



Cape Peninsula
University of Technology

**EXPERIENCES OF LEARNING TO BECOME A FURTHER EDUCATION AND
TRAINING MATHEMATICS TEACHER – A CASE STUDY**

by

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ABSTRACT

Low achievement in school mathematics, in comparison to other countries, impacts South Africa's global competitiveness. A shortage of qualified mathematics teachers is a key contributor to the low performance of learners in mathematics. To address the above challenge, a one-year Post Graduate Certificate in Education (PGCE), accessible to suitable diploma or degree graduates, is used to increase the number of qualified mathematics teachers in South Africa. This study explores how the PGCE equips these graduates with the knowledge, skills and attitudes to function as a newly qualified teacher (NQT) in the classroom. A qualitative case study methodology, purposive sampling, semi-structured interviews and document analysis are used. The case study focuses on a specific Higher Education Institution (HEI), represented by teacher educators and students/NQTs involved in a PGCE Further Education and Training (FET) mathematics programme. One of the key findings is: The PGCE offers graduates a concentrated Bachelors in Education (B. Ed.) fourth year pedagogical content knowledge (PCK) related qualification during afternoon/evening contact sessions, using continuous assessment to verify development. General education theories, PCK (which includes aspects that can be considered specialised simplified content knowledge (SSCK)), and positive and negative aspects associated with the teaching profession, formed the basis of the PGCE, to equip NQTs to meet national policy expectations. The part-time aspects of the PGCE, such as afternoon/evening classes and the appointment of teacher educators, restricted one-on-one engagements with the ever-increasing number of students and meetings between all involved in PGCE delivery. Guided self-study required students to take an active role in influencing the quality and content of the PGCE. One of the key recommendations arising from the study is the need to verify subject matter knowledge (SMK), to identify the need for extra modules or an introductory PGCE. Another is the need to develop and design PGCE context-specific content, in addition to the current practice of using B. Ed. related content. The contribution made by this study is that it serves as an example of how to explore ITE programme experiences of learning to teach in a longitudinal qualitative approach.

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GLOSSARY

Acronyms/Abbreviations/Terms	Explanation
B. Ed.	Bachelors in Education
CCK	Common Content Knowledge
CHE	Council on Higher Education
DBE	Department of Basic Education
D. Ed.	Doctorate in Education
DHET	Department of Higher Education
FET	Further Education and Training
HEI	Higher Education Institution
ITE	Initial Teacher Education
KC[L]	Knowledge of Content and Learners
KCL	Knowledge of Content and Learning
KCT	Knowledge of Content and Teaching
Learner	The term learner is used for an individual who is registered at a school and is completing one of the 12 grades comprising the South African schooling system
M. Ed.	Masters in Education
Mentor teacher	The term mentor teacher is used for an individual who is employed in a school that serves as a host during TP
NDMT	National Diploma in Mathematical Technology
NPDE	National Professional Diploma in Education
NQF	National Qualifications Framework
NQT	Newly Qualified Teacher
PCK	Pedagogical Content Knowledge
PGCE	Post Graduate Certificate in Education
PK	Pedagogical Knowledge
SACE	South African Council of Educators
SAQA	South African Qualifications Authority
SCK	Specialised Content Knowledge
SMK	Subject Matter Knowledge
SSCK	Specialised Simplified Content Knowledge
Student	The term student is used for an individual who is registered for the PGCE
TE	The term teacher educator (TE) is used for an individual appointed to lecture in the PGCE
TPACK	Technological Pedagogical and Content Knowledge
VPRO	Vision Philosophy Role Orientation

CHAPTER 1 ORIENTATION

1.1. Introduction

The case study on experiences of learning to become a FET mathematics teacher is introduced. This is done by clarifying the rationale for focusing on mathematics, teaching, teacher education and the context of the study. The research aim and objectives (see Table 1.1) are presented. This is followed by an overview of the methodology used to collect and analyse ethical qualitative data. The Chapter concludes by providing an overview of the ten chapters comprising the thesis.

1.2. Rationale for pursuing the study

With the aim of clarifying the reasons for conducting this study, four aspects are discussed: why mathematics is important as a school subject; why good teaching is complex in nature; what initial teacher education is in South Africa; and what the context is of the study.

1.2.1. Importance of mathematics as a school subject

The focus of this study is on school mathematics as valued and useful knowledge. It is understood that a sound background in mathematics at the FET level, specifically in Grade 12, could influence individual work prospects (Aguilar & Zavaletta, 2012:5; McElvy, 2009:27). This is because of its ability to serve as a “gatekeeper to academic and professional success” (Blömeke & Delaney, 2012:258). Eighty percent of job growth in the modern era occurred in fields requiring a sound background in mathematics (McElvy, 2009:27) and this trend is predicted to continue (Brodie, 2015:7).

We cannot build a society without strong mathematics graduates who will become our engineers, our doctors and nurses, our technology developers and our next generation of teachers (Brodie, 2015:17).

Valero et al. (2012:4) believes “the school mathematics curriculum is a powerful technology of the self”. This is to say, it equips an individual with “techniques that human beings have historically developed in practice to understand themselves as human” (Valero et al., 2012:4 also see Foucault, 1997:225). In short, mathematics as a school subject contributes to the development of mathematical ‘thinkers’ as needed by a specific society.

[Mathematics] embodies and makes available the cosmopolitan forms of reason, which build on the belief of science-based human reason having a universal, emancipator capacity for changing the world and people (Valero et al., 2012:4).

Mathematics is a human invention and therefore not perfect (Aguilar & Zavaleta, 2012:5; Daher, 2012:2). Meaning, mathematics can serve “as a tool to improve the welfare of humanity” by ensuring that all citizens can access the development of mathematical skills to take advantage of the perceived job growth. Alternatively, it can “increase inequality and injustice” by restricting access to a sound mathematical background, reducing an individual’s chances of taking advantage of the perceived job growth (Aguilar & Zavaleta, 2012:9; also see McElvy, 2009:27). The reality is that in South Africa, “approximately one in seven youths obtain a grade 12 pass in mathematics” (DBE, 2011:68). This low number is further exacerbated when one considers the drop-out rate in South African schooling: 539 102 learners who started grade 1 in 2000 were unaccounted for in 2011 when they were supposed to be in Grade 12 (a drop-out rate of 52% between Grade 1 and 12) (John, 2012:10). Additionally, only around 1 in 8 youth who pass Grade 12 “fulfils the requirements for Bachelor studies at University” (DBE, 2011:66). An undeniable contributing factor to the low performance in mathematics is that various schools are chronically short of qualified and confident mathematics teachers who are able to teach diverse learners in diverse contexts (Chetty, 2014:92; Spaull, 2012:12).

The schooling system is clearly failing the country, both with respect to the number of mathematics passes and the number of learners who excel (DBE, 2011:68).

Additionally, South Africa has deemed mathematics (which includes mathematical literacy) “compulsory for all learners” (November, 2010:195). In doing so, it created an increasing demand on HEIs to produce competent and confident mathematics teachers as needed in all schools. Unfortunately, this created demand is perceived as not being adequately satisfied due to two potential reasons. The first is that not enough individuals are pursuing teaching mathematics as a career to satisfy the demand. The second is that there is no guarantee that those who choose to pursue mathematics teaching as a career will receive the desired quality of university education (Taylor, 2014:19; Jansen, 2013:91; DBE, 2011:68; Darling-Hammond, 2008:1320). The second rationale related aspect is addressed below.

1.2.2. Good teaching is complex in nature

Shulman (2004:504) concluded (after dedicating 30 years to studying and researching teaching) that being a classroom teacher is “perhaps the most complex, most challenging, and most demanding and frightening activity our species has ever invented”. From this, it is deduced that learning to become a teacher can be perceived in the same vein. It should be noted that the above applies to individuals “who strive to be good teachers, rather than merely reading from a textbook, giving facts to learners or keeping learners busy with activities that require little intellectual effort while ensuring that learners behave” (Gravett & De Beer, 2010:2). In other words:

Developing routines can be helpful and can free up teachers’ attention for other aspects of their work; however, offering only routines does not help teachers develop the diagnostic and instructional skills for dealing with [learners] who require different approaches or additional supports if they are to learn successfully. Because teachers have multiple goals, [learners] are many and diverse, and teaching requires that many different areas of knowledge be integrated, teachers need to learn to analyse what is going on in the classroom and to make sound decisions about curriculum, instruction, assessment, and classroom management in the light of the particular [learners] they teach (Darling-Hammond & Baratz-Snowden, 2005:119).

It is argued that good teaching requires more than following “well-rehearsed scripts and routines” (Loughran, 2007:3) or transmitting knowledge from textbooks and managing learner behaviour (Gravett & De Beer, 2010:3). It is accepted that good teachers whose learners achieve academically do much more. That is to say, good teachers use different assessment tools to identify what learners know and how learners learn; they use information gained from assessments to advance learners “from where they are to where they want to be”; they organise learning activities and resources to take advantage of learners’ prior knowledge, and to assist learners of all levels to achieve to their full potential; and they anticipate and address misconceptions in their subject to address and avoid confusion where possible (Darling-Hammond & Baratz-Snowden, 2005:112). In short, a good teacher who is able to make informed decisions anchored in required teacher knowledge, skills and attitudes is a key ingredient that positively influences a learner’s academic achievement (Slater et al., 2012:643-644; Hanushek & Wößmann, 2007:20). The final rationale related aspect is addressed below.

1.2.3. Initial teacher education in South Africa

In South Africa, one can access a career as a mathematics classroom teacher through one of two ITE routes, namely the PGCE or B. Ed. Taylor (2014:10) states that “PGCE curricula are largely concentrated versions of B. Ed. curricula, without subject [matter knowledge] ([SMK]) modules”. Both routes offer “entry-level initial professional knowledge and skills as classroom teachers in a chosen phase(s) and/or subject(s)” (DHET, 2015:26). The key difference is that the PGCE is anchored in the assumption that SMK was gained due to completing “an undergraduate qualification”, and aims to “cap” this existing knowledge by “developing [pedagogical content knowledge (PCK)] reflexively grounded in educational theory” (CHE, 2006:1), as covered during the B. Ed. (Taylor, 2014:10). Interestingly, although assumed to be SMK experts, the perception exists that some PGCE graduates (from here NQTs) struggle when required to explain basic SMK to learners related to their undergraduate qualification majors (CHE, 2010:48; Feiman-Nemser, 2001:1020). In other words:

[S]tudents’ undergraduate academic majors in relevant subjects are no guarantee of sufficient disciplinary knowledge as a basis for building [PCK] (CHE, 2010:48).

To complicate matters further, Ellis (2007:450-2) argues that SMK should not be treated as being “already in-place” at any stage of a teacher’s career. SMK requires specific and continuous experiences that reveal how to build on and develop existing SMK (Loughran, 2010:218). In support, Taylor and Taylor (2012:22) argue that it is a mistake to assume all teachers hold a natural ability to enhance their existing SMK on their own for the sake of enhancing SMK. Understanding that the PGCE assumes that SMK is in place, a PGCE student is potentially expected to be able to complete the task of studying “their subject for its own sake” (Taylor & Taylor, 2012:22). This assumption exists even though practising teachers are potentially unable or unwilling to do so on their own without specific external support or training (Taylor & Taylor, 2012:22).

To conclude, the rationale for this study is the need to explore student ITE experiences as a way to understand the process followed in South Africa to develop a FET mathematics teacher. By understanding this process, evidence should emerge of what is being done well and what could potentially be done better within the limitations of a specific HEI’s context. In other words:

Understanding and improving the student experience is of critical importance if South African higher education is going to produce the number and quality of [mathematics teachers] needed in the 21st Century (Strydom & Mentz, 2010:viii).

1.2.4. Context of the study

In summary, South Africa is increasing the number of qualified teachers annually in an attempt to meet the needs of a diverse democratic society and the modern economy. The PGCE (see Chapter 3 for specific details about the PGCE) is one of the key strategies used to increase the potential number of qualified teachers, especially for the FET phase (high school). The delivery of the PGCE is governed by national policy and relies on HEIs and teacher educators to develop PGCE curriculum and assessments. National policy guidelines relating to PGCE delivery include three conceptual tools: (1) Five types of learning associated with the acquisition, integration and application of knowledge for teaching purposes (see Table 2.6 in Chapter 2); (2) The prescribed seven collective roles of the teacher (see Table 2.7); and (3) Eleven policy expectations placed on NQTs (see Table 2.8). Guided by the above, this case study explores the PGCE ITE route from the perspective of teacher educators, students/NQTs and accessible documents.

1.3. Methodology overview

After reflecting on the discussions presented above and engaging with the study's supervisor, Table 1.1 emerged as presented below.

Table 1.1: Intention of the project

RESEARCH AIM	RESEARCH QUESTION
To examine experiences delivered to students in a specific PGCE FET mathematics programme in relation to knowledge, skills and attitudes to function as a classroom teacher.	How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher?
OBJECTIVE ONE	SUB-QUESTION ONE
To examine the PGCE ITE route to gain background information and to understand what the programme entails in terms of selection process, modality, curriculum and assessment.	What can a student expect when pursuing the PGCE ITE route in terms of the selection process, modality, curriculum and assessment?
OBJECTIVE TWO	SUB-QUESTION TWO
To examine the policy-stipulated teacher knowledge, skills and attitudes developed during the PGCE FET mathematics programme.	What policy-stipulated teacher knowledge, skills and attitudes were actually developed during the PGCE?
OBJECTIVE THREE	SUB-QUESTION THREE
To identify the constraints in the PGCE FET mathematics programme as experienced by those directly involved in it.	What are the constraints of the PGCE FET mathematics programme as identified by those who undertook and facilitated it?

Table 1.1 serves to clarify 'what' the study addresses to avoid, as far as possible, the potential of the study going off track (Maxwell, 2013:23; Chenail, 2011:118). To clarify,

the study explores a specific HEI that offers a specific ITE programme, equipping NQTs with a qualification that grants access to a career as a FET mathematics classroom teacher (Leedy & Ormrod, 2010:135; Creswell, 2009:193; Luker, 2008:103; Henning et al., 2004:40). The researcher decided to focus on the PGCE as it is offered over one year, as opposed to the four-year B.Ed. The shorter timeframe allowed a focus on all modules and experiences of the PGCE. To answer the questions presented, qualitative research commonly used in case studies is argued as the most suitable methodology (Bless et al., 2013:44; Chenial, 2011:1176; Leedy & Ormrod, 2010:135; Babbie & Mouton, 2001:270). A purposive sampling strategy is selected as the case involves a specific small population (teacher educators=11 & students=26). This allows for all willing and accessible participants and documents, comprising the purposefully selected case, to function as purposefully selected data sources (Luker, 2008:103).

The study takes an interpretivist approach to data collection. The researcher holds that context-specific reality is “socially constructed from the subjective meanings individuals and groups develop and communicate in an attempt to understand their world” (Creswell, 2009:8; also see Butler-Kisber, 2010:6; Krauss, 2005:764). There is also a need to explore the case (the process of learning to teach by completing the PGCE ITE route) through various lenses to allow for multiple facets of the phenomenon to emerge and be understood (Leedy & Ormrod, 2010:135; Baxter & Jack, 2008:544). Semi-structured interviews are selected to expose the core issues in as much depth as possible, by probing and asking follow-up questions (Bold, 2012:119; Leedy & Ormrod, 2010:146; Simons, 2009:43; Flinders & Richardson, 2002:1160; Babbie & Mouton, 2001:289). Documents are reviewed to reveal, as far as possible, “a detailed emphatic description of the experiences of the individual” students/NQTs and teacher educators during the completion of the 2014 PGCE at a specific HEI (Mouton, 1988:18). In addition to using multiple data sources, the validity and reliability of this qualitative study is enhanced by reflecting on Guba’s model (1981) of trustworthiness (credibility, transferability, dependability and confirmability) when decisions are made about data (Shenton, 2004:63-73; Krefting, 1990:215-217). To guide ethical decision-making during the completion of the thesis, the following factors will be implemented:

- Participants will not be subject to “unusual stress, embarrassment or loss of self-esteem” (Leedy & Ormrod, 2010:102).
- Participation in this study is completely voluntary (Leedy & Ormrod, 2010:102; Du Plooy, 2001:91).

- The names of participating NQTs and teacher educators (including the institution where the study is to be conducted) are coded to ensure anonymity (Leedy & Ormrod, 2010:102; Du Plooy, 2001:91).
- All thoughts, ideas or words of another are referenced to acknowledge indebtedness to such individuals (Leedy & Ormrod, 2010:102; Du Plooy, 2001:91).
- Ethical clearance will be obtained from the ethics committee of the Cape Peninsula University of Technology (CPUT).

Once securing valid and reliable data from the sample in an ethical manner, Tesch's coding method will be used as the starting point to analyse data (Tesch, 1990:142-145). The core logic behind the decision to use Tesch's (1990) coding method as a point of departure is as follows. Firstly, a method is needed to reduce/combine the multiple sources to a single document to bring the data together. Secondly, a method is needed to secure codes, themes and categories (see Appendix S) to present the collected data in a structured format (Flick, 2007:100-101; Henning et al., 2004:127-128). The outline of the thesis is presented in the section that follows.

1.4. Overview of the chapters comprising the thesis

The previous sections briefly presented the rationale and methodology for the thesis. As a roadmap for the reader, the chapters comprising the thesis are briefly introduced.

Chapter 1 serves as an orientation to the thesis, focusing on experiences of becoming a FET mathematics teacher. This is done by clarifying the rationale for pursuing the study, presenting the methodology and offering an overview of the ten chapters comprising the thesis.

Chapter 2 clarifies the golden thread linking the literature (and policy) review, methodology and data analysis chapters to follow. The golden thread, namely professional teacher knowledge, skills and attitudes, is illustrated (see Figure 2.5) and serves as the first of two complimentary conceptual frameworks built during literature review.

