and expressions in telling my story and the reading of complex theories in academic English. I struggled to come to grips with confusing, complex theoretical notions and methodological implications, which improved during the time of completing this document. This resulted in a narrative that sometimes retains the style of a theoretical application of theory as well as the deeply embedded discourse of positivism. Although the narration is mostly captured in the language/discourse of positivism, speaking about influential factors such as statistical indicators and questionnaires as a means of collecting data, the set of questions guides a more interpretive inquiry. Theoretically based reflection that is grounded in everyday practice is my preferred type of autoethnography because it enables critical reflection on my own practice. It did, however, over time allow me to come to the understandings that will be reflected in this last chapter. After a brief overview of the main findings of the various chapters, I will offer a critical reflexive engagement with my own experience as it was informed by the experiences of my colleagues. These critical reflexive engagement also speaks to the policy gap or the space between the policy text and the enactment in the classroom and is informed by Bourdieu's notions of habitus, field, strategy and practice, as elaborated on by Lingard and Christie (2003), as well as the Foucauldian notion of power as interpreted by Ball (1995) and Berkhout (2005).

In Chapter 1 I argued that although the main reasons for including the Technology Curriculum in the RNCS were laudable, this inclusion elicited rather unexpected actions from the educators who had to implement the curriculum. As a trained Woodwork educator, I struggled to comprehend and make sense of the changes with which I had to deal with on a daily basis since the technology and Civil Technology curricula implementation. The fact that it was, however, a more generally experienced phenomenon as well as part of what Ball described as the policy gap in Chapter 3 resulted in my selecting critical reflexive narrative as a means of inquiry to conduct

my research. The selection of these appropriate methods and methodology allows for an extensively autoethnographic inquiry, which suits my specific type of research, as well as the framework to be adhered to in conducting such an inquiry. To enhance my narrative, I conducted in-depth interviews with colleagues with a similar background who also had to deal with the challenges of the implementation of the Technology and Civil Technology curriculum.

In Chapter Two I explored requirements and challenges for the 21st century as it is being shaped by the accompanying economic discourses, namely globalisation and the knowledge economy, and how these discourses converge with the Technology curriculum. Globalisation and the knowledge economy as economic discourses were briefly discussed as well as the changes they brought along in economic ideology, which led to the rethinking of the relationship between education and the industry. This resulted in education policies being adjusted to serve the purpose of the markets. This inquiry only focused on these discourses to the extent that it specifically speaks to the Technology curriculum and its alignment to the demands of a more skilled and knowledgeable populace for the market in the South African context. The Technology learning area curriculum, in comparison with the previous mode of knowledge production which was industrialist or Fordist, is clearly orientated towards the new Mode 2 knowledge production and its concomitant endeavour to also produce a knowledgeable human capital base to eventually participate in the broader global knowledge economy or community. In this chapter some of the challenges that are facing most South African schools when putting structures for teaching and learning in Technology education in place were highlighted. I also concentrate on the importance of the maintenance of these structures and accessibility thereof to the whole country's school population. I question the capacity of the diverse, unequal South African society, in which the majority are disadvantaged and low skilled, to deal with these changes. The conclusion revealed the different effects of globalisation on developed and developing countries, namely the perpetuating of inequalities among communities, the exclusion of two-thirds of the world population because of an underdeveloped technological infrastructure as well as the lack of sustainability of globalisation.

In Chapter 3 I located the perceived policy gap in the policy implementation process and continued to highlight some of the challenges that policy changes entail as well as the personal and professional challenges they will pose for the educators who will have to facilitate the

implementation process. Because these changes mainly speak to the educators' professional make-up that was established and guided by their formal teacher training years and also to their personal attitude towards these changes, I found it most suitable to ground my research in Pierre Bourdieu's notions of habitus, field, strategy and practice and Michel Foucault's notions on power and discourses as theoretical frameworks. Bourdieu's notions allowed me to reflect on how these changes created tensions between my established patterns of practising in my professional field as well as the strategies I employed to address these challenges. Foucault's notions allowed me to demonstrate how the disposition and orientation of educators can be determining in making a success of failure of policy implementation strategies.

In Chapter 4 I identified factors that played a role in the perceived policy gap, which I classified, for the purpose of discussion, as seen or visible elements that are mainly limited to management inadequacies. The chapter deals with visible and tangible aspects, such as management with regards to the availability of resources, infrastructural challenges and educator capacity, which were neglected and ignored in the implementation process.