Chapter 3 clarifies the PGCE as an experience by using the following as headings: approved ITE qualifications; accessing the PGCE with a FET mathematics focus; opportunities available as a result of completing the PGCE; outcomes achievable from completing the PGCE; PGCE modules and other refinements and current policy

stipulations governing PGCE modules. This understanding is used to refine the conceptual framework built in Chapter 2 to illustrate the PGCE context (see Figure 3.2).

Chapter 4 presents insights on how teacher knowledge, skills and attitudes can be developed. The understanding gained is illustrated as a second complimentary conceptual framework (see Figure 4.9) to end and summarise the literature review component of this case study. Figure 4.9 serves as the case study's overall conceptual framework by including Figure 3.2 in its centre (see the star linking the five steps/criteria to illustrate the golden thread).

Chapter 5 clarifies and contextualises the qualitative research methodology followed to realise the aim and objectives of this study.

Chapter 6 presents analysed data relating to the PGCE FET mathematics programme's structure and goals. The discussion presented is organised by using four points (selection of students; modality; curriculum; and assessment) to refine the first criteria/step illustrated in the second complimentary conceptual framework 'built' in Chapter 4 (see Figure 4.9). The insights presented under these four points are summarised in a Table format to serve as the short answer to the sub-question: What can a student expect when pursuing the PGCE ITE route in terms of the selection process, modality, curriculum and assessment?

Chapter 7 explores the policy-stipulated teacher roles developed in the PGCE. The discussion presented is organised by reflecting on the revised list of policy expectations placed on NQTs (see Table 2.9 in Chapter 2) as themes. In addition to the above, Figure 4.9 is reflected upon (specifically refined step/criteria two to four) to allow for categories to emerge. This is the reason why step/criteria two to four include the term 'policy expectations'. The insights gained are summarised in a Table format to present a revised list of the policy expectations placed on NQTs as realised (or not) during the PGCE. This revised list presents the short answer to the sub-question: What policy stipulated teacher knowledge, skills and attitudes were actually developed during the PGCE?

Chapter 8 highlights the constraints identified by those directly involved in the PGCE FET mathematics programme. The discussion is organised by using one Theme emanating from the revised fifth criteria/step as illustrated in Figure 4.9, namely, aspects restricting programme coherence. The insights gained are summarised in a Table checklist format to serve as the short answer to the sub-question: What are the

constraints of the PGCE FET mathematics programme as identified by those who undertook and facilitated it?

Chapter 9 presents insights in terms of how the PGCE equips NQTs for the classroom context. The aim is to present a context specific conceptual framework to serve as the studies core contribution to the existing body of knowledge focusing on ITE and teacher knowledge, skills and attitudes. This framework is also presented as the short answer to the research question: How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher?

Chapter 10 concludes the thesis by presenting findings, recommendations and the study's significance/contribution.

1.5. Closing

This Chapter introduced the thesis by presenting the rationale for pursuing the study, providing an overview of the methodology, and offering an overview of the chapters that make up the thesis. The Chapter to follow presents an understanding of the teacher knowledge, skills and attitudes perceived as essential to function as a classroom teacher.

CHAPTER 2

TEACHER KNOWLEDGE, SKILLS AND ATTITUDES

2.1. Introduction

The previous Chapter served as the orientation to the thesis. This Chapter presents a literature review focusing on professional teacher knowledge, skills and attitudes. The aim of this Chapter is to secure a model focusing on teacher knowledge, skills and attitudes, to serve as a conceptual framework. Doing so highlights the “golden thread” (teacher knowledge, skills and attitudes) that links literature, methodology and data analysis (Ngulube et al., 2015:46-47; also see Maxwell, 2013:9). Building a conceptual framework reveals links between concepts comprising a phenomenon (Ngulube et al., 2015:46-47; Maxwell, 2013:41). A conceptual framework also assists with interpreting, understanding and presenting findings in a logical and organised manner (May, 1993:20). It is rare to find a conceptual framework that fits a case study’s context perfectly. Therefore, it needs to be ‘built’ using existing models to enhance understanding of a phenomenon under investigation (Ngulube et al., 2015:46-47; Maxwell, 2013:41; Jabareen, 2009:51). The process to build a conceptual framework on teacher knowledge and skills is presented below.

2.2. Shulman (1986) refined by Ball, Thames and Phelps (2008)

The most popular emerging model that categorises professional teacher knowledge is Shulman’s (1986:9-14) original category scheme, namely: (1) subject matter knowledge (SMK) (“the amount and organisation of knowledge per se in the mind of the teacher”); (2) pedagogical content knowledge (PCK) (“ways of representing and formulating the subject that make it comprehensible to others”); and (3) curricular knowledge (“the officially specified curriculum and instructional materials for a subject, as well as ‘lateral and vertical curriculum knowledge’, so as to relate this particular subject to other subjects being learned before, after and at the same time”).

In support of the above, Shulman (1986:14) found that a good teacher is confident and competent in a fourth supporting category, namely: pedagogical knowledge of teaching, which includes aspects such as classroom management, knowledge of learners, school organisation and educational foundations. Almost twenty years later, Shulman (2004:227) further refined the original category scheme (Shulman, 1986) into the following seven categories:

[1] [SMK]; [2] pedagogical knowledge (general knowledge about the teaching and learning process and strategies of classroom management and organisation; [3] curriculum knowledge; [4] [PCK] (the understanding of how best to teach the content so that it is meaningful for learners); [5] knowledge of learners and their characteristics (including backgrounds, needs, existing knowledge on the topic, misconceptions they may hold, and possible barriers to learning); [6] knowledge of educational contexts (ranging from the workings of the group or classroom and the facilities available to the socio-cultural context of the school and policies that impact education); [7] knowledge of educational ends, purpose and values (Shulman, 2004:227).

Even though there is general agreement that professional teacher knowledge exists, there is still a tendency to undervalue teaching (even within the teaching profession itself). This is because the nature of such knowledge is often tacit and explicit (Burn, 2007:447; Loughran et al., 2003:853). Because of this, it is “difficult to find concrete examples of what it might look like and how it might be readily portrayed for others, by either teachers or academics” (Loughran et al., 2003:868). Since the 1980’s, as an example, the term PCK has been acknowledged to serve as a category of teacher knowledge indicating a general agreement of the existence of professional knowledge only held by teachers. Although widely debated, theorised and applied (Ellis, 2007:449; Guyver & Nichol, 2004:3; Turner-Bisset, 2001:13), there is, as yet, “no universally accepted conceptualisation of PCK, nor any consensus as to precisely which different knowledge components are included within it” (Burn, 2007:447). To this end, the study explored models, theories and policy stipulations focusing on teacher knowledge, skills and attitudes, with the aim of clarifying it within the context of teaching mathematics for analysis purposes. During this search, Ball et al. (2008:393) refinement of Shulman’s original category scheme (1986) emerged:

Based on our analysis of the mathematical demands of teaching, we hypothesise that Shulman’s categories of [SMK] and [PCK] can be sub-divided into common content knowledge [CCK] and specialised content knowledge [SCK], on the one hand, and knowledge of content and [learners] (KC[L]) and knowledge of content of teaching [KCT], on the other. Perhaps of most interest to us is evidence of the second category – [SCK]. Like [PCK] it is closely related to practice, but unlike [PCK] it does not require additional knowledge of [learners] or teaching. It is distinctly familiar to mathematicians (Ball et al., 2008:394).

The above categories are illustrated and clarified on the next page:

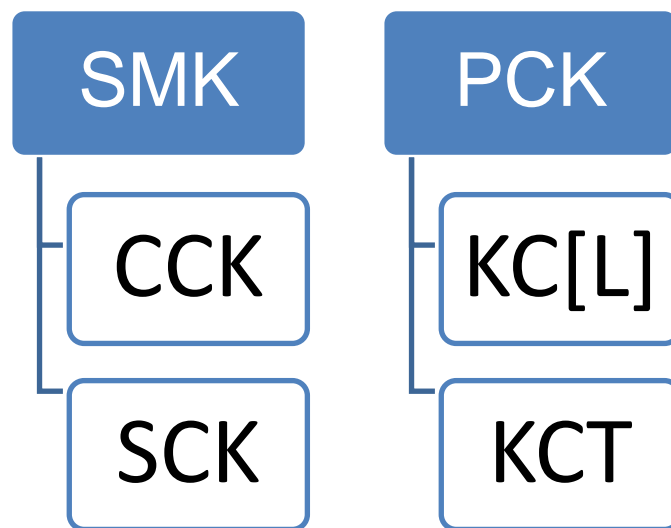


Figure 2.1: Shulman's (1986) original category scheme refined by Ball et al. (2008:393)

CCK is the skills and competencies needed by a teacher to do the work assigned to learners (Ball et al., 2008:394). An example is being able to recognise and name “a two-dimensional shape as a rectangle or pentagon” (Blömeke & Delaney, 2012:230). In short, these are the mathematical skills and competencies “we would expect a well-educated adult to know” (Ball et al., 2008:394).

The mathematical demands of teaching require specialised mathematical knowledge, needed by teachers, but not needed by others (Ball et al., 2008:390).

SCK is skills and competencies that allow an individual to be called a mathematician because they hold specialised mathematical knowledge that is not necessarily held (or perceived as needed) by all educated people (Ball et al., 2008:397). An example is knowing a range of mathematically sound and complete definitions for shapes (Blömeke & Delaney, 2012:230). In short, SCK requires “significant mathematical resources; but do not yet necessarily require knowing about [learners] or teaching” (Ball et al., 2008:397).

What caught us by surprise, however, was how much purely mathematical knowledge was required, even in many everyday tasks of teaching [mathematics] – assigning [learners] work, listening to [learners] talk, grading or commenting on [learners] work (Ball et al., 2008:396).

KC[L] is the ability of a teacher to predict what actions and activities will retain a learner's interest, as well as to motivate learners to complete difficult tasks in the future using the basic knowledge gained (Ball et al., 2008:397). An example is anticipating how to prove to a learner that a square rotated 45 degrees remains a square (Blömeke

& Delaney, 2012:230). In short, KC[L] “requires an interaction between specific mathematical understanding and familiarity with [learners] and their mathematical thinking” (Ball et al., 2008:397). KC[L] allows a teacher to use knowledge of common learner errors (frequent mathematical mistakes) to anticipate potential pitfalls in the learning process (Ball et al., 2008:397).

The lines between our four types of knowledge can be subtle. For instance, recognising a wrong answer is... (CCK), while sizing up the nature of the error may be either... (SCK) or... (KC[L]) depending on whether a teacher draws predominantly from her knowledge of mathematics and her ability to carry out a kind of mathematical analysis or instead draws from experience with [learners] and familiarity with common student errors. Deciding how best to remediate the error may require... (KCT) (Ball et al., 2008:390).

KCT involves actions such as “knowing how to select a poster to support the teaching of shapes by using non-examples and non-stereotypical examples” (Blömeke & Delaney, 2012:230). In short, it requires a teacher to combine knowledge of teaching during “the design of instruction” (Ball et al., 2008:397).

The shortcomings relating to Figure 2.1, as a model to analyse teacher knowledge, skills and attitudes related data are highlighted in the section to follow.

2.3. Critique of Ball, Thames and Phelps refinement of Shulman

Petrou and Goulding (2011:17) argue that refinement is required in two broad areas of the sub-divided categories identified by Ball et al. (2008) (see Figure 2.1). The first inclusion should be a teacher's attitude, which influences their understanding and application of mathematics as a school subject. The second is that SCK and PCK need to be more clearly distinguished (Petrou & Goulding, 2011:17). This critique served as a guide to secure relevant theories or models, to identify potential refinement of the model presented as Figure 2.1. The discussion of the above is broken down into two sections, namely: acknowledging and developing attitudes relating to mathematics, and differentiating SCK from PCK.

2.3.1. Acknowledging and developing attitudes relating to teaching mathematics

To begin, Barton (2009:7) argues that a good mathematics teacher understands that a broader and more fundamental component of an individual's mathematical knowledge is “how teachers hold” mathematics. The ‘how’ involves a teacher's attitude towards

mathematics, as categorised in four potential parts: a teacher's vision of mathematics, a teacher's philosophy of mathematics, a teacher's perception of the role of mathematics in society and a teacher's orientation towards the subject (Barton, 2009:7).

Table 2.1: How teachers hold mathematics: VPRO clarified (Barton, 2009:7)

V	By a vision of mathematics I mean their concept of the discipline as a whole: what is the content of mathematics, how does it develop, what does mathematics deal with, what can it do and not do?
P	By a philosophy of mathematics I mean the way a teacher will answer questions such as: what is mathematical knowledge like, where does mathematics come from, how do we come to know mathematics, what is the status of mathematical objects and mathematical truths?
R	By a sense of the place [role] of mathematics I mean how a teacher relates mathematics to other areas of knowledge, how they consider mathematics can affect society for better or worse, and what a teacher thinks mathematics is for - why should we value mathematical activity?
O	By an orientation to the subject I mean the way a teacher personally approaches mathematics: do they engage with it as a creative exercise, as a formal structure, as a set of facts, as a solitary activity, or as a game to be played with others? Do they regard it as awesome, as beautiful, as having infinite potential - or perhaps as formal, as a bare structure, as pure reason?

Concerning Table 2.1, Barton (2009:7) abbreviates the four identified categories of “how teachers hold Mathematics” as “VPRO”. Reflecting on specific questions reveals a teacher’s “VPRO” and thereby their attitude towards mathematics. When exploring answers to the above questions, it should be noted that due “to the constraints and difficulties under which teachers work” there are sometimes “contradictions between what they believe and what they do” (Swan, 2006:59-61). In short, holding the most desired attitude does not automatically lead to quality teaching practices suitable for diverse learners in diverse contexts. Attitudes are known to influence behaviour (Swan, 2006:61) and therefore it is of value to reveal the attitudes teachers hold to identify potential training and development needs, to influence teacher education programmes (Purnomo, 2017:24).

[I]t is not unreasonable to argue that the effectiveness of teacher education programs should partly be judged by the extent to which they improve [students and teachers] beliefs and attitudes (Charalambous et al., 2009:164).

To enhance the understanding presented on VPRO, each category is discussed below.

2.3.1.1. Vision of mathematics

This category focuses on why school mathematics exists (Barton, 2009). It is generally agreed that it exists to enhance learners' work prospects (Aguilar & Zavaletta, 2012:5; McElvy, 2009:27) as it serves as a "gatekeeper to academic and professional success" (Blömeke & Delaney, 2012:258). Eighty percent of job growth is perceived to occur in fields requiring a sound background in mathematics (McElvy, 2009:27). Examples of such fields include engineering, medicine, technology developers and teaching (Brodie, 2015:17). In short, mathematics as a school subject exists as it contributes to the development of mathematical 'thinkers' needed by society (Valero et al., 2012:4).

[A] critical mass of youths with exceptional results in mathematics is a prerequisite for the innovation needed to sustain niche industries that can improve the global competitiveness of the country (DBE, 2011:68).

In summary, this category involves a deep understanding of opportunities accessible to those who are competent and confident in school mathematics.

2.3.1.2. Philosophy of mathematics

The second category in VPRO focuses on what teachers think mathematics is and who can do mathematics (Barton, 2009:7). It is assumed that the process followed by a teacher in becoming competent in mathematics greatly influences their philosophy of mathematics (Geist, 2015:328). This philosophy is also perceived as being influenced by a teacher's level of enthusiasm and confidence when presenting and doing school mathematics (Charalambous et al., 2009:164). Another influencing factor is the context in which a teacher perceives teaching of mathematics can best occur (Beswick, 2008:4). To challenge teachers' philosophy of mathematics, they can be engaged in discussions and/or training focusing on the following related aspects:

- (1) "the processes and struggles through which mathematics was developed" within the parameters of enhancing learners' understanding of the content being presented;
- (2) providing "insights about the evolution of mathematics curricula" to be able to clarify to learners why the specific content being presented is important; and
- (3) exploring attitudes "about themselves as teachers and learners of mathematics; about the manner in which knowledge is acquired, about the nature of the discipline of mathematics, and about internal and external factors that affect the learning of mathematics" (Charalambous et al., 2009:162-164).

[A] teacher's [philosophy of mathematics] would depend upon: the particular physical classroom and school (place), the behaviours that the [learner] would be expected to engage in both to learn and to demonstrate learning (actions), the date and duration of the lesson (time), the nature of the ideas/topic being considered, and characteristics of the [learner] (subjects)" (Beswick, 2008:4).

A teacher's philosophy of mathematics can further be revealed and influenced by engaging them in discussions or training focusing on two philosophies related to mathematics. To clarify, Beswick (2012:129) presents two different yet complimenting philosophies of mathematics held by those who decided to become mathematics teachers. The first, a philosophy of mathematics as a discipline, is argued to be held by mathematicians who are responsible for assessing mathematics. The second, a philosophy of school mathematics, is argued to be held by mathematics teachers who are responsible for assessing learners' competence in mathematics (Beswick, 2012:129).

Broadly, a mathematics teacher is expected to be an expert in school mathematics with an understanding of the requirements placed on a mathematician to prove to learners the future value of school mathematics (Beswick, 2012:144; Beswick, 2008:3). A mathematician is not expected to be an expert in teaching school mathematics. Understandably then, "studying mathematics to third year university level does not guarantee" that a mathematician has developed the desired philosophy of school mathematics (Beswick, 2012:144). In other words, mathematics teachers are assumed to have developed specialised knowledge related to school mathematics that is only really needed by mathematics teachers (Ball et al., 2008:397). To assist in revealing and influencing a mathematics teacher's philosophy of school mathematics and their philosophy of the discipline, Beswick (2012:27) presents the following matrix (see Table 2.2 on the next page).

Concerning Table 2.2, the matrix was used to clarify the different philosophies believed to be held by mathematicians and mathematics teachers. By doing so, a teacher can identify their current philosophy of both school mathematics and the discipline. This allows a teacher to start identifying the attitudes and assumptions that influence their behaviour and actions when delivering a school mathematics lesson (Beswick, 2012:146). The matrix also allows teachers to take note of alternative philosophies to assist in the process of influencing their existing philosophy of mathematics.

Table 2.2: Philosophy of mathematics about the discipline and school mathematics (Beswick, 2012:133)

		Philosophy about the nature of (the discipline of) mathematics		
		Instrumentalist	Platonist	Problem solving
Philosophy about the nature of (school) mathematics	Instrumentalist	School mathematics is about learning basic skills that [learners] will need in everyday life.	School mathematics is about learning basic skills that will allow understanding of higher level more interesting mathematics later.	Mathematics can be creative but you need to have a set of basic skills first. Mathematical creativity is not for school.
	Platonist	School mathematics is a body of hierarchical interconnected knowledge that needs to be learned so that it can be applied to practical situations.	School mathematics is part of a body of hierarchical interconnected knowledge understanding of which forms the basis on which some will learn higher level mathematics.	School mathematics is a body of hierarchical interconnected knowledge understanding of which will enable the gifted few eventually to be mathematically creative.
	Problem solving	Learner/process focus is aimed at motivating [learners] to learn the skills they need in everyday life.	Learner/process focus is aimed at motivating [learners] so that they come to understand more of the body of hierarchical interconnected knowledge that is mathematics.	Learner/process focus is aimed at helping [learners] to appreciate mathematics as a powerful and creative process.

In closing, the philosophy of mathematics is summarised as involving a teacher's attitude about what they believe mathematics is and who they believe can become competent in school mathematics.

2.3.1.3. Role of mathematics

The third category broadly focuses on what teachers believe the value of mathematics holds for society and individuals (Barton, 2009:7). To begin, Aguilar and Zavaleta (2012:9) argue that a good mathematics teacher should "hold mathematics" with a deep understanding of promoting democratic competencies in learners and themselves. This means a good mathematics teacher has potentially developed (and continues to develop) his/her attitude concerning the importance of allowing all learners to feel/believe that they can take control of their lives, by using and understanding mathematics (Aguilar & Zavaleta, 2012:9).

Concerning the practical reality of the above, Aguilar and Zavaleta (2012:9) found that it occurs when a teacher revealed a willingness to sacrifice the traditional notion of authority and understood "that challenges to their authority [were] part of what constitutes a democratic education". By doing so they promote a classroom environment where all believe they can take control of their lives by using mathematical knowledge. This, as an example, is achieved by a good teacher holding an attitude that all "learners ought to be shaped by an acknowledgement that they be considered as

fellow human beings” (Davids & Waghid, 2012:26). These teachers see individual learners “within the broader social context” and place their focus on “the needs, interests and rights of the learner rather than those of the school” (Dunbar-Krige & Van der Merwe, 2010:161-166).

In support, Barton (2009:7) found that good mathematics teachers allow learners to explore alternate and developing views about mathematics in an open and democratic fashion. Additionally, the Department of Basic Education Action Plan 2014 (DBE, 2011:108) highlights that a good teacher understands the *Constitution* (South Africa, 1996) and reveals such understanding by, as an example, promoting “values such as human-dignity, non-racialism, non-sexism, democracy and the rule of law in the classroom”. Overall, good teachers potentially perceive themselves as ‘world citizens’: “a citizen that is sensitive to different cultures and the concerns and interests of ethnic, racial and religious minorities both near and far” (Nussbaum, 1997:59). Within the South African context, a good teacher potentially interacts with others as a world citizen by focusing on “the spirit of ubuntu”. They thereby ensure, as far as possible, that their classrooms are never “divorced from everyday life” and the realities associated with a young democracy as found in South Africa (November, 2010:196).

[E]ducation must serve the purpose of a democracy. This latter condition means that teachers assume the purpose of enabling young people to participate fully in political, civic, and economic life in our society. It also means that education-including teaching-is intended to support equitable access to what that society has to offer (Darling-Hammond, 2006a:303).

Concerning the implications of the above on school mathematics, Aguilar and Zavaletta (2012:7) found that critical mathematical skills are vital when analysing social problems or addressing issues that affect one’s personal life. Moses and Cobb (2001) in Daher (2012:2) argue that access to critical mathematical skills, “especially algebra and advanced mathematics”, should be treated as a civil right equal to the right to vote (as well as other human rights). This is because mathematics as a school subject is needed to gain entry into further and higher education (Blömeke & Delaney, 2012:258) and to take advantage of job growth in sectors requiring a sound background in mathematics (McElvy, 2009:27). Therefore, access to critical mathematics should potentially be perceived by good mathematics teachers as being a basic human right needed by all, as anchored in the following understanding of mathematics and democracy (with a greater focus on showing respect to others):

We have identified three links between mathematics education and democracy... Firstly, mathematics education can provide [learners] with mathematical skills to critically analyse their social environment, and also to identify and evaluate the uses and misuses of mathematics in society. The second link relates to the fact that the mathematical education that [learners] receive in a classroom can promote or inhibit values and attitudes that are essential to build and sustain democratic societies. The third link is the acknowledgement that mathematics education can function as a sort of social filter that restricts the opportunities for development and civic participation of some [learners] (Aguilar & Zavaleta, 2012:5).

The above quote reveals “links between mathematics and democracy” as identified by Aguilar and Zavaleta (2012:5). These links, it is argued, assist in the process of exploring a teacher’s attitude of the role of mathematics. These links also assist in the process of exploring experiences aimed at influencing a teacher’s attitude about the role of mathematics. Examples of such potential experiences include: (1) Exposing teachers to activities where they critically analyse the use of mathematics in society; (2) Exposing teachers to experiences that highlight the importance of ensuring all learners gain access to critical mathematics; and (3) Exposing teachers to experiences that develop an understanding of the consequences for a learner who is not granted access to critical mathematics (Aguilar & Zavaleta, 2012:5).

In summary, this category involves the usefulness of school mathematics in equipping learners to qualify for opportunities created by a democratic society.

2.3.1.4. Orientation to mathematics

The fourth VPRO category focuses on what is needed to become competent and confident in mathematics (Barton, 2009:7). The teacher’s competence and confidence influence the approach taken in teaching school mathematics (Geist, 2015:328; CHE, 2010:48). Before one can teach mathematics, one needs to be able to do mathematics. Being competent in mathematics by no means guarantees that an individual can teach diverse learners in diverse contexts (Taylor & Taylor, 2012:22; Loughran, 2010:218; Ellis, 2007:450-2). All teachers were learners in the past, which allowed them to observe the teaching of mathematics. These observations are perceived as having a greater influence on a student than the formal preparation delivered during ITE (Akyeampong et al., 2011:71; Ashby et al., 2008:14; Sinclair, 2008:92; Hammerness et al., 2005:366; Feiman-Nemser, 2001:1016).

In other words, during the process of becoming a mathematics teacher, experiences occur which orientate teachers to “the nature of mathematics, mathematics teaching (and learning), and assessment” (Purnomo, 2017:25). It is generally agreed that such engagements “influence the ways” a teacher approaches teaching mathematics (Beswick, 2012:127). It is perceived as vital to identify and offer support to overcome “negative mathematics experiences” which negatively influenced a teacher’s orientation to mathematics and therefore their approach when teaching (Gautreau, 2016:28). Positive mathematics experiences should also be identified and encouraged to be repeated when teaching. For example:

[B]ecause family influences attitudes toward mathematics, teachers should strive to build a positive network between parents and teachers (Gautreau, 2016:35).

To clarify the above, a positive experience might have been the involvement of family support in assisting the teacher to become competent and confident in mathematics. Because of such experiences, actions can be taken to encourage and highlight such support for learners. If family support structures are absent, there might be an opportunity to create such support by means of extra lessons or peer tutoring at the school. At the very least, a mathematics teacher should reveal a sense of enthusiasm and wonder when engaging with school mathematics during lessons (Looney et al., 2017:36). Although a teacher’s attitude towards mathematics can influence learner achievement, it is noted that learner achievement in mathematics is dependent on the interest held for and recognition given to mathematics as a school subject by the learner (Cribbs et al., 2015:1048). In short, a learner who is interested in mathematics has been found to succeed in mathematics. Nonetheless, a teacher’s attitude towards mathematics plays a role in learner achievement in terms of igniting learners’ interest and perceived efficacy in mathematics (Looney et al., 2017:36). To start revealing and influencing a teacher’s orientation to mathematics, focus can be placed on a teacher’s pedagogical framework as presented on the next page. Concerning Table 2.3, the pedagogical framework was developed by Alexander (2015:6) to analyse qualitative and quantitative classroom data when exploring “the nature of teaching”. It is argued that this framework can assist in the process of revealing and influencing a teacher’s orientation to mathematics. This could be done by allowing teachers to reflect on their orientation to mathematics and the processes they have been exposed to in overcoming, as an example, mathematical anxiety (Geist, 2015:328). Such reflection can be guided by providing teachers with, as an example, a pedagogical framework as presented in Table 2.3 to influence their attitudes in terms of their orientation to mathematics.

Table 2.3: Pedagogical framework (Alexander, 2015:6).

TEACHING AS AN ACT: Teaching, in any setting, is the act of using method x to enable [learners] to learn y [and therefore linked to KC[L]];	
i	the act itself, subdivided into the planned learning tasks, the activities and interactions through which tasks are mediated and the judgements by which [learners'] needs, progress and attainment are assessed;
i	the form by which units of teaching are bounded (usually the lesson); and
iii	the organisational, curricular, epistemic and temporal elements of its frame.
TEACHING AS IDEAS: Teaching has structure and form; it is situated in, and framed by, space, time and patterns of organisation, and it is undertaken for a purpose [and therefore linked to KCT]	
i	classroom (ideas relating to [learners], learning, teaching and curriculum that enable teaching on a day to day basis);
ii	system/policy (ideas about schooling, curriculum, assessment and other matters that formalise or legitimise teaching); and
iii	cultural/societal (ideas about community, culture and self that locate teaching).

In closing, the orientation to mathematics is summarised as involving an understanding of attitudes held in terms of the process of becoming competent and confident in mathematics.

2.3.1.5. Summary

The four VPRO related categories were discussed in the sections above. These four are summarised by means of the following four questions:

- Vision of mathematics - Why mathematics exists?
- Philosophy of mathematics - How competency in mathematics occurs?
- Role of mathematics - What value does mathematics offer society?
- Orientation to mathematics - Which approaches assist learners to become competent in mathematics?

These four questions are used as a point of reference when referring to VPRO as part of the conceptual framework focusing on what teacher knowledge, skills and attitudes involves. The second critique of Figure 2.1 is explored in the section to follow.

2.3.2. Differentiating SCK from PCK

The lack of clear differentiation between SCK and PCK, as critiqued by Petrou and Goulding (2011:17) in relation to Figure 2.1, is explored below. To begin, Table 2.4 is presented on the next page. This table presents examples of SCK as stated by Ball et al. (2008:398). Petrou and Goulding (2011:17) argue that when the clarifications of SCK and PCK are read (as stated under section 2.2), it becomes clear that the

examples in Table 2.4 could be seen as being examples of competencies of both SCK and PCK. This Table serves as the core evidence that the difference between SCK and PCK, as presented in Figure 2.1, is vague. This critique is acknowledged but deemed unnecessary. Ball et al. (2008:390) states that “lines between [their] four types of knowledge can be subtle” and therefore there will be an overlap between examples of each. When an overlap occurs, SCK or PCK can be differentiated by identifying the ‘core’ knowledge used by a teacher to handle a teaching-learning situation. This means that when a challenge requires purely mathematical knowledge, good teachers make more use of SMK (CCK or SCK) to make a decision. When a challenge requires knowledge of learners or teaching, a good teacher relies more on PCK (KC[L] or KCT). In both instances, most good teachers will reveal that a combination of SMK and PCK is called upon to adequately handle challenges or situations that occur in a classroom context (Ball et al., 2008: 393-397).

Table 2.4: Examples of SCK that could also serve as examples of PCK (Ball et al., 2008:398)

1	Presenting mathematical ideas,
2	Responding to students’ “why” questions,
3	Finding an example to make a specific mathematical point,
4	Recognising what is involved in using a particular representation,
5	Linking representations to underlying ideas and to other representations,
6	Connecting a topic being taught to topics from prior or future years,
7	Explaining mathematical goals and purposes to parents,
8	Appraising and adapting the mathematical content of textbooks,
9	Modifying tasks to be easier or harder,
10	Evaluating the plausibility of students’ claims (often quickly),
11	Giving or evaluating mathematical explanations,
12	Choosing and developing useable definitions,
13	Using mathematical notation and language and critiquing its use,
14	Asking productive mathematical questions,
15	Selecting representations for particular purposes,
16	Inspecting equivalencies.

To explore differentiating SCK and PCK, with reference to situations that a teacher is required to handle, Table 2.5 is presented on the next page. This Table shows that a good mathematics teacher holds adequate teacher knowledge, skills and attitudes that allows them to predict, link, analyse, diagnose, generate and respond in the mathematics classroom in such a manner that quality teaching-learning practices are realised. A good mathematics teacher is someone who is able to “quickly analyse complex situations” as presented in the Table. In addition, they continuously reflect on

how their existing SMK (CCK and SCK) and/or PCK (KC[L] and KCT) helped them with situations/challenges (Darling-Hammond & Baratz-Snowden, 2005:116). In other words, a good teacher is someone who holds “a wide body of knowledge and the ability to use this knowledge appropriately in a variety of instructional contexts” (IALEI, 2008:24). Therefore, it is argued that exact differentiation of SCK and PCK is not possible due to the nature of situations and challenges that a teacher is expected to manage, as presented in Table 2.5. This is potentially the reason why there is, as yet, “no universally accepted conceptualisation of PCK, nor any consensus as to precisely which different knowledge components are included within it” (Burn, 2007:447).

Table 2.5: Core situations which good mathematics teachers manage (Tatto et al., 2008 in Blömeke & Delaney, 2012:227)

Mathematical curricular knowledge	Establishing appropriate goals, Knowing about different assessment formats, Selecting possible pathways and seeing connections within the curriculum, Identifying the key ideas in learning programmes, Knowledge of the mathematics curriculum.
Knowledge of planning for mathematics teaching (pre-active)	Planning or selecting appropriate activities, Choosing assessment formats, Predicting typical learner responses, including misconceptions, Planning appropriate methods for representing mathematical ideas, Linking didactical methods and instructional designs, Identifying different approaches for solving mathematical problems, Planning mathematics lessons.
Enacting mathematics for mathematics teaching and learning (interactive)	Analysing or evaluating learners' mathematical solutions or arguments, Analysing the content of learners' questions, Diagnosing typical learner responses, including misconceptions, Explaining or representing mathematical concepts or procedures, Generating fruitful questions, Responding to unexpected mathematical issues, Providing appropriate feedback.

Reflecting on the above, there is a need to refine Figure 2.1 to include the context of situations/challenges that a good mathematics teacher manages. Figure 2.2 on the next page presents this refined model. It includes two circular arrows to indicate the “variety of instructional contexts” in which a mathematics teacher is expected to apply teacher knowledge, skills and attitudes (IALEI, 2008:24). In addition, VPRO (see section 2.3.1) are included in these two arrows to present a teacher’s attitude in terms of being able to teach mathematics to diverse learners in diverse contexts (Barton, 2009:7).

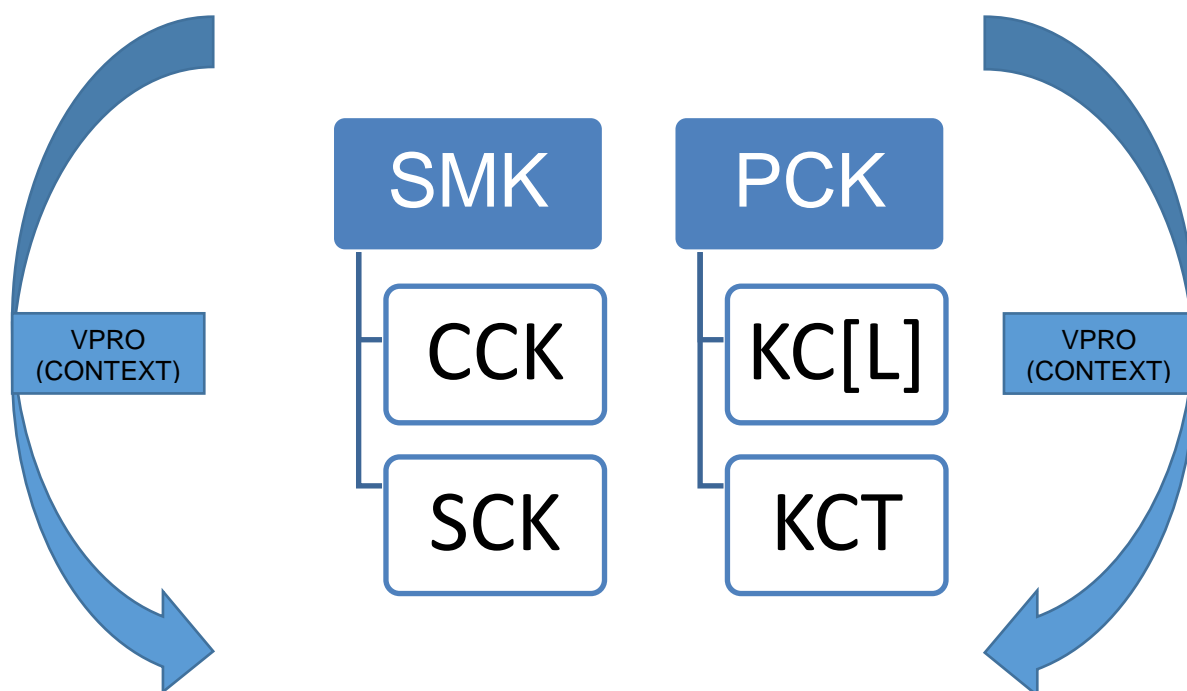


Figure 2.2: Mathematics teacher knowledge, skills and attitudes in context

To build on the understanding presented at this stage of the review, focus is placed on an alternative model of professional teacher knowledge. The aim is to secure a form of professional teacher knowledge which serves as a merger of SMK and PCK (an all-encompassing category for professional teacher knowledge). It is argued that this is needed to allow for in-depth analyses of how ITE develops a student to predict, analyse, diagnose, generate and respond in the mathematics classroom by using a combination of all knowledge perceived as needed by a teacher (Blömeke & Delaney, 2012:227).