In Chapter 5 I engaged with aspects that I categorised as the more unseen or implicit dimensions that were ignored in the implementation process. These included the challenges that OBE as an education model poses to educators, namely a shift to a learner-centred approach as well as the implications thereof for educator practice, the accompanying new assessment framework as well as the effect these new policies have on established habitual patterns in the teaching/learning environment. In the last section of Chapter 5 I focused on CPTD and reflected on the rather inadequate manner in which it was conducted during the implementation of the Technology and Civil Technology curriculum.

The last part of this chapter will be a critical theoretically informed reflexive engagement with my own experience as it is informed by the experiences of my colleagues. Here I interpret participants' responses in order to determine how they resonate or conflict with my personal experiences in terms of Bourdieu's notions of habitus, field, practice and strategy.

6.2 Patterns of habitus, field, practice and strategy and the effect on educator practice

Bourdieu's notions of habitus, field, practice and strategy, which address how social agents operate in ways that are compatible with their social situations, enable me to demonstrate how

educator school-based patterns shaped the Technology curriculum and learning practices in secondary schools. “Habitus refers to the acquired, socially constituted dispositions of social actions, to the classificatory principles they use, and to the organising principles of the actions that they undertake without conscious planning” (Bourdieu, 1998 as cited in Lingard & Christie, 2003:320). The author further states that habitus is the “subjective incorporation or internalisation of social structure, and has the effect of making the social world seem natural and it’s practice taken for granted” and is “a form of internalized social conditioning that constrains the thought and direct action” (also in Bourdieu, 1998 as cited in Lingard & Christie, 2003:320).

Most of the Woodwork educators at public schools, where the subject was replaced by Civil Technology I, had been teaching Woodwork since the beginning of their teaching careers as their field of specialisation. At the college where I received my teacher’s training, not many students were allowed to specialise in Woodwork in a specific year (maybe because of spatial constraints), which explains the scarcity of Woodwork educators between the years 1990 and 2007 to teach the subject at schools. Some practising Woodwork teachers also came from a vocational background where they did their respective trade tests, followed by a teaching certificate, which enabled them to practise as Woodwork teachers. Some had also completed National Certificates at a Technikon, followed by a teaching certificate.

I would like to argue that because of the years of repeatedly teaching the same content in the Woodwork syllabus by the educators, it had become part of their practice, which lends itself to the formation of habitual patterns or everyday practice. The foundation of educator practice, within the subject context, is laid by the field in which they are qualified and the repeated practising thereof in a field structuration.

The early phase of educator training at a teacher’s training college consists of a pool of general subjects, with the possibility of specialisation into certain fields after the first year until the concluding phase. Educators’ actions over a period of time become an internalised routine after the intense specialised training they received in their teacher’s training course. I concur with Smeyers and Burbulus’ (2006) view that, with regard to specialist technical or practical subjects, educators have to be initiated into the field in order to be in a position to contextualise the content. Subjects such as Technology lend themselves to certain customs and conventions

pertaining to that particular field. Specialised fields are what Wittgenstein, as cited in Smeyers and Burbulus (2006:441), calls the “shaping of behavior to conform to activities licensed by practice or custom” wherein practitioners become skilled professionals.

In the initial phases of the implementation of the Technology (GET) and Civil Technology (FET) bands, educators were expected to teach the new learning area with only the curriculum as guidance as well as their previous knowledge and a limited amount of assistance. Practical learning areas, I believe, cannot be taught by just handing down written instructions to participants to be followed. Smeyers and Burbulus (2006:441) confirm my opinion by stressing that “the practical aspects of rule-following cannot be taught on the basis of rules alone; it has to be picked up by examples and by training”.

I experienced that although educators often profess otherwise, they find it difficult to adjust within a short space of time to a new learning area and that it will take some intense training and practice in the methodology, content and techniques used in (to a lesser degree) Technology (GET) and in (to a larger degree) Civil Technology (FET) to enable educators to replace habitual patterns and to present the new learning area meaningfully and with conviction. The lack of a thorough mastering of the use of tools and techniques and their proper application, with the appropriate accompanying conventions, may furthermore lead to serious physical injuries being inflicted on the educator as well as the learners. Being in control of the tools and the techniques to complete practical aspects within the learning area will allow for adaptation to the constant change in a specific field. My view concurs with Wittgenstein’s argument in Smeyers and Burbulus (2006:441–442) that we have to look at models or templates of learning that may build on templates shaped by our initial training, which may create space for going on in the same way, utilising the old and new ways, which may lead to a gradual transition to the new templates.