2.4. The technological pedagogical content knowledge model (TPACK)

As an overview, Figure 2.3 on the next page “supports the idea that at the basis of effective teaching lies the complimentary combination of pedagogical, content and technological knowledge in a way that requires an understanding and the negotiation of all three” (Charbonneau-Gowdy, 2015:239). Concerning the original basis of the TPACK model, Mishra and Koehler (2006: 1020) developed it with an “understanding that teaching is a highly complex activity that draws on many kinds of knowledge”. Regarding the value of the TPACK model within this study’s context:

[TPACK model] provides an analytic framework and categorisation schemes for the analysis of teacher knowledge and its evolution (Mishra & Koehler, 2006:1045).

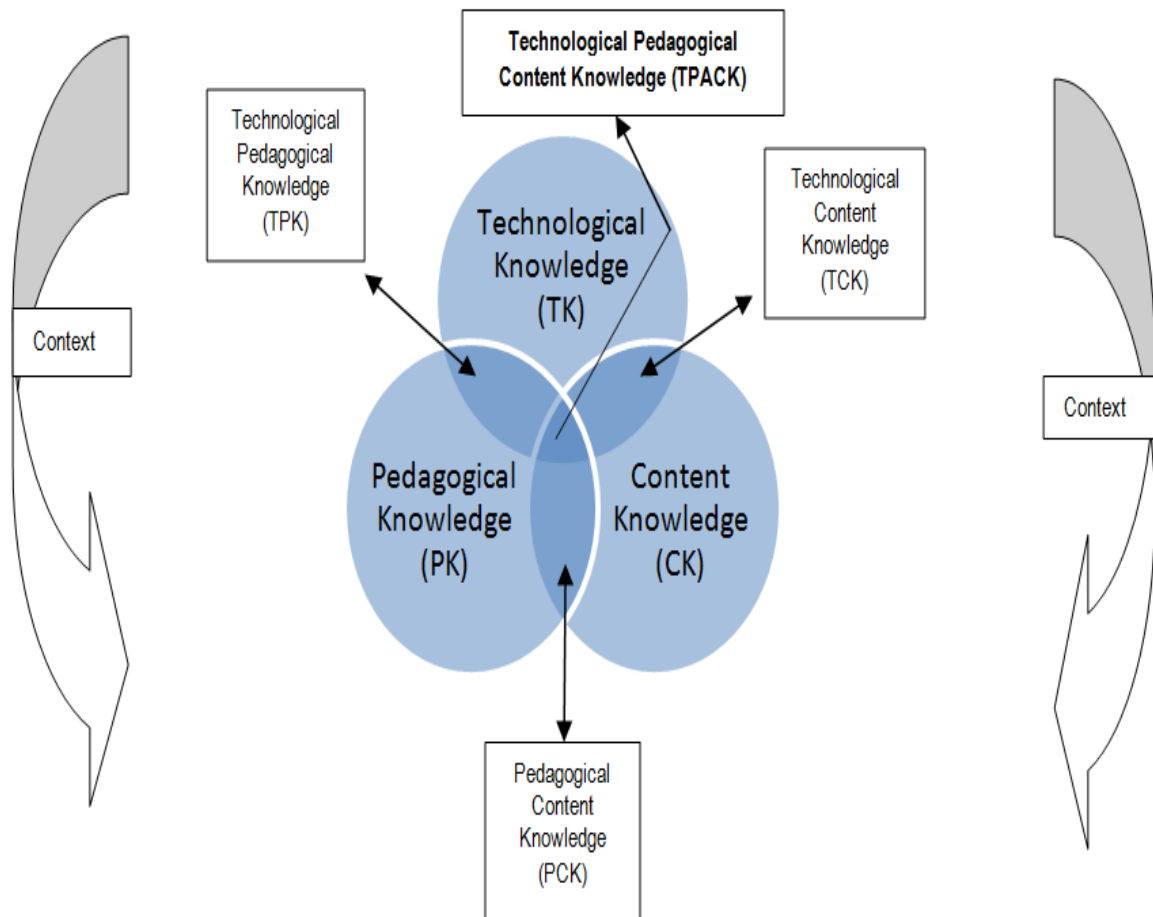


Figure 2.3: The technological pedagogical content knowledge model (TPACK) (Mishra & Koehler, 2006 in Charbonneau-Gowdy, 2015:239)

Although the TPACK model (Mishra & Koehler, 2006) does not mention SCK, it mentions PCK (which potentially includes SCK). To clarify PCK within the context of the TPACK model, the following was stated:

At the heart of PCK is the manner in which subject matter is transformed for teaching. This occurs when the teacher interprets the subject matter and finds different ways to represent it and make it accessible to learners (Mishra & Koehler, 2006:1021)

Mishra and Koehler (2006:1030) state that the TPACK model separates teacher knowledge into three “core” categories, namely: content, pedagogy, and technology. The purpose behind this separation “is an analytical act and one that is difficult to tease out in practice” (Misha & Koehler, 2006:1029).

Viewing any of these components in isolation from the others represents a real disservice to good teaching (Misha & Koehler, 2006:1030).

The TPACK model is argued to hold value as it allows one to focus “on what is [perceived as being more] important and what is [potentially] not” when analysing and exploring teacher knowledge, skills and attitudes. Additionally, Mishra and Koehler (2006:1047) argue that “no single framework tells the “complete story”; no single framework can provide all the answers. The TPACK model is no exception. However, [they] believe “that any framework... is better than no framework at all”. Concerning the limitations attached to the TPACK model, the included teacher knowledge and skills are discussed.

Figure 2.3 categorises teacher knowledge and skills into three main categories, namely: TK, PK and CK. These three are presented as spheres in the centre of Figure 2.4. In the space where all three spheres meet, a “complimentary” category emerges. This is titled TPACK as it is a merger of TK, PK and CK (all the categories of professional teacher knowledge perceived as being needed to function in diverse contexts). Another two technology-focused “complimentary” categories are also featured, namely TPK (which occurs where TK and PK merge) and TCK (which occurs where TK and CK merge). The model also presents a fourth “complimentary” category where PK and CK merge, titled PCK (Charbonneau-Gowdy, 2015:239). The TPACK model acknowledges the impact that context has on the teacher knowledge categories. Two arrows circling the three core categories indicate this impact (Charbonneau-Gowdy, 2015:239). To clarify the meaning behind the categories in Figure 2.3, the original definitions used by Mishra and Koehler (2006) are presented:

CK “is knowledge about the actual subject matter that is to be learned or taught” (Mishra & Koehler, 2006:1026).

PK “is a generic form of knowledge that is involved in all issues of [learner] learning, classroom management, lesson plan development and implementation, and [learner] evaluation. It includes knowledge about techniques or methods to be used in the classroom; the nature of the target audience; and strategies for evaluating understanding” (Mishra & Koehler, 2006:1026).

PCK “is concerned with the representation and formulation of concepts, pedagogical techniques, knowledge of what makes concepts difficult or easy to learn, knowledge of [learners]’ prior knowledge, and theories of epistemology. It also involves knowledge of teaching strategies that incorporate appropriate conceptual representations in order to address learner difficulties and misconceptions and foster meaningful understanding” (Mishra & Koehler, 2006:1027).

TK “is knowledge about standard technologies, such as books, chalk and blackboard, and more advanced technologies, such as the Internet and digital videos” (Mishra & Koehler, 2006:1027).

TCK “is knowledge about the manner in which technology and content are reciprocally related... Teachers need to know not just the subject matter they teach but also the manner in which the subject matter can be changed by the application of technology” (Mishra & Koehler, 2006:1028).

TPK “is knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, and conversely, knowing how teaching might change as a result of using particular technologies” (Mishra & Koehler, 2006:1028).

TPACK “is the basis of good teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that [learners] face; knowledge of [learners’] prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones” (Mishra & Koehler, 2006:1028-1029).

TPACK is a form of knowledge that [good] teachers bring to play anytime they teach. Sometimes this may not be obvious, particularly in cases (where) standard (transparent) technologies are being used (Mishra & Koehler, 2006:1030).

It is noted that the use of technology (standard or advanced) requires an additional set of knowledge, skills and attitudes. A different or creative way is needed to present specific content with a teaching technique that is enhanced (not replaced) by the technology. For example, recording a standard lesson in a classroom and publishing it on the internet (Gustafsson, 2013: 127) is not an example of using TPACK (Mishra & Koehler, 2006: 1028-1029). Using recorded lessons to enhance (not replace) the delivery of a lesson is. TPACK involves the inclusion of technology (standard or advanced) to enhance a planned lesson. An example is using instant messaging applications on mobile phones for one-on-one engagements with students who have specific mathematical problems (Greyling, Koorsse, Ngundu & Kyazze, 2013: 45).

Reflecting on the above, Figure 2.2 is refined by including TPACK, as seen in Figure 2.4. TPACK, from the TPACK model, is included to assist in the process of analysing data relating to teacher knowledge, skills and attitudes. The assumption made is that the remaining knowledge categories included in the TPACK model are already considered within the categories presented as Figure 2.2. By including TPACK, a professional teacher knowledge category presenting a combination of all perceived needed teacher knowledge, skills and attitudes is included for analysis purposes (Mishra & Koehler, 2006:1028-1029). In summary, SMK involves knowing the subject. PCK involves knowing how to teach a subject. TPACK involves being able to teach SMK by using PCK and the most suitable available technology (standard or advanced).

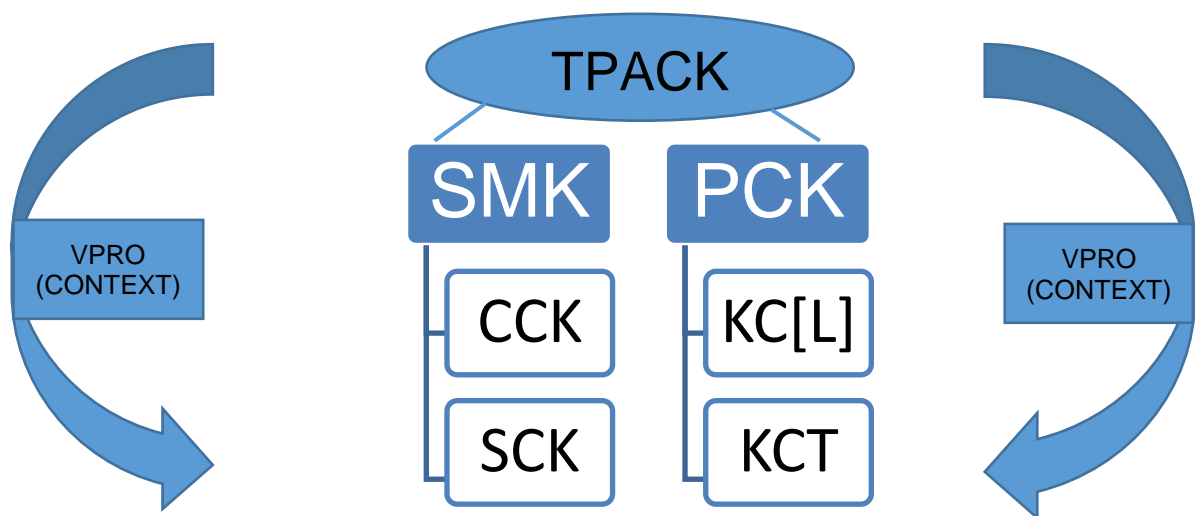


Figure 2.4: Mathematics teacher knowledge, skills and attitudes including context and technology (standard and advanced)

To identify whether the model above can be further refined, the next section focuses on policy stipulations on teacher knowledge, skills and attitudes.

2.5. Policy stipulated knowledge, skills and attitudes required by teachers

Teacher knowledge, skills and attitudes are explored within a South African context. Specifically, stipulations in the “Revised Policy on the Minimum Requirements for Teacher Education Qualifications (19 February 2015)” (from here MRTEQ) (DHET, 2015) are presented and reflected upon.

2.5.1. Five types of knowledge stipulated in policy

The five “types of knowledge” which the DHET (2015:10) perceives as essential for “teaching purposes” are presented in Table 2.6 on the next page. The rationale behind

the inclusion/categorisation of the five types of knowledge in national policy is due to the following:

Teaching is a complex activity that is premised upon the acquisition, integration and application of different types of knowledge practices or learning... [T]he approach adopted in [MRTEQ] pays close attention to the various types of knowledge that underpin teachers' practice, while encapsulating all of these in the notion of integrated and applied knowledge (DHET, 2015:9).

Table 2.6: The types of learning associated with the acquisition, integration and application of knowledge for teaching purposes (DHET, 2015:10-11)

Disciplinary	[R]efers to disciplinary or subject matter knowledge and can be presented in two components within a teaching curriculum. Firstly, it is represented in the study of education and its foundations, including but not limited to the philosophy, psychology, politics, economics, sociology and history of education. Secondly it includes the study of specific specialised subject matter relevant to the academic disciplines underpinning teaching subjects or specialisations. Professional ethics and issues related to knowledge of, and relationships between the self and others are cross-cutting themes that are theoretically located in the study of education and its foundations.
Pedagogical	[I]ncorporates general pedagogical knowledge and refers to the study of the principles, practices and methods of teaching. Pedagogical learning includes knowledge of learners, learning, curriculum and general instructional and assessment strategies and specialised pedagogical content knowledge which includes knowing how to present the concepts, methods and rules of a specific discipline in order to create appropriate learning opportunities for diverse learners, as well as how to evaluate their progress. Inclusive education forms an important aspect of both general and pedagogical knowledge and specialised pedagogical content knowledge.
Practical	[I]nvolves learning from and in practice. Learning from practice includes the study of practice, using discursive resources to analyse different practices across a variety of contexts, drawing from case studies, video records, lesson observations, etc., in order to theorise practice and form a basis for learning in practice. Learning in practice involves teaching in authentic and simulated classroom environments. Work-integrated learning (WIL) takes place in the workplace and can include aspects of learning from practice (e.g. observing and reflecting on lessons taught by others), as well as learning in practice (e.g. preparing, teaching and reflecting on lessons presented by oneself). Practical learning is an important condition for the development of tacit knowledge, which is an essential component of learning to teach.
Fundamental	[I]n the context of teacher education in South Africa refers to learning to converse competently in a second official language, the ability to use Information and Communication Technologies (ICTs) competently, and the acquisition of academic literacies, which lay the foundation for effective learning in higher education contexts. (The development of other important literacies is expected to be integrated into other types of learning – especially Disciplinary Learning – in addition to the utilisation of ICTs for innovative teaching and enhanced learning).
Situational	[R]efers to knowledge of the various learning situations, contexts and environments of education (classrooms, schools, communities, districts, regions, countries and globally), as well as to the prevailing policy, political and organisational contexts. Naturally, all learning – including disciplinary learning, pedagogical learning, practical learning and fundamental learning – should involve learning in context. This includes an understanding of the complex and differentiated nature of the South African society, learning to work in nuanced ways in confronting the diverse challenges faced by children in schools and the communities they serve, for example HIV and AIDS, poverty and the lingering effects of apartheid, dealing with diversity, promoting inclusivity and environmental sustainability.

In summary, the DHET (2015:9) argues that the five “types of knowledge” should not be perceived as being independent of one another. It should be understood as being “[i]ntegrated and applied knowledge” requiring an ITE programme (such as the PGCE) to scrutinise, fuse together and express the different “types of knowledge” (the what/theory), by being exposed to adequate and sufficient actual and simulated classroom experiences (the how/practice) (DHET, 2015:9). The policy-stipulated expectations placed on teachers are presented next.

2.5.2. Seven collective policy roles placed on teachers

Table 2.7: The prescribed seven collective roles of the teacher (DHET, 2015:58-59; DHET, 2010:51-52; DBE, 2006:5)

Specialist in a phase, subject discipline or practice	The educator will be well grounded in the knowledge, skills, values, principles, methods and procedures relevant to the phase, subject, discipline or practice. The educator will know about different approaches to teaching and learning (and, where appropriate, research and management), and how these may be used in ways which are appropriate to the learners and the context. The educator will have a well-developed understanding of the knowledge appropriate to the specialisation.
Learning mediator	The educator will mediate learning in a manner which is sensitive to the diverse needs of learners, including those with barriers to learning; construct learning environments that are appropriately contextualised and inspirational; and communicate effectively, showing recognition of a respect for the differences of others. In addition, an educator will demonstrate sound knowledge of subject content and various principles, strategies and resources appropriate to teaching in a South African context.
Interpreter and designer of learning programmes and materials	The educator will understand and interpret provided learning programmes, design original learning programmes, identify the requirements for a specific context of learning and select and prepare suitable textual and visual resources for learning. The educator will also select, sequence and pace the learning in a manner sensitive to the differing needs of the subjects and learners.
Leader, administrator and manager	The educator will make decisions appropriate to the level, manage learning in the classroom, carry out classroom administrative duties efficiently and participate in school decision making structures. These competencies will be performed in ways that are democratic, support learners and colleagues, and which demonstrate responsiveness to changing circumstances and needs.
Scholar, researcher and lifelong learners	The educator will achieve ongoing personal, academic, occupational and professional growth through pursuing reflective study and research in their field, in broader professional and educational matters, and in other related fields.
Assessor	The educator will understand that assessment is an essential feature of the teaching and learning process and know how to integrate it into this process. The educator will have an understanding of the purpose, methods and effects of assessment and be able to provide helpful feedback to learners. The educator will design and manage both formative and summative assessment in ways that are appropriate to the level and purpose of the learning and meet the requirements of accrediting bodies. The educator will keep detailed and diagnostic records of assessment. The educator will understand how to interpret and use assessment results to feed into processes for the improvement of learning programmes.
Community, citizenship and pastoral role	The educator will practice and promote a critical, committed and ethical attitude towards developing a sense of respect and responsibility towards others. The educator will uphold the Constitution and promote democratic values and practices in schools and society. Within the school, the educator will demonstrate an ability to develop a supportive and empowering environment for the learners and respond to the educational and other needs of learners and fellow educators. Furthermore, the educator will develop supportive relations with parents and other key persons and organisations based on a critical understanding of community and environmental development issues. One critical dimension of this role is HIV/AIDS education.

These seven collective roles serve as a guide of the expectations placed on all teachers in South Africa (DHET, 2015:58-59). The roles emphasise the need for teamwork

among staff at schools. The expectation is not that a teacher should fulfil all seven roles all the time (DHET, 2015:58-59; DHET, 2010:51-52; DBE, 2006:5). As a collective, all teachers should fulfil individual roles, allowing the seven collective roles to assist in delivering a quality education for all. Additional to the seven collective roles presented above, national policy also includes a separate list focusing on NQTs.

2.5.3. Eleven policy expectations placed on NQTs

Concerning the policy expectations presented as Table 2.8, Deacon (2012:27) revealed that it was included after criticism revealed that there is a lack of clarity concerning the difference in policy expectations placed on NQTs and teachers (Deacon, 2012:27). In short, the list serves to clarify the difference between the policy expectations placed on teachers (see Table 2.7) and NQTs.

Table 2.8: What policy expects from a NQT (DHET, 2015:62; DHET, 2010:55)

The following are the minimum set of competences required of newly qualified teachers	
1	Newly qualified teachers must have sound subject knowledge,
2	Newly qualified teachers must know how to teach their subject(s), and how to select, sequence and pace content according to both the subject and learners needs,
3	Newly qualified teachers must know who their learners are and how they learn, understand their individual needs, and tailor their teaching accordingly,
4	Newly qualified teachers must know how to communicate effectively, in general and in relation to their subject(s), in order to mediate learning,
5	Newly qualified teachers must have highly developed literacy, numeracy and IT skills,
6	Newly qualified teachers must have knowledge of the school curriculum and be able to unpack its specialised contents, and be able to use available resources appropriately, so as to plan and design suitable learning programmes,
7	Newly qualified teachers must understand diversity in the South African context, in order to teach in a manner that includes all learners, and must be able to identify learning and social problems and work in partnership with professional services to address them,
8	Newly qualified teachers must be able to manage classrooms effectively across diverse contexts in order to ensure a conducive learning environment,
9	Newly qualified teachers must be able to assess learners in reliable and varied ways, and to use the results of assessment to improve teaching and learning,
10	Newly qualified teachers must have a positive work ethic, display appropriate values, and conduct themselves in a manner which befits, enhances and develops the teaching profession,
11	Newly qualified teachers must be able to reflect critically, in theoretically informed ways and together with their professional community of colleagues, on their own practice in order to constantly improve it and adapt it to evolving circumstances.

Concerning Table 2.8, it is noted that the first policy expectation emphasises the need for sound subject knowledge. The second policy expectation highlights the ability to teach the subject knowledge. The nine policy expectations that follow can be seen as supportive expectations anchored within the first two expectations, namely: know the learner; know how to communicate; be confident with literacy, numeracy and IT skills; know how to unpack and deliver the curriculum; understand and know how to manage diversity; know how to manage a classroom; know how to assess; know how to

enhance the teaching professions reputation; and lastly, know how to reflect on and improve practices (DHET, 2015:62; DHET, 2010:55).

2.5.4. Comparing policy expectations placed on teachers and NQTs

Within the context of gaining deeper understanding of what is expected of a NQT, similarities and differences between the content presented in Table 2.7 and Table 2.8 are briefly discussed. Regarding similarities, policy expects NQTs and teachers to hold adequate subject knowledge and knowledge about teaching this content. Both are expected to hold adequate knowledge about diverse learners, assessment, communication, creating environments conducive to learning, and the school curriculum relating to their subjects and phases. Additionally, both are expected to conduct themselves as professionals and do their part to enhance the status of teaching as a profession. Looking at differences, Table 2.7 makes no specific mention of an expectation of holding “highly developed literacy, numeracy and IT skills” as stated in Table 2.8. Additionally, Table 2.8 makes no specific mention of a “pastoral role” as stated in Table 2.7. As examples of vagueness of differences, Table 2.7 includes the following statement under the role “learning mediator”: “...design original learning programmes”. Table 2.8 states “...design suitable learning programmes” under the sixth expectation. No clarity is provided to explain what the practical difference is between “original” and “suitable” in the policy stipulations mentioned within the context of designing learning programmes. It is argued that if something has to be designed, it is automatically original. Additionally, it is argued that Table 2.7 and Table 2.8 state mostly the same content in different wording. Therefore, the difference between policy expectations placed on a teacher and a NQT remain unclear (Deacon, 2012:27). Although argued to be unclear in clarifying differences, policy stipulates that the content presented as Table 2.7 and Table 2.8 are to be considered when designing a learning programme for, as an example, the PGCE (DHET, 2015:8-9 & 26). It is argued that a gap exists in terms of clarifying the difference in the policy expectations placed on teachers and NQTs. To start clarifying this gap for analytical purposes, the section to follow presents a combined list of expectations based on the policy stipulations presented above.

2.5.5. Merged list of policy expectations

Table 2.9 (on the next page) is presented as a revised list of expectations placed on an NQT.

Table 2.9: Revised list of policy expectations placed on NQTs (DHET, 2015: 10-11, 58-59 & 62)

Specialist in a phase, subject discipline or practice	NQTs must have sound subject knowledge proven by holding understanding of; firstly, education and its foundations (including but not limited to the philosophy, psychology, politics, economics, sociology and history of education); and secondly, specific specialised subject matter relevant to the academic disciplines underpinning teaching subjects or specialisations including the utilisation of ICTs for innovative teaching and enhanced learning.
Learning mediator	NQTs must know how to teach their subject(s), and how to select, sequence and pace content according to both the subject and learners needs proven by holding general pedagogical knowledge (knowledge of learners, learning, curriculum and general instructional and assessment strategies) [and] specialised pedagogical content knowledge (how to present concepts, methods and rules for diverse learners, how to evaluate progress, and [how to utilise] ICTs for innovative teaching and enhanced learning). In addition, [a NQT must] demonstrate sound knowledge of subject content and various principles, strategies and resources appropriate to teaching in a South African context. NQTs must understand diversity in the South African context, in order to teach in a manner that includes all learners, and must be able to identify learning and social problems and work in partnership with professional services to address them as proven by showing recognition of a respect for the differences of others. NQTs must know how to communicate effectively, in general and in relation to their subject(s), in order to mediate learning as proven by understanding how to converse competently in a second official language as proven by communicating effectively.
Interpreter and designer of learning programmes and materials	NQTs must have knowledge of the school curriculum and be able to unpack its specialised contents, and be able to use available resources appropriately, so as to plan and design suitable learning programmes as proven by holding understanding of inclusive education as an important aspect and being able to prepare suitable textual and visual resources for learning who will be able to, after gaining experience and further development, develop original learning programmes. NQTs must know who their learners are and how they learn, understand their individual needs, and tailor their teaching accordingly as proven by [knowing] about different approaches to teaching and learning and where appropriate, research and management), and how these may be used in ways which are appropriate to learners and the context. [A NQT] will also select, sequence and pace the learning in a manner sensitive to the differing needs of the subjects and learners.
Leader, administrator and manager	NQTs must be able to manage classrooms effectively across diverse contexts in order to ensure a conducive learning environment as proven by holding understanding of the various learning situations, contexts and environments of education as well as the prevailing policy, political and organisational contexts. [Additionally, NQTs] will make decisions appropriate to the level, manage learning in the classroom, carry out classroom administrative duties efficiently and participate in school decision making structures. These competences will be performed in ways which are democratic, which support learners and colleagues, and which demonstrate responsiveness to changing circumstances and needs.
Scholar, researcher and lifelong learner	NQTs must have highly developed literacy, numeracy and IT skills as proven by the ability to use ICTs competently and the acquisition of academic literacies [to] achieve ongoing personal, academic, occupational and professional growth. NQTs must be able to reflect critically, in theoretically informed ways and together with their professional community of colleagues, on their own practice in order to constantly improve it and adapt it to evolving circumstances as proven by holding understanding of learning from practice (case studies, video records, observing and reflecting on lessons taught by others, et cetera) and in practice (preparing, teaching and reflecting on lessons presented by oneself).
Assessor	NQTs must be able to assess learners in reliable and varied ways, and to use the results of assessment to improve teaching and learning as proven by understanding [how to] design and manage both formative and summative assessments that are appropriate to the level and purpose of the learning and meet the requirements of accrediting bodies. Additionally, [a NQT] will understand how to interpret and use assessment results to feed into processes for the improvement of learning programmes.
Community, citizenship and pastoral role	NQTs must have a positive work ethic, display appropriate values, and conduct themselves in a manner which befits, enhances and develops the teaching profession proven by holding understanding of professional ethics and issues related to knowledge of, and relationships between the self and others [due to studying] cross-cutting themes that are theoretically located in the study of education and its foundations. This includes an understanding of the complex and differentiated nature of the South African society, learning to work in nuanced ways in confronting the diverse challenges faced by children in schools and the communities they serve, for example HIV and AIDS, poverty and the lingering effects of apartheid, dealing with diversity, promoting inclusivity and environmental sustainability. Additionally, [a NQT] will uphold the Constitution and promote democratic values and practices in schools and society. Furthermore, the educator will develop supportive relations with parents and other key persons and organisations based on critical understanding of community and environmental development issues.

The policy expectations placed on a NQT are revised for analytical purposes. This is realised by merging the content presented in Table 2.6 - 2.8. The prescribed “seven collective roles of the teacher” (see Table 2.7) (DHET, 2015:58-59) are used as themes. The expectations placed on a NQT (see Table 2.8) (DHET, 2015:62) are grouped under the perceived relevant “teacher role”, and elaborated on by reflecting on the “five types of knowledge” (see Table 2.6) perceived as essential to realise the expectations placed on a NQT (DHET, 2015:10-11) and the “seven collective roles of

the teacher” (DHET, 2015:58-59). Table 2.9 is presented as the merged understanding to be referred to concerning the refinement made to Figure 2.4 as presented in Figure 2.5 below.

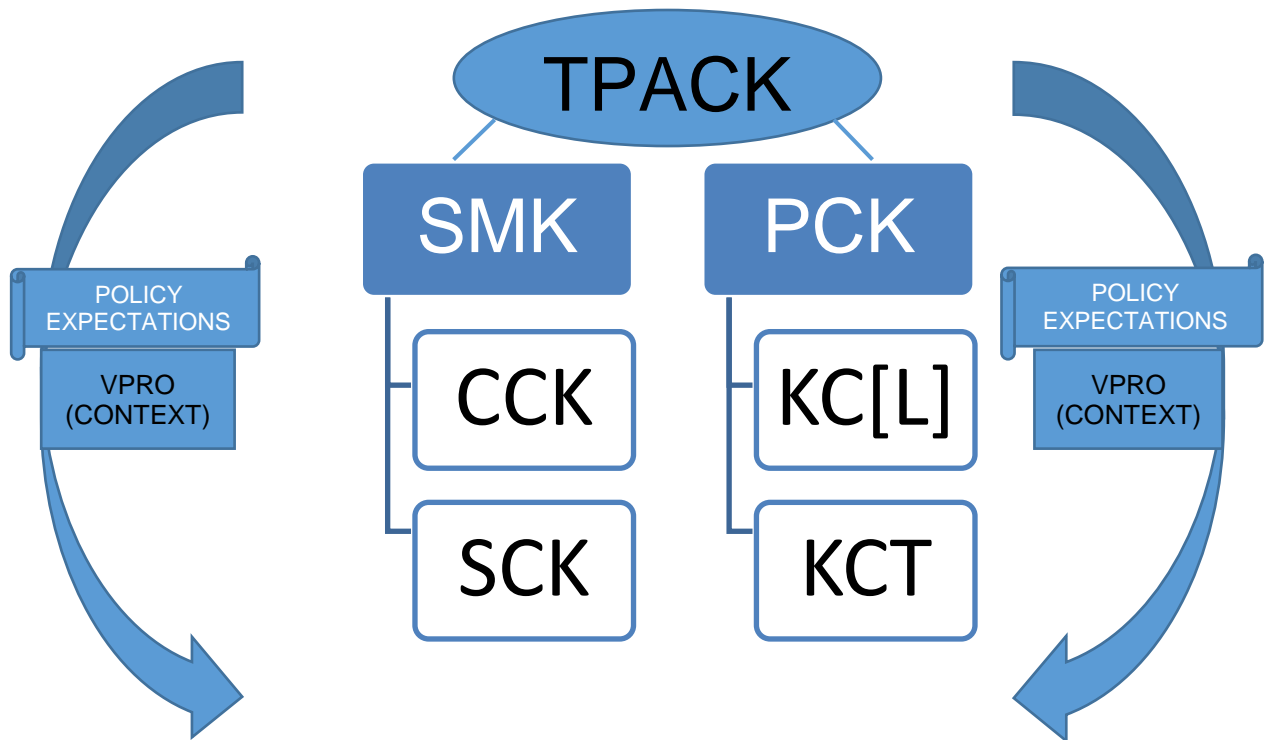


Figure 2.5: Mathematics teacher knowledge, skills and attitudes including context and technology (standard and advanced) and policy expectations

Figure 2.5 is not presented as an answer to all teacher knowledge categories needed by a good teacher in a classroom context. Rather, it serves as a model to explore teacher knowledge, skills and attitudes transferred during the PGCE FET mathematics programme. At its core, teacher knowledge, skills and attitudes are categorised into three components for analytical purposes:

[T]eacher professional knowledge can be said to comprise three components: disciplinary knowledge, subject knowledge for teaching, and classroom competence; or, put another way, content knowledge of the respective school subject [SMK]; theoretical and research findings concerning the nature of the subject and methods of teaching it [PCK]; and the practical ability to convey the subject to learners in real classrooms [TPACK] (Taylor & Taylor, 2012:3).

Figure 2.5 is presented within the following understanding: teachers need knowledge of their subject (SMK), knowledge of pedagogy (PCK), knowledge of the curriculum and knowledge of how to use available tools and techniques to transfer understanding to diverse learners in diverse contexts (TPACK) (Darling-Hammond, 2008:1320; IALEI, 2008:24; Guyver & Nichol, 2004:3; Turner-Bisset, 2001:13-19). “[S]imply knowing one’s

subject matter” is inadequate to realise a quality education for diverse learners in diverse contexts (Darling-Hammond & Baratz-Snowden, 2005:117). Enhancing the probability of delivering a quality education for diverse learners requires “a wide body of knowledge and the ability to use this knowledge appropriately in a variety of instructional contexts” (IALEI, 2008:24). Teachers should also understand the influences of globalisation on education to ensure that teaching practices lead to relevant learning, as applicable in a modern economy and deemed relevant by diverse learners (November, 2010:189). Teachers should hold “a rich coherent conceptual map of the discipline; an understanding of how knowledge is developed and validated with different social context; [and] an understanding of why the subject is important” (Darling-Hammond & Baratz-Snowden, 2005:122). Teachers need “the skills and will to evaluate” their own practice and the ability to “search for new answers when needed” (Darling-Hammond & Baratz-Snowden, 2005:116). Additionally, “teaching is an ever-changing practice” (November, 2010:196) and “professional teacher knowledge” is influenced and continuously changed by various disciplines “like economics, history, sociology, philosophy or psychology” (Robinson & Lomofsky, 2010:33). “Professional teacher knowledge” is also subject to change due to changes in the “aims, policies and curricula required” by the South African education (schooling) system (Hudson, 2010:32).

Focusing specifically on educational policy, November (2010:195) found that such policy “seems very much driven by forces outside education”, emphasising an importance on gaining skills “rather than the type of people education can enable learners and teachers to become”. Additionally, “teachers have very little power to change some of the fundamental conditions of their work” (Brodie, 2015:17). At this stage of the review, the researcher agrees with Shulman (2004:504) that being a classroom teacher is “perhaps the most complex, most challenging, and most demanding and frightening activity our species have ever invented”. Although not perfect (and no model could be deemed perfect), it is argued that Figure 2.5 allows for the complex nature of being a classroom teacher to be categorised in terms of teacher knowledge, skills and attitudes perceived as needed by forces inside education.

Concerning policy expectations, teachers are expected to construct their own “professional teacher knowledge” by drawing on their “knowledge and understanding of the content” to “make informed pedagogical choices around other facets of their teaching practice (including their preparation, selection of appropriate teaching strategies, managing their classrooms as safe learning environments and the ways in which they monitor learning)” (Rusznyak, 2010:128). By constructing their own

“professional teacher knowledge” a teacher is, in fact, developing their own professional identity and are “characters in their own stories of teaching that they author” (Whelan et al., 2001:143). During this process, “professional teacher knowledge” needs to be “interpreted, re-interpreted and transformed” throughout a teachers’ career to adjust to changing contexts and circumstances (Deacon, 2012:17). In other words, a professional teacher is, in fact, a professional learner who is able to communicate their understanding.