A result of educators’ lack of control of certain parts of the new curriculum may be that they will only concentrate on the parts of the syllabus content that relate to their current knowledge base, namely woodwork, as well as the knowledge base of the subjects they specialised in and neglect or ignore the aspects that form part of the new knowledge base that they are not acquainted with. Bourdieu (1998b) in Lingard, Rawolle and Taylor 2005:760) argues that a field is a structured social space in which various actors struggle for the transformation or preservation of a field. Educators or agents who are supposed to be the bearers of capital or (knowledge of the subject)

have the disposition to orientate themselves to the preservation of the distribution of capital or to the subversion of it. Bourdieu (1998) in Lingard & Christie (2003:320) describe habitus as a “product of social conditioning”, which I find the main contributor to the fact that educators without protesting accept the proposed changes and creatively orient their strategies according to their capacity and local conditions, which may either endorse or undermine the policy intention. Not being knowledgeable may also lead to the inculcation of bad traits or practices.

The hidden effect within the whole process is the disempowerment of educators. The respondents expressed their discontentment with civil technology introduction in the following ways: “Cognizance was like a hammer against the head ... it puts a lot of pressure on educators ... that increases repugnance” because their “experience and training fields were being disrupted”. “It created uncertainty among Woodwork teachers, because they did not have any or very limited skill or knowledge about the new learning area” (Respondent 1). Respondent 3 regarded educator inclusion or recognition in the implementation process as “unethical ... and unprofessional”. “Bad memories” and feelings of “fear, expectations and disappointment” with the implementation process led to a stressful period in the life of Respondent 4. My contention, after experiencing the sessions that preceded the implementation of Civil Technology, was that educators just agreed on the inclusion of the subject in the curriculum because of their uncertainty regarding their jobs, fearing that their posts would become redundant with the phasing out of woodwork as a subject. The respondents concurred with this statement by constantly referring to their years of experience, which stretched individually over 15 to 20 years, in the Woodwork field and to their concern over losing their jobs. They also doubted and questioned their willingness to being trained in the new learning area. Instead of being empowered by an inclusive introductory approach, educators became victims because they were left with an uninformed choice as well as little opportunity to make a meaningful assessment of their capacity and environment to teach the learning area (Respondent 4). The way in which the new learning area was presented assumed that adaptation was just a procedural change. Nor were educators provided with adequate opportunities to empower themselves in their field in order to be in a position to reorientate their strategies to be able to make a meaningful contribution in the whole change process.

The new curriculum also placed new demands on the educators, mainly with regard to the change in the methodology of teaching, which directly challenged educator capacity as one of the habitually established content-driven approaches to teaching. Foucault's notion on power is demonstrated in the following reaction by the interviewed educators: No respondent, be it deliberate or not, gave any indication of how he dealt with the new methodological approach. They only referred to the number or wider pool of resources that had to be consulted in lesson planning, which can be interpreted as an act of ignoring or defying or just being uninformed about the new approach that was extensively discussed in a previous chapter. This is a good example of how educators can apply their power in devising their strategies in dealing with the curriculum.

Another example of how educators' habitual patterns are being challenged is reflected in the respondents' recurring reference to the exclusion of the practical component of woodwork from the civil technology curriculum. In Civil Technology there still is a simulated activity that has to be completed, which fulfils the role of the practical component, providing learners with the opportunity to boost their year mark. Besides this, educators still argue that Woodwork empowered learners with skills to the extent that they could exit school after matric and find employment without further tertiary education. This is to my knowledge not true because Civil Technology provides a bigger spectrum of opportunities for learners after completing school training. Instead of being limited to the cabinet-making industry, learners will have, with adequate trainers/educators at their disposal, options of entering the plumbing, bricklaying, water provisioning, land surveying, quantity surveying and many other fields that pertain to the built environment. They will have the basic knowledge enabling them to be absorbed into apprenticeship programmes at companies where they can be nurtured in a specialist field of their choice.

At the end of the interviews, respondents did agree that civil technology offers better opportunities within the modern context or, as I argued, within a continuously changing global context and the demands of the knowledge economy, which can be interpreted as a way of expressing their desire to continue within their old capacity framework and also conceding that renewal is imminent and unavoidable.