2.6. Closing

This Chapter presented a model for a mathematics teacher’s knowledge, skills and attitudes, within the perimeters of this study’s aim and objectives (see Table 1.1). The combined understanding gained from relevant literature and policy is presented as Figure 2.5. This model serves as the core of this study’s conceptual framework (see Figure 4.9 in Chapter 4) with reference to expectations placed on NQTs after completing the PGCE. The Chapter to follow focuses on the PGCE.

CHAPTER 3 POST GRADUATE CERTIFICATE IN EDUCATION

3.1. Introduction

The preceding Chapter focused on teacher knowledge, skills and attitudes. This Chapter presents an orientation of the PGCE in South Africa by focusing on the following: approved ITE qualifications; accessing the PGCE with a FET mathematics focus; opportunities available after completing the PGCE; outcomes achievable from completing the PGCE; PGCE modules and other refinements, and current policy stipulations governing the PGCE. The aim of discussing these elements is to secure understanding so that the conceptual framework built in Chapter 2 can be refined (see Figure 2.5) in relation to the PGCE. The first discussion focusing on strategies to develop newly qualified teachers (NQTs) is presented below.

3.2. Approved ITE qualifications

ITE in South Africa involves a minimum of four years full-time academic study by pursuing one of two available routes:

Table 3.1: Approved ITE qualifications offered by a HEI (DBE, 2014:1-2)

ROUTE ONE	ROUTE TWO	
UNDERGRADUATE STUDIES	UNDERGRADUATE STUDIES	GRADUATE STUDIES
A four-year Bachelor of Education degree (B. Ed.), specialising in the Foundation Phase (Grades R-3); Intermediate Phase (Grades 4-6); Senior Phase (Grades 7-9); and the Further Education and Training (FET) Phase (Grades 10-12).	A three or four-year Bachelors degree, e.g. Bachelor of Science, Bachelor of Engineering, Bachelor of the Arts, Bachelor of Computer Science, Bachelor of Technology, in fields suitable for admission to the one-year programme: Postgraduate Certificate in Education (PGCE).	One-year Postgraduate Certificate in Education (PGCE) for graduates whose degrees include majors that allow admission to the PGCE.
Equals 480 credits at NQF level 7	Equals a minimum of 360 credits at NQF level 6	Equals 120 credits at NQF level 7

Concerning Table 3.1, a B. Ed., Bachelor's degree or equivalent followed by the one-year PGCE, allows individuals to register with the South African Council of Educators (SACE) as a professional teacher (DBE, 2014:1-2). SACE is important because it is a "professional body that is concerned with the professional development of teachers... the promotion and development of the teaching profession [and] also registers teachers through a formal process" (Keevy et al., 2011:2-12).

3.3. Accessing the PGCE with a FET mathematics focus

Table 3.1 mentions a “three or four-year Bachelor’s degree” that serves as a suitable undergraduate qualification granting access to the PGCE (DBE, 2014:1-2). The DHET (2015:65) further stipulates that “an approved undergraduate Bachelor’s degree (NQF Level 7 or 8)” is preferred in terms of granting access. Although preferred, the reality is that an insufficient number of Bachelor degree holders, in terms of specific groupings of subject specialisations, pursue the PGCE. Acknowledging this reality, policy stipulates the following:

Providers of teacher education programmes are encouraged to consider holders of diplomas in these appropriate and scarce fields for admission into [the PGCE], especially with regard to the [FET] phase (DHET, 2015:65).

In this vein, policy stipulates that “a number of 360 credit exit Level 6 diplomas offered by accredited public and private higher education institutions” should be accepted in the following specialisations: engineering; tourism; hospitality; agriculture; fine art; dance; music; dramatic art; business studies; accounting; design; engineering graphics and design; medical technology; chemical technology; information technology; biotechnology; sport and exercise technology; applied sciences; and mathematics technology (DHET, 2015:65 also see CHE, 2015:4). Looking at a diploma that grants access to the PGCE with mathematics as a major, policy stipulates that:

Some universities offer Numerical Analysis, Statistics, Dynamics and Mechanics as part of the Applied Mathematics syllabus. This is not perfectly suitable as a basis for teaching Mathematics, but is acceptable (DHET, 2015:68).

In exploring the rationale behind policy allowing the above graduates access to the PGCE, it was revealed that South Africa is perceived as experiencing an education crisis. This is due to South Africa’s low performance in mathematics compared to other countries (Reddy et al. [TIMSS-2015], 2016: 15; DHET, 2015:68; Naicker, 2013:244). An undeniable contributing factor to this phenomenon is that many schools are chronically short of qualified teachers who are confident in teaching mathematics to diverse learners in diverse contexts (DHET, 2015:65; Chetty, 2014:92; Spaull, 2012:12). Therefore, the PGCE exists to help overcome the shortage of qualified teachers as needed in South Africa, especially in various FET and Senior phase specialisations (DHET, 2015:26; Taylor, 2014:10; CHE, 2006:1). Concerning the shortage of teachers, the CDE (2015:3) states that learner enrolments “are expected

to rise from 12.4 million in 2013 to... 13.3 million in 2015". Teacher shortages are predicted as a consequence, which ITE is expected to satisfy:

[T]he teaching force will need to expand from around 426, 000 in 2013 to around 456, 000 in 2015, an increase of approximately 30, 000 teachers over 12 years (CDE, 2015:3).

It seems that the current teacher education system is focused on increasing the quantity of students who become NQTs. This is potentially at the cost of developing quality teachers. In support, Taylor (2014:10) found that some ITE programmes accepted students "without any reference to what motivates them to become teachers", along with accepting students with "weak subject content knowledge, lack of proficiency in English, and generally poor reading and writing skills". This is possibly due to the trend that teaching is rarely a student's first choice when pursuing higher education (Taylor, 2014:19; Jansen, 2013:91; DBE, 2011:68). It seems that the strategy followed by the teacher education system is to increase the number of students gaining access into ITE by "the removal of preparation requirements" (Darling-Hammond, 2008:1317).

Even though certain entrance requirements have been removed/amended, HEIs conduct selection interviews before granting access to the PGCE. Such interviews aim to "rigorously assess candidates' motivation, commitment and perceptions of what teaching entails" (Ashby et al., 2008:63). Alongside interviews, the CHE (2015:42) states "[e]very [HEI] has rules that allow it to exclude, or more appropriately, refuse to admit" students. The purpose of having such rules and conducting interviews is to "promote students' success" by "admitting the right students" who "have a good chance of succeeding" (CHE, 2015:41). Within the context of such rules and interviews in the PGCE, it seems that flexibility is the order of the day. The PGCE potentially does not attract enough of the perceived "right people" in terms of being "high achievers" and/or holding "motivational suitability for teaching" (Deacon, 2012:32). This possibly "forces" HEIs to accept students who do not meet all entrance criteria to ensure that the desired quantity of individuals are equipped with a recognised teacher qualification. This even seems to occur in contexts where bursaries are available (Jansen, 2013:91; Parker, 2009a:14). For example, Parker (2009a:14) analysed the Funza Lushaka Bursary Scheme data and found that HEIs "with the highest failure rates (in bursary students across all fields of specialisation and ITE options) were [those] that did not apply academic criteria for selection and awarded students without the minimum entry requirements the bursary". HEIs are potentially "forced" to accept some students who pursue the PGCE, not because they want to become a teacher, but because they

perceive the accessible careers and further studies linked to their degree or diploma granting access into the PGCE as “undesirable” (Ashby et al., 2008:5).

In closing, the perception exists that the PGCE is, in many cases, a second opportunity to pursue an alternative career linked to a completed undergraduate qualification (Deacon, 2012:43; Thomson et al., 2012:326; Watt & Richardson, 2008:409). Although the perception exists that not all those that pursue the PGCE do so for “positive reasons” (Roness, 2011:629; Ashby et al., 2008:5; Sinclair, 2008:81), a general level of agreement exists that the common denominator for choosing teaching as a career is to be able to make a difference. In addition, various students hold the expectation of entering a career that is “interesting, demanding, creative and rewarding” (Davidson et al., 2005:318). The section to follow explores the potential of realising such a career.

3.4. Opportunities available as a result of completing the PGCE

Ideally, a NQT will be entering a work environment with the assurance that through hard work and dedication to the profession, they will be able to “rise through the ranks” while making a difference and achieving job satisfaction (Quan-Baffour & Arko-Achemfour, 2014:1).

[Students] must also have an understanding that this is a continuing path with many opportunities to learn and grow (Robinson, 2015:42).

With these opportunities, the assumption is that a NQT will learn and grow as they gain experience as a classroom teacher, attend workshops and potentially pursue further studies. Policy stipulates formal qualification pathways linked to specific careers in the education system, to encourage personal growth and development. This is presented in Table 3.2 on the next page. When looking at the Table, the PGCE represents the first step of a four/five step process included in a policy-stipulated qualification pathway. The second step encourages specialisation in one of three qualification pathways to assist with professional development and/or career progression. The remaining steps allows for further specialisation to prepare and enhance knowledge, skills and attitudes deemed relevant to a specific career in education, for example: a subject advisor, principal, researcher or teacher educator. Upon successfully completing ITE (PGCE/B.Ed./Step 1), “most teachers will begin their careers as phase and/or subject specialists”, and will usually work in a classroom as a NQT (DHET, 2011:12). Note that it is not compulsory for an individual to complete a qualification pathway up to the second, third or fourth/fifth step to gain access to a specific career. The three

qualification pathways indicate the recommended qualification route to follow to enhance employability and efficacy based on a teacher's career ambitions.

Table 3.2: Examples of qualification pathways for ITE graduates (DHET, 2011:5)

PATHWAY:	TEACHING AND LEARNING	MANAGEMENT AND LEADERSHIP	EDUCATIONAL PLANNING, RESEARCH AND/OR POLICY DEVELOPMENT
Step 1:	Initial Teacher Education B. Ed. / PGCE or equivalent	Initial Teacher Education B. Ed. / PGCE or equivalent	Initial Teacher Education B. Ed. / PGCE or equivalent
Step 2:	B. Ed. Honours or equivalent (Specialising in teaching and learning)	B. Ed. Honours or equivalent (Specialising in management and leadership)	B. Ed. Honours or equivalent (Specialising in educational planning, research and/or policy development)
Step 3:	M. Ed. (Coursework and/or research focusing on teaching and learning)	M. Ed. (Coursework and/or research focusing on management and leadership)	M. Ed. (Coursework and/or research focusing on educational planning, research and/or policy development)
Step 4:	D. Ed./PhD (Research focusing on teaching and learning)	D. Ed./PhD (Research focusing on management and leadership)	D. Ed./PhD (Research focusing on educational planning, research and/or policy development)
Step 5:			Post-doctoral Studies
Associated Careers:	Continue in classroom; School Library; Co-ordinator of school based support; Specialist in a teaching centre; Subject advisor; Teacher educator; et cetera.	Principal; Deputy-Principal; Work in the district, provincial or national office as a human resources development officer, researcher, planner, policy developer or as a data or systems manager; Teacher educator; et cetera.	

To build on the above, the realistic chance of promotion is explored within the context of opportunities to learn and grow. To begin, Deacon (2012:26) stated that the “qualification pathways” presented in Table 3.2 are “intended to provide opportunities for teachers to advance their careers within the teaching profession and within the school context”. The qualification pathways aim “to improve teacher retention, both within the profession and more especially within the classroom” (Deacon, 2012:26). Although the above intention and aim is present, it has been found that numerous teachers believe that they will never be promoted and do not recommend teaching as a career (Quan-Baffour & Arko-Achemfour, 2014:14; ODE, 2013:301). Not being promoted is further complicated by the uniformity of teachers’ payment, whether high performing or not (Darling-Hammond, 2008:1322; Greene & Forster, 2008:2; Tichenor, 2005:89). In addition, other professions, especially in the field of mathematics, are generally perceived as offering greater financial rewards and promotion opportunities

(Deacon, 2012:7). These occurrences potentially contribute to the struggle in attracting the desired quantity of the right type of student to the PGCE.

The above discussion presented insights into further development and training linked to the PGCE. The section to follow presents insights on the broad development realised by completing the PGCE in South Africa.

3.5. Outcomes achievable from completing the PGCE

Recent policy stipulates the following broad outcomes associated with the PGCE in South Africa:

Table 3.3: Exit level competences of HEQSF qualifications NQF level 7 (DHET, 2015:60-61)

LEVEL 7	
1	Provides intellectual enrichment,
2	Enhances flexibility in changing circumstances,
3	Intensive, focused and applied specialisation required for a specific niche in the labour market,
4	Provides for a deep and systematic understanding of current thinking, practice, theory and methodology in an area of specialisation,
5	Well-rounded, broad education, which provides a knowledge-base, theory and methodology of a discipline,
6	Demonstrates initiative and responsibility in an academic and professional context,
7	Principles and theories are emphasised as a basis for entry into the labour market, professional training, post-graduate studies or professional practice in a wide range of careers,
8	Prepares for a change in career paths,
9	Provides for continuing professional development.

The DHET (2015:60) presents the above Table to indicate “exit level competencies” for qualifications on NQF Level 5 to NQF Level 10, to “be applied in conjunction” with the “SAQA Level descriptors for the 10-Level NQF” (DHET, 2015:60). To clarify its relevance in terms of PGCE outcomes, the following quote is presented:

[Exit level competencies] will assist designers of programmes to ensure that these are fit for their purpose, and identify the correct level for different aspects of their programmes (DHET, 2015:60).

Table 3.3 presents exit level competencies for Level 7, where the PGCE is located. These competencies therefore serve as the foundation for PGCE outcomes. Reflecting on Table 3.3, policy stipulations reveal that the PGCE focuses on: “intellectual enrichment”; coping with change (being flexible); becoming a specialist “for a specific niche in the labour market” such as becoming a mathematics teacher; broad knowledge

of education, teaching and theories and practices; being a professional and developing one's professionalism; practical industry exposure in terms of teaching learners; understanding options concerning a "change in career path"; and the need for continuous professional development (DHET, 2015:60-61). In support, the CHE (2006:1) states that students who successfully complete the PGCE "will be competent [NQTs] who will still need time, experience and appropriate support to develop as fully fledged extended professionals" after realising the following PGCE specific outcomes:

Table 3.4: PGCE exit level outcomes (CHE, 2006:1)

Students entering the programme are thus assumed to have acquired the appropriate level of subject knowledge in the Bachelor's degree. In order to prepare competent teachers within the limited period of one year full-time or two years of part-time study, a PGCE programme should:	
1	Consolidate subject knowledge and develop appropriate pedagogical knowledge,
2	Cultivate a practical understanding of teaching and learning in a diverse range of South African schools, in relation to educational theory, phase and/or subject specialisation, practice and policy,
3	Foster self-reflexivity and self-understanding among [students],
4	Nurture commitment to the ideals of the teaching profession and an understanding of teaching as a profession,
5	Develop the professional dispositions and self-identity of students and teachers,
6	Develop students as active citizens and enable them to develop the dispositions of citizenship in their learners,
7	Promote and develop the dispositions of competences to organise learning among a diverse range of learners in diverse contexts.

When looking at Table 3.4, the CHE (2006:1) acknowledges that a key assumption in the PGCE is that the initial qualification that grants access had developed adequate subject knowledge. The seven exit level outcomes stated in Table 3.4 emphasise this by highlighting exit level outcomes in: pedagogy (and consolidating existing subject knowledge); self-reflexivity; teaching as a profession; active citizenship; and teaching in different contexts. It is noted that the CHE's assumption of students being subject experts is done within the context of students being Bachelor's degree graduates. This assumption might be outdated due to recent policy allowing diploma graduates access to the PGCE even though policy mentions that doing so might not provide the most desired level of SMK (DHET, 2015: 26 & 68). There is potentially a need to include an outcome that proves the existence of, or develops, SMK further in the modern PGCE.

To build on the above understanding, specific outcomes linked to modules comprising a specific PGCE is presented in Table 3.5 on the next page. Insights presented include the following:

- The *curriculum specialisation modules* emerged as the core of the PGCE. It develops a student to become a subject expert with the ability to select content and an appropriate strategy to transfer and assess the appropriate principles in the curriculum in various school contexts.
- The *language mediums* ensured that the process of communication was understood to transfer subject knowledge.
- *Education research* was aimed at enhancing students' reflexive practices and to stay up-to-date with subject and pedagogical knowledge and trends.
- *Teaching practice* was aimed at the overall efficiency of the student as a teacher who will need to plan and implement teaching and learning initiatives.
- The module(s) that focused on *educational management, governance, leadership, diversity, inclusivity* and *learning and learner support* focused on classroom practice and classroom management. These modules highlighted relevant legislation, professional organisations/role-players, human rights, democratic classroom practices and sensitivity concerning a democratic society.

Table 3.5: PGCE programme outcomes with specific design features (Carl, 2008:31-32)

1	Show insight into the importance of language for effective learning and can use language for instruction (Afrikaans/English) effectively (Language mediums are compulsory modules to enhance language proficiency),
2	Demonstrate adequate knowledge and insight into the content and skills of the appropriate subjects/learning areas (Students have to complete a minimum of two curriculum specialisation modules/Introduction to Education Research),
3	Demonstrate aspects of an efficient educator/facilitator (Teaching practice / Introduction to Educational Research and contents of all modules),
4	Be able to select content and methods that are appropriate for the subjects/learning areas, as well as for the needs of the learner (Students must complete a minimum of two curriculum specialisation modules),
5	Be able to implement [the current curriculum] and the appropriate principles successfully in curriculum and programme development (Curriculum specialisation modules address this aspect),
6	Demonstrate insight and knowledge regarding the following aspects of classroom practice and classroom management: current legislation regarding school management and schools; knowledge of professional organisations; human rights; the creation of a democratic classroom; an appreciation and sensitivity regarding cultural, racial and gender differences (Module on Educational Management, Governance and Leadership; Module on Diversity and Inclusivity, as well as Learning and Learner Support address this aspect),
7	Be able to plan and implement relevant programmes (Curriculum specialisation modules; Teaching Practice/ work-based learning opportunity),
8	Be able to assess learners' levels of knowledge, skills and attitudes through multiple assessment strategies (Curriculum specialisation modules; Teaching Practice/ work-based learning opportunity; Computer Use),
9	Become reflexive practitioners and researchers (All modules, specifically Introduction to Education Research address this aspect).