6.3 Conclusion

The focus in this document was mainly on the implementation process of Technology (GET) and Civil Technology (FET) in secondary schools and how it engaged with school-based patterns of teaching practice, within the framework of Bourdieu's and Foucault's notions, as mentioned in Chapter 3. The emphasis throughout was on highlighting the perceived gap in the implementation process as well as the contextual factors within it. Through unpacking that ignored factors that are a reality in school-based practices, the intention was to motivate why the intended outcomes will be difficult to achieve. I also endeavoured to emphasise that proper planning by competent managers to deal with the existing contextual factors as mentioned may have led to a smoother integration of Technology and Civil Technology into the school. Educators dealt with and adapted easier to the technology (GET) curriculum because the learning area was more general in nature and educators could rely on their peers. The extent of the learning area was that it covered most of the content of the old practical subjects in the old curriculum. Resources, learning materials and appropriate accredited training opportunities were available to the educators having to present the learning area. Civil Technology, however, has since implementation up to now (2010) put no formal accredited structures in place to assist practising educators to equip themselves adequately. The lack of properly trained educators is enough reason to believe that the aims of providing skilful participants for the global knowledge economy will remain a dream and will only result in the widening of the gap between the advantaged and the disadvantaged in an already unequal, impoverished South African society.

Appendices

A.1 Research Questionnaire

Research Topic: Implementing the new Technology Curriculum Statement in the context of the Knowledge Economy.

Research questions/Navorsingsvrae

Student: Franklin Arendse

Respondent :.....

1. How were you informed about the exclusion of woodwork from the National Curriculum Statement, and what went through your mind when you learn that it was going to be replaced by Civil Technology?

Hoe was U aanvanklik ingelig oor die uitfassing van houtwerk uit die Nasionale Kurrikulum Verklaring, en wat het deur jou kop gegaan toe jy verneem dat dit gaan deur Tegnologie Siviël vervang word?

2. What impact did the change from the woodwork to the civil technology curriculum have on your everyday teaching practice and what personal, as well as professional changes did it entails?

Watter impak het die verandering vanaf houtwerk na die tegnologie siviël kurrikulum op alledaagse onderrigpraktyk gehad, en watter persoonlike sowel as professionele veranderinge het dit behels?

3. How did your existing knowledge base of woodwork teaching, acquired through the completion of your teacher's diploma, compliment you in teaching the Technology and Civil Technology curriculum?

Hoe het jou kennisbasis van houtwerk, wat jy opgedoen het deur jou opleiding as houtwerk student, jou gekomplimenteer in jou oorskakeling na die onderrig van tegnologie en Siviël tegnologie?

4. What impact did the teacher pupil ratio, as well as availability of resources have on you teaching practice in the first stages of the implementation of the subject?

Watter impak het die opvoeder:leerder verhouding, sowel as beskikbaarheid van fisiese onderrighulpmiddels op jou onderwys praktyk gehad in die aanvangstadium?

5. How did you experience and manage the introduction of Civil Technology, while you still had to teach Woodwork which was being phased out.

Hoe het jy die infassering en die bestuur van Tegnologie Siviël gehanteer, terwyl houtwerk op dieselfde tyd besig was om uitgefasseer te word?

6. How would you describe your school management's attitude with regards to the allocation of certain learners to the technical stream? Did this change from the attitude towards learners doing woodwork?

Hoe sal jy die houding van jou skool se bestuurspan beskryf betreffende die allokering van leerders tot die tegniese stroom by jou skool? Hoe het dit vergelyk met die houding wat betrokke was by keuring van leeders vir houtwerk?

7. What is your opinion when you have to compare the level at which the Technology curriculum has to be taught, with that of the woodwork curriculum?

Wat is jou opinie omtrent die vlak of moeilikheidsgraad/makliheidsgraad van aanbieding van tegnologie, in vergelyking met die van houtwerk?

8. Elaborate on the strategies put in place at your school to ensure Technology learners their rightful access to IT laboratories, and is this access adequate and meaningful?

Brei uit oor jou skool se strategie in plek om tegnologie leerders hul gelykmatige toegang tot die skool se Komper laboratoriums verseker, en is die toegang voldoende en betekenisvol?

9. Can you briefly reflect on your experience during the introduction period of Technology (GET), as well as Civil Technology (FET), as well as the professional development strategies embarked on by the WCED to ensure effective teaching and learning?

Kan jy kortliks reflekteer oor jou ondervinding van die periode waartydens Tegnologie en Siviele tegnologie ingefasseer was, met die inagneming van die rol wat die amptenare van die WKOD gespeel het in die uitvoering van die Professionele Ontwikkelings strategie wat effektiewe opvoeding en leer moes verseker?

10. In your opinion, and with hindsight, is the shift from woodwork to technology justifiable within the societal context or not, and why?

In jou opinie, en met nabetraging, kan die oorskakeling van houtwerk na tegnologie (GET en FET) geregverdig word vanuit 'n samelewings oogpunt?