Based on these competences [see Table 3.5], the key components of any programme which would strive to meet the South African needs and accommodate the prescribed seven roles of the teacher, therefore had to include the components of the following: (1) Fundamental learning (the teacher as scholar and lifelong

learner; as mediator, assessor, leader, administrator and manager); (2) Subject and content knowledge (the teacher as interpreter and designer of learning programmes, mediator of learning and subject specialist); (3) Teaching and learning processes (all seven roles) and, (4) the school and the teaching profession (the teacher as leader, administrator and manager, and the community and pastoral role) (Carl, 2008:30).

The above discussion presented outcomes associated with the PGCE. It also revealed a link between specific modules comprising the PGCE and the seven collective roles policy stipulates for teachers. Additional understanding of the modules which make up the PGCE is presented below.

3.6. PGCE modules and other refinements

To begin, insights were sought on the PGCE structure. During this search, the content presented below emerged as an example of how a specific PGCE was structured by a specific HEI. The Table below shows the changes that occurred after the specific PGCE was reviewed and refined in 2006 to better equip students to cope in diverse classroom contexts and to conduct research.

Table 3.6: PGCE modules (Carl, 2008:33)

PROGRAMME BEFORE 2006	2006 PROGRAMME MODULES AND CREDITS
Didactics 114 (12)	Curriculum Studies 174 (12)
Educational Psychology 114 (12)	Learning and Learning Support 174 (12)
Educational Management 144 (12)	Educational Management and Leadership 174 (12)
Philosophy of Education 144 (12)	Philosophy of Education 174 (12)
Teaching Practice 174 (18)	Teaching Practice 174 (26)
Subject Didactics 174 (12)	Curriculum Studies (School subject) 174 (12)**
Subject Didactics 174 (12)	Curriculum Studies (School subject) 174 (12)**
Computer Use (Ed) 112 (6) or 142 (6)	Computer Use (Ed) 172 (4) (Compulsory self-study module)
Educational Enrichment (Religion Studies) 122 (4);	Phased out.
Educational Enrichment (Environmental Studies) (4)	Some key components included in modules; Diversity and Inclusivity 174 and Learning and Learning Support 174
Educational Enrichment (Learners with Special Educational Needs) (4)	
Afrikaans medium 174 (6)	Afrikaans Medium 176 (6)
English Medium 174 (6)	English Medium 176 (6)
***	Introduction to Educational Research 172 (8) New module
***	Diversity and Inclusivity 174 (12) New Module. HIV/AIDS included in this module
TOTAL: 120 CREDITS	TOTAL: 134 CREDITS
** Students must take a minimum of two Curriculum Specialisation Studies (School subjects). These modules were formerly known as Subject Didactics.	

To clarify the rationale of refining the specific PGCE, the following quote is stated:

[N]ew modules were introduced and the contents of existing modules were adapted to address the needs of the changed circumstances... The modules now have a research basis and acknowledge the realities of the changing South African context. Modules like Curriculum Studies 174 and the Curriculum Studies (School Subjects) now accommodate current curriculum changes. Learning and learning Support stresses the whole notion of inclusivity and the need to address learner needs, Education Management and Leadership focuses on the need to facilitate the development of educational leadership in a democratic and deliberative manner, while Diversity and Inclusivity focuses on the need to educate learners in a diverse and pluricultural society- that is, students have to be initiated into understandings of difference, diversity and multiculturalism aimed at enhancing what it means to respond to the otherness of the other. An attempt is hereby made to prepare students for the diversity of learners they will encounter in South African schools (Carl, 2008:34-35).

Concerning the relevance of the above changes, in the context of 2014 and beyond, recent policy emphasises a focus on inclusivity:

All PGCE graduates must be knowledgeable about inclusive education and skilled in identifying and addressing barriers to learning, as well as in curriculum differentiation to address the needs of individual learners within a grade (DHET, 2015:29).

Concerning other changes to the PGCE, the following was revealed by the DHET (2011):

With regard to the Advanced Diploma in Teaching (which will replace the PGCE qualification), [s]tudents should spend a minimum of 6 weeks and a maximum of 8 weeks on supervised school based practice over the one year of the Advanced Diploma in Teaching. At least three of these weeks should be consecutive (DHET, 2011:28).

From the above it seems the intention was to rename PGCE during 2011 along with further refinements. Interestingly, PGCE was not renamed when the DHET (2015:29) stated that the PGCE was to be implemented in terms of extending the “Teaching Practice” time-allocation stipulations by two to four weeks in comparison to DHET (2011:28) stipulations:

For the PGCE, a full-time contact programme requires students to spend a minimum of eight weeks and a maximum of 12 weeks in a formally supervised and assessed school-based practice in the one-year duration of the programme (DHET, 2015:29).

The DHET (2015:26) revealed the following as the rationale for retaining the title PGCE:

[T]he title [PGCE] may be used to denote a qualification in education which conforms to all the specifications and requirements of an Advanced Diploma as stipulated in the HEQSF, including admission requirements, purpose, characteristics and progression routes (DHET, 2015:26).

Concerning credits allocated to the PGCE, Table 3.6 revealed that the qualification was allocated “120 credits” before 2006. After 2006, it was allocated “138 credits”. The DHET (2015:26) indicates that the PGCE is now, similar to the PGCE before 2006, allocated a “[m]inimum total credits: 120”. This re-allocation of 120 credits potentially indicates that focus is to be placed on “the what and the how” (Soudien, 2013:114) and ensuring all those directly involved “do what they are supposed to do” (Gallie, 2013:331). In short, increasing credit allocation was potentially explored and found inadequate on its own to enhance achievable outcomes. Hindle (2013:346) argues that to improve the current education system, attention needs to be placed on “improving the experience of schooling for most of our children”. This argument is paraphrased by stating that what is also potentially needed is to improve “the experience of [teacher education and specifically ITE] for most of our [students]” pursuing a career as a teacher (Hindle, 2013:346), and not to merely increase or decrease credit allocation, to enhance the probability that they will be able to deliver positive experiences for learners.

From the above, understanding was gained that specific modules comprise the PGCE. PGCE modules have been reviewed and refined over the years to equip NQTs to conduct research and cope in diverse classroom contexts. Concerning the content comprising PGCE modules, Taylor (2014:10) states that “PGCE curricula are largely concentrated versions of [B. Ed.] curricula, without subject content modules”.

In closing, the revealed purpose of the PGCE is not to educate a perfect teacher. It aims to equip a NQT with sufficient exposure to experiences to develop into a professional teacher. The PGCE aims to develop NQTs who are able to function effectively in a diverse classroom context. NQTs should also hold a deep understanding of the need to actively participate in continuous professional

development. By understanding this need, NQTs ability to function in diverse contexts “by means of an effective integration of theory and practice”, as introduced during the PGCE, is potentially enhanced (Carl, 2008:30). The section to follow reveals who is responsible for delivering the PGCE.

3.7. Current policy stipulations governing PGCE modules

In recent times, the “*Revised Policy on the Minimum Requirements for Teacher Education Qualifications [MRTEQ]* (19 February 2015)” was approved to govern all teacher education qualifications, including the PGCE, in South Africa (DHET, 2015). Relevant stipulations are summarised and presented in Figure 3.1 below.

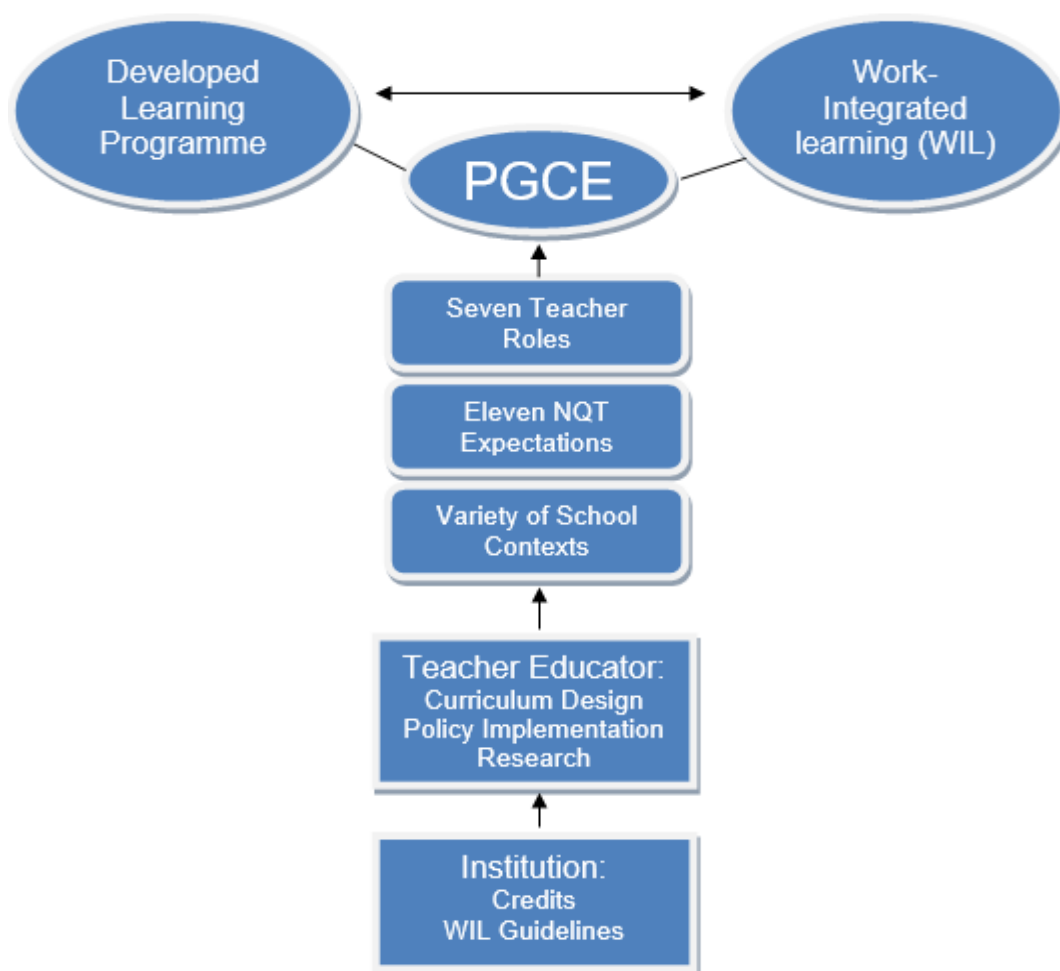


Figure 3.1: Revised policy on the minimum requirements for teacher education (DHET, 2015:10-11)

Understanding presented in Figure 3.1 includes the fact that the PGCE consists of two core complimentary components, namely: (1) a developed learning programme; and (2) work-integrated learning (WIL). These two core components are governed at institutional level with reference to credit allocation (which includes a list of five “types

of learning associated with the acquisition, integration and application of knowledge for teaching purposes” (see Table 2.6 in Chapter 2)) and WIL guidelines.

The minimum requirements for teacher education qualifications (MRTEQ) draws attention to the complexity of teaching as an activity that is premised upon the acquisition, integration and application of different types of knowledge practices or learning (Geduld & Sathorar, 2016: 40).

The day-to-day decision-making within the PGCE is in the hands of teacher educators and HEIs under authority of the Higher Education Quality Committee (HEQC). Teacher educators are expected to design and implement PGCE-related curriculum, anchored in valid and reliable research, which is relevant in a variety of school contexts. In short:

[The DHET] relies upon competent teacher educators and quality teacher education programmes (DHET, 2011:7).

Teacher educators and HEIs are broadly guided by policy as follow:

- (i) Students need to be exposed to content and experiences focusing on the seven collective roles of teachers (see Table 2.7 in Chapter 2);

The notion of teacher roles continues to be a useful tool to assist in the design of learning programmes... (DHET, 2015:8-9).

- (ii) Students need to be exposed to content and experiences equipping them with the ability to function in a variety of school contexts;

[The PGCE] requires a specific depth and specialisation of knowledge, together with practical skills and workplace experience to enable successful students to apply their learning as [NQTs] in schools in varying contexts (DHET, 2015:26).

- (iii) Students need to be exposed to content and experiences enabling them to develop and master the eleven expectations placed on NQTs (see Table 2.8 in Chapter 2);

The minimum set of competences required of a [NQT] is outlined in [Table 2.8 in Chapter 2], and the knowledge mix selected for any [ITE] qualification programme must lead to the development of these competence (DHET, 2015:11).

It is understood that “[s]pecific mixes [and credit allocation] of these five types of learning and knowledge depend on the purpose of the qualification and provide the basis for the design of curricula for specific learning programmes” (DHET, 2015:28). In terms of PGCE, the DHET (2015:28-29) stipulated credit allocation for the “types of knowledge” as follow: (a) 32 credits for disciplinary knowledge and fundamental knowledge as a whole; (b) 40 credits for specialised pedagogical knowledge; (c) 8 credits for general pedagogical knowledge; (d) 24 credits for WIL; (e) 8 credits for simulated classroom learning; (f) 8 credits for situational knowledge. This totals 120 credits. Although disciplinary knowledge is allocated 32 credits, it is noted that it shares these allocated credits with fundamental knowledge. Although no specific allocation for fundamental knowledge is presented by the DHET (2015) in terms of the broadly allocated 32 credits, the following was stated to clarify it as a “type of knowledge”:

With regard to fundamental learning, a student’s competence in a second language and in ICT should be assessed at the outset and, if necessary, additional modules should be studied to reach the required levels of competence (DHET, 2015:29).

The five types of knowledge (see Table 2.6 in Chapter 2) in the MRTEQ were included to address the challenge relating to quality in ITE. The CDE (2015:1) argues that it was included because of the general understanding that simply being qualified does not guarantee that someone will be a good teacher. What matters is how individuals are trained and developed by ITE and therefore:

All ITE programmes [needed] to be re-designed with particular emphasis on subject content knowledge, how to teach that content knowledge, and the practice teaching component (CDE, 2015:2).

A key challenge perceived as affecting the quality of all ITE routes is the current funding mechanism used to direct funding to HEIs. ITE routes are located in the lowest possible funding classification as they are in the lowest category by level of higher education qualification.

This has created a disincentive for the universities to allocate more money to ITE. Teaching practice, which has been identified as one of the weakest areas of ITE, is typically underfunded (CDE, 2015:5).

From the above, it is assumed that the revised MRTEQ requires teacher educators and education faculties to do more (re-design programmes) with the current limited funding provided by means of grants. Alternatively, the MRTEQ is potentially promoting the

teacher education system to secure alternative funding sources, as a way to supplement grants. An example of such funding mentioned by the CDE is CSI:

Corporate social investment: Private donors could fund strategic initiatives to strengthen ITE in public HEIs in areas where maximum impact on quality, efficiency and teacher shortages can be achieved. Ad hoc projects will not do the job. Strengthening ITE is one of the most urgent and strategic national interventions needed to improve South African schooling and requires the combined resources and expertise of the public and private sectors. However, this needs to be coupled with effective teacher performance management and capacity-building through targeted professional development for the teachers in service (CDE, 2015:10).

Concerning the above, most corporate donors do not offer CSI funding on an ad-hoc basis “but follow strict policy guidelines to evaluate funding requests” (Mestry & Verster, 2014:184). Such funding is also directed to causes identified and supported by corporate employees and often forms part of an employee wellness programme (Mestry & Verster, 2014:184). In addition, CSI funding is often directed to serve as a ‘top-up’ to government-funded initiatives and rarely serve as stand-alone initiatives (Mestry & Verster, 2014:184). A potential gap in the MRTEQ is potentially an assumption that teacher educators (or HEI management) holds the knowledge and skills to secure CSI to assist in meeting funding shortfalls to improve, as an example, TP as an experience. To identify further potential gaps in the revised MRTEQ to assist teacher educators to deliver quality ITE, the following is presented.

Before the MRTEQ, the Norms and Standards for Educators (NSE) guided the design and delivery of ITE programmes:

It set out seven roles for the [teacher] and each role was broken down into three units – practical competence; foundational competence; and reflexive competence. These were further elaborated into a total of 132 specific competences (ODE, 2013:296).

The NSE required all ITE programmes to equip NQTs with 132 specific competencies. The NSE was perceived as being “too elaborate a superstructure” and “particularly unrealistic” to expect NQTs to hold all required competencies (ODE, 2013:296). It was replaced by “The National Policy Framework for Teacher Education and Development in South Africa” in 2006 (ODE, 2013:311). This was followed by the Draft policy on the Minimum requirements for teacher education in 2011. This, in turn was replaced by the “Revised Policy on the Minimum Requirements for Teacher Education Qualifications”

on 19 February 2015 (DHET, 2015). Policy is expected to ensure quality by stipulating the following: access requirements; recognised teacher education programmes; expectations placed on a NQT; expectations placed on teachers; and institutions that are allowed to offer teacher education programmes (Ingvarson et al., 2014:3). The success of the MRTEQ will be revealed over time. Challenges that the ODE (2013:306) identified during the implementation of preceding policy included:

- A body of teacher educators “had little or no practical experience of implementing the new policies and had little sense of ownership of them”;
- Almost 50% of teacher educators were appointed on a part-time basis, which is perceived as being “harmful to the academic and research work of faculties”;
- The current subsidy for teacher education is too low to allow for the delivery of quality qualifications by means of diverse engagements such as “small group and individual attention, as well as large groups” and “laboratory type conditions”;
- The level of skill required and expenses associated with providing all students access to skilled monitoring and critical feedback during TP has been a challenge;
- In most instances the student to staff ratios are perceived as being too high to allow for critical individual feedback and mentoring; and
- “Existing staff are overstretched, which in turn impedes their research output, which is badly needed in the system” (ODE, 2013:306).