A.2 Consent Form



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STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH

Topic: Implementing the new Technology Curriculum Statement in the context of the Knowledge Economy

You are asked to participate in a research study conducted by Franklin Arendse, from the Med. Policy Studies Department at Stellenbosch University. This interviews will be used in the process of completing my mini-dissertation. You were selected as a possible participant because you adhered to the requirements which stated in this study. Participants had to be an educator experienced the implementation period of the Technology (GET) and Civil Technology (FET) curriculum since its inception.

1. PURPOSE OF THE STUDY

The purpose of this study is to critically engage with the discourses and school based patterns of engagement that shape the technology curriculum, as well teaching and learning practices in a secondary school.

This research project endeavours to highlight some of the contextual interactions that poses challenges to the implementation of OBE, especially the Technology (FET), and the Civil Technology (FET) curricula. It is important, in the interest of social participation in the implementation process, to establish how educators, as the implementers of this Policy are responding and engaging with the Policy Text and the accompanying discourses. This may contribute to or inform future implementation strategies.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

I will require of you to engage with me in an interview in which the list with questions, being provided beforehand, will be addresses. Date (before September 2010), and venue will be decided on mutually, but guided mainly by you as the participants' preferences. The duration of interview will not exceed an hour (one hour). The interview will be recorded with a voice recorder for later use only by the researcher, as well as the supervisor and examiners, if required afterwards.

3. POTENTIAL RISKS AND DISCOMFORTS

At this stage I do not envisage any foreseeable risks, discomforts, inconveniences or physical or psychological aspects that may be impart on participants.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

[Describe benefits to subjects expected from the research. If the subject will not benefit from participation, clearly state this fact.]

[State the potential benefits, if any, to science or society expected from the research.]

5. PAYMENT FOR PARTICIPATION

The participation will be voluntarily and they will not be eligible for being remunerated after the completion of the research.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of referring to participants as Respondent One, Two, Three and Four respectively. The transcribed data will be included as an attachment in my final thesis document. A copy of the original will be kept on my laptop in a hidden file. Nobody have access to my PC because a password is required.

The information will only be released to my supervisor, who on her terms will release it to the relevant parties involved with the evaluation process.

The recorded interviews will only be released for transcription purpose to a confidential source. A copy will be downloaded on my PC also in a hidden file with the rest of the documents. The subjects will have to have access to the recorded tapes, but not with the purpose of editing it. Editing will spoil the data. They had enough time to prepare for the interview and the structuring of their answers. They will have to right to add to their answers if they felt that it can make a difference to the given ones.

Confidentiality will be maintained in the final thesis document by constantly using the abovementioned coding when referring to the participants. There is currently no plan to publish any of the thesis results, except in the final thesis document.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact:

Franklin Arendse (Researcher)

22 Frost Drive

Nooiensfontein

Kuilsriver

7580

Home Tel: 021-9033731

Cell: 0845 838641

Prof SJ Berkhout (Supervisor)

University of Stellenbosh

Education Faculty (Policy Studies)

Tel: 021 8082419

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to me by Franklin Arendse in Afrikaans and Iam in command of this language or it was satisfactorily translated to me. I..... was given the opportunity to ask questions and these questions were answered to my satisfaction.

I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

Name of Subject/Participant

Name of Legal Representative (Not applicable)

Signature of Subject/Participant or Legal Representative

Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ [*name of the subject/participant*] and/or [his/her] representative _____ [*name of the representative*]. [He/she] was encouraged and given ample time to ask me any questions. This conversation was conducted in [*Afrikaans/*English/*Xhosa/*Other*] and [*no translator was used/this conversation was translated into* _____ by _____].

Signature of Investigator

Date

A.3: Ethical Clearance



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jou kennisvennoot • your knowledge partner

Mr. F Arendse
Department of Educational Policy Studies
University of Stellenbosch
STELLENBOSCH
7602

Reference: 462/2010

Mr. F Arendse
APPLICATION FOR ETHICAL CLEARANCE

With regards to your application, I would like to inform you that the project, *Implementing the new technology curriculum statement in the context of the knowledge economy*, has been approved on condition that:

1. The researcher/s remain within the procedures and protocols indicated in the proposal;
2. The researcher/s stay within the boundaries of applicable national legislation, institutional guidelines, and applicable standards of scientific rigor that are followed within this field of study and that
3. Any substantive changes to this research project should be brought to the attention of the Ethics Committee with a view to obtain ethical clearance for it.
4. The researcher/s implements the suggestions made by the mentioned by the Research Ethics Committee (Human Research) in order to reduce any ethical risks which may arise during the research.

We wish you success with your research activities.

Best regards

MR SF ENGELBRECHT
Secretary: Research Ethics Committee: Human Research (Non-Health)

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