If the above remains unaddressed, the recent revised policy might struggle to overcome the challenges experienced by preceding teacher education policies. To summarise the understanding gained, refinement to the conceptual framework (see Figure 2.5) is made and presented as Figure 3.2 on the next page. Figure 3.2 is refined by including PGCE modules in a ‘thought cloud’, to represent the understanding that the PGCE modules should be designed and delivered in such a manner that policy expectations can be met. VPRO (CONTEXT) present mathematics teacher attitudes in terms of functioning in diverse contexts. TPACK, SMK (CCK and SCK) and PCK (KC[L] and KCT) presents mathematics teacher knowledge and skills. At this stage of the review it is argued that the “what” in terms of teacher knowledge, skills and attitudes are included in the conceptual framework within the following understanding of the value of the included categories:

Verbal categories are important and necessary, but only if we remember three things: first, that the fact of naming something can cause us to define the thing named, rather than the other way around; second, that we name categories of [teacher knowledge, skills and attitudes] only after they exist...; and, that

categories are useful as long as we remember that the boundaries between them are, to a large extent, shades of overlap, not fixed lines (Gant, 2017: 87-88).

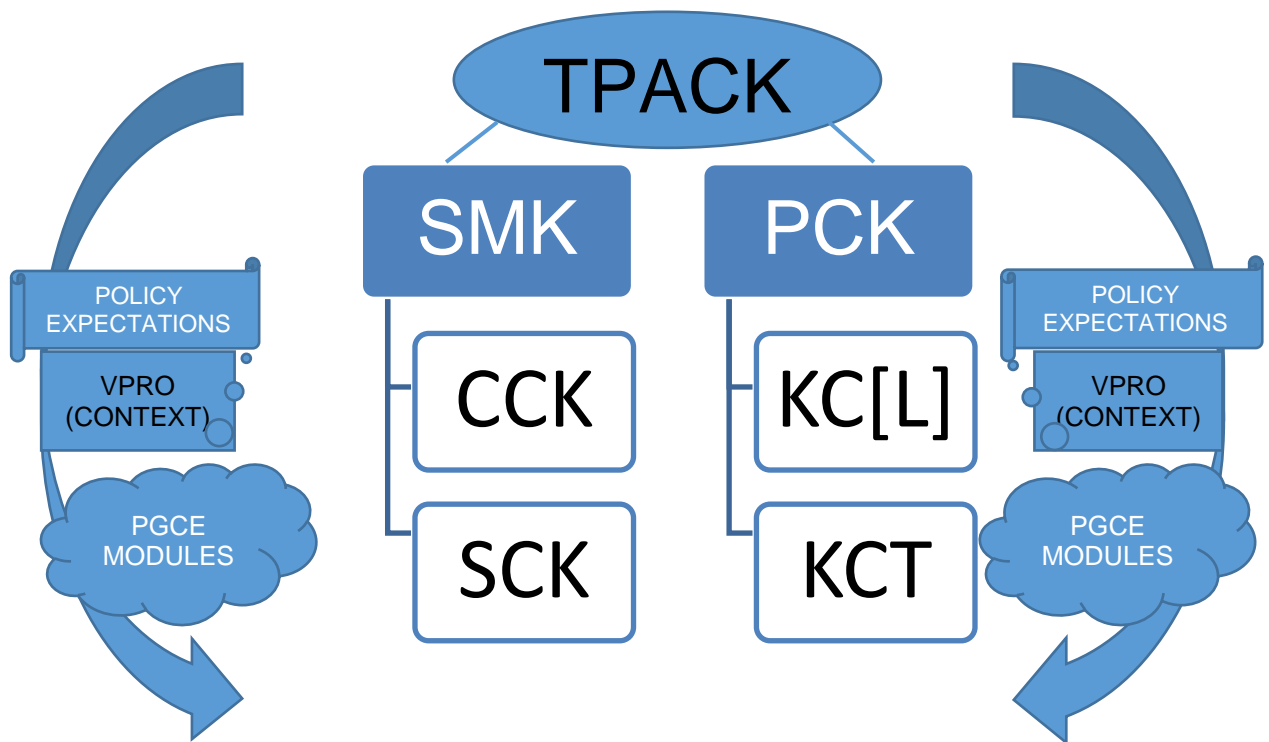


Figure 3.2: What teacher knowledge, skills and attitudes should be transferred – a conceptual framework

3.8. Closing

This Chapter started by revealing insights on teacher knowledge, skills and attitudes transferred in the PGCE. This was done by highlighting policy stipulations and PGCE related outcomes. The Chapter to follow presents insights on how the PGCE potentially delivers knowledge, skills and attitudes. This is done within the aim of securing a second complimentary conceptual framework that focuses on the process of learning to teach by using Figure 3.2 as its core (see the star in the centre of Figure 4.9).

CHAPTER 4

LEARNING HOW TO TEACH

4.1. Introduction

The preceding Chapter gave a background on the PGCE in order to refine a conceptual framework that focuses on teacher knowledge, skills and attitudes. This framework serves as the core of the overall framework to be built. This Chapter presents insights into the process of developing one in a PGCE context. To begin, a merged model adapted from two separate models is presented. This merged model serves as the skeleton to guide the process of building the study's overall (combined) conceptual framework (see Figure 4.9).

4.2. Learning how to teach in and from practice

To begin exploring the 'how' in terms of learning to teach, a model for teaching in practice is merged with another for teaching from practice. This merged model serves as the skeleton for the overall conceptual framework.

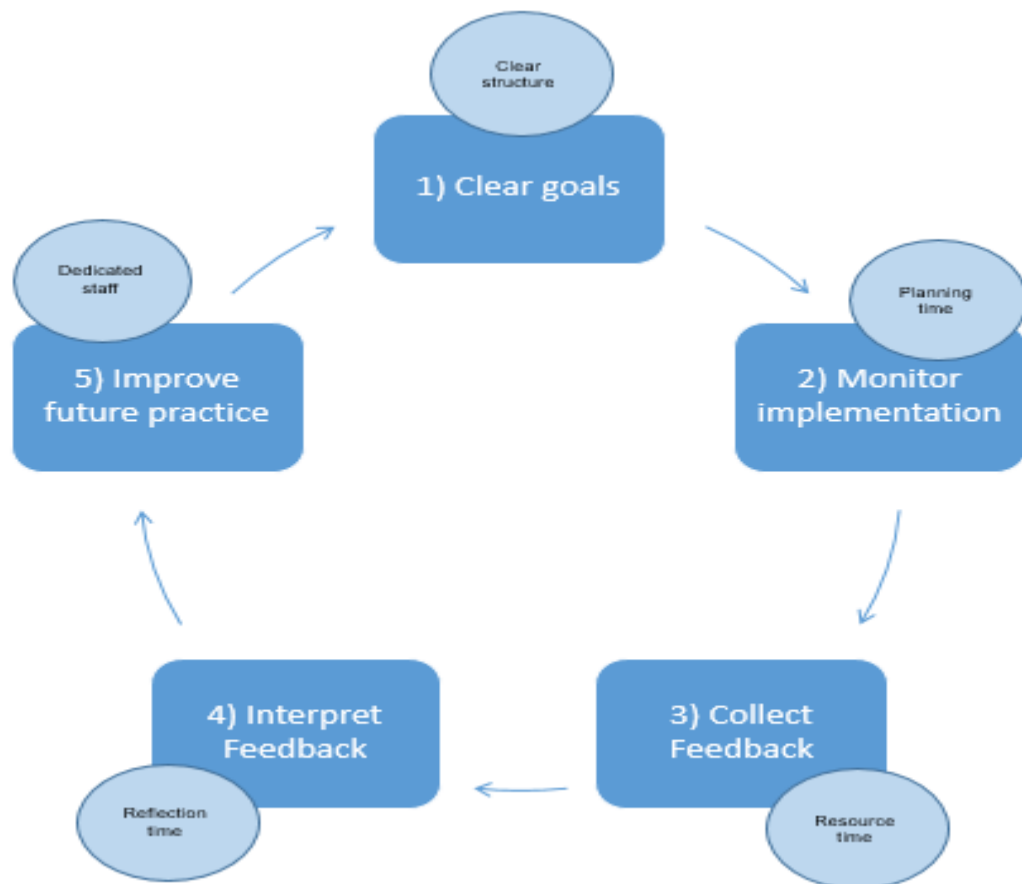


Figure 4.1: Skeleton of the conceptual framework to learn how to teach in and from practice

Figure 4.1 illustrates a proposed process of how to teach (in practice) and how to learn to teach (from practice). The first, how to teach, involves five steps as presented in the rectangles. The first step requires a student to set clear goals for planned lessons. The second step requires students to monitor planned lessons by keeping set goals at the centre of decision-making and actions. The third step requires students to collect feedback, to verify that the goals of the lesson have been realised (or not). The fourth requires students to interpret the collected feedback to establish the extent and reasons why set goals were realised (or not). The fifth step requires students to use the analysed feedback to improve future practices, thereby ensuring as far as possible that diverse learners master the content delivered in future lessons (Hiebert et al., 2003:206-219). These five steps present potential experiences during the PGCE that focus on learning to teach in practice (how to teach). These steps illustrate the actions a student should complete to enhance the PGCE as an experience and to link their practice to theory.

Figure 4.1 further highlights criteria that the appointed teacher educators should consider when delivering the PGCE, as presented in the circles. The first criteria, clear structure, involves compiling a written document that outlines the structure of the PGCE. Such a document, along with supporting policy and subject guides, serves as the 'map' to guide delivery. These sources, supported by marketing communication (websites, faculty handbooks, et cetera), serve as a standardised structure for how the PGCE is to be delivered. The second criteria, planning time, involves the development of students' ability to design and implement lessons with the greatest probability of realising a quality education for diverse learners in a classroom. The third criteria, resource time, involves the development of students' capacity to identify, develop and use learning and teaching resources to enhance the quality of lessons delivered. The fourth criteria, reflection time, involves developing students' ability to compare their own exposure (past, present and future) to the profession against the theories and engagements introduced during the PGCE. The fifth criteria, dedicated staff, involves appointing a dedicated complement of staff (teacher educators, administrative staff, mentor teachers, et cetera), who are granted support and time to deliver the PGCE (Hobson et al., 2006:265). These steps illustrate the actions teacher educators should complete to enhance the PGCE as an experience and to link practice with theory.

Although Figure 4.1 presents the processes of learning to teach and teaching as linear, it is acknowledged that this is not a true reflection of the complex process that is teaching (learning or doing). Linearity is only illustrated for the purpose of organising literature insights in a logical sequence. The merged model does not serve as the

conceptual framework but rather, as the skeleton which allows a conceptual framework to be 'built'. The merged model also aims to convey that learning to teach requires specific and complimentary actions from students (Hiebert et al., 2003:206-219) and teacher educators (Hobson et al., 2006:265) to promote the delivery of a quality and coherent ITE programme (Darling-Hammond, 2006b:276). It is worthwhile to examine and elaborate on each paired step-criteria in the merged model.

4.3. Clear goals (clear structure)

To begin, the goal of PGCE is to develop teacher knowledge, skills and attitudes to equip a NQT to cope in diverse classroom contexts (Deacon, 2012:20; Czerniawski, 2011:432; Dahlgren & Chiriac, 2009:2; Parker, 2009a:80-1; Rots, 2007:1; Flores & Day, 2006:220; Beijaard et al., 2004:113). Four points of focus to release this goal are discussed within the PGCE structure. These are: the selection process followed to ensure suitability of students, "the modality of the training", "the teacher education curriculum" and "the assessment process" (Naylor & Sayed, 2014:9-10).

4.3.1. Selection process followed to ensure suitability of students

The process of gaining access to the PGCE was discussed in Chapter 3 (see section 3.3). Building on this is an exploration of the aspects that influence the structure and realisation of PGCE goals within the selection process context. To begin, the realisation of PGCE goals is restricted when access is given to students who are perceived as being academically weak. This prevents such students from engaging at the desired academic level in the PGCE (ODE, 2013:301). As an example, some students struggle to explain basic SMK (CCK) related to their undergraduate qualification majors (CHE, 2010:48; Feiman-Nemser, 2001:1020).

When a [student's] subject matter knowledge is limited, his or her capacity to use innovative methods, to capitalise on [learner] ideas, to actively engage [learners] in discussion around important concepts and to provide useful feedback will also be limited (Ingvarson et al., 2014:8).

By not holding adequate SMK, a student is potentially unable to actively engage in the PGCE, which only focuses on PCK (Ingvarson et al., 2014:8). Although the selection process of the PGCE involves the completion of an undergraduate qualification as evidence that adequate SMK is held, the qualification is unfortunately no guarantee that a student holds such in the PGCE context (CHE, 2010:48; Feiman-Nemser, 2001:1020). To enhance the probability of reaching PGCE goals, students' SMK should

be verified and additional modules (extra-lessons or contact sessions) should be introduced when students are found to be lacking. The second point relating to clear goals (clear structure) is explored.

4.3.2. The modality of the training

The modality of the PGCE can occur in three potential formats, namely: teaching theories before putting them into practice; 'constructing' theories or 'extracting' principles from practical experience; and teaching theories with practice (Reeves & Robinson, 2014:238). The modality for the PGCE in South Africa has been to follow the first format:

[M]any PGCE courses are still organised in a way that suggests that skills and knowledge are to be acquired in a general (often abstract) form first before being deployed in specific circumstances at a later date (Philpot, 2006:300).

Concerning the format stated above, the PGCE as a process introduces students to an expert teacher (teacher educator) who develops desired knowledge, skills and/or attitudes. This means that during engagements, teacher educators model teacher knowledge, skills and attitudes while introducing the relevant theory and examples:

Faculties of Education find themselves in the unique position of teaching about teaching...A course for preparing teachers should, wherever possible, teach through example, demonstration and modelling. While some differences are apparent between adult learners and young learners, many of the core principles of good teaching can be modelled through the design and delivery of their course (McArdle, 2010:64).

After the process of introducing theory and modelling teacher knowledge, skills and attitudes (Robinson, 2015:42; McArdle, 2010:64; Hobson et al., 2006:286), students are required to complete TP. This process is guided by HEI policy. To explore this policy, Samuel (2009:751-752) identified the following key stipulations to consider when designing TP:

- Host schools are treated as "Partnership Schools" and "attention is paid to the quality of collaborative effort in identifying support required for students and their mentor teachers at school level";
- All teacher educators and mentor teachers "are trained in a detailed workshop" about their roles and responsibilities during the TP;

- The relationship between the school and the HEI is “a more formalised contractual agreement... with respect to roles and responsibilities”;
- Students are expected to complete TP “in school types other than the ones that they themselves went to as school learners”;
- Students are placed in schools as a group “to assist in providing a diversity of resources amongst” the students as a unit during TP;
- The purpose of TP is “to assess the role” of students “as a novice who is expected to execute the range of roles” as stipulated in national policy;
- “The aim is not to ‘crit’ students, but to provide the platform for ongoing professional support and growth”; and
- It is communicated to all (teacher educators, students and mentor teachers) that TP is “only an initial step in a lifelong journey of professional growth and development”.

In addition to the policy stipulations above, mentor teachers are expected to model the teacher knowledge, skills and attitudes as delivered and modelled by teacher educators (Matoti et al., 2011:1141). During such modelling, focus should be on instilling “confidence in a [student] to enhance their self-efficacy” (Matoti et al., 2011:1141) and developing a student’s ability to learn how to teach (Hiebert et al., 2003:207). To realise the above, TP needs to be “extensive and well-planned” (Samuel, 2009:751-752; Matoti et al., 2011:1144). If this is not the case, TP could restrict equipping students with teacher knowledge, skills and attitudes to cope in a classroom context as a NQT. For example:

When [students] experience negative thoughts and fears regarding their capabilities, those affective reactions can themselves lower self-efficacy perceptions and trigger additional stress and agitation that contribute towards the inadequate performance they fear (Matoti et al., 2011:1153).

The third point relating to clear goals (clear structure) is explored.

4.3.3. The teacher education curriculum

To clarify the goals and structure of the PGCE, the focus is on the teacher education curriculum. The curriculum should clarify expectations placed on students, in terms of TP and modules comprising the PGCE. Broadly, the expectation placed on students is to develop competence relating to “who is taught, and who it is that teaches; what is taught; where teaching and learning occurs; how one teaches, and plans to teach, and how learners (and teachers) learn, and how they are assessed” (Darling-Hammond,

2006a:307). In realising expectations, TP is the pinnacle of most ITE programmes. This is due to the expectation that students examine and apply “concepts and strategies” transferred “alongside teachers who can show them how to teach in ways that are responsive to learners” (Darling-Hammond, 2006a:307).

In addition, Philpot (2006:298) identified the following expectations that mentor teachers have for students during TP, namely: circulating materials; assisting individual and groups of learners; managing learner behaviour; completing attendance registers; teaching a section of a lesson planned by the mentor teacher; and teaching an entire lesson planned alongside the mentor teacher.

Focusing on mathematics as a school subject, Brijlall and Maharaj (2014:107) identified the following PCK aspects to be included in a teacher education curriculum, namely: solution of inequalities; domain and range of functions; correct use of mathematical notation; principle of squaring of real numbers; undefined trigonometric expressions; deductive reasoning; conceptual understanding of the derivative; and interpretation of graphs of derivative functions to deduce the properties of the respective original function (Brijlall & Maharaj, 2014:107).

Additionally, Brijlall and Maharaj (2014:107) argue that at its core, the development of a mathematics teacher should transfer understanding “about what makes a particular topic easy or difficult for pupils to understand, the common misconceptions that pupils may have on a particular topic, and the strategies on how to deal with such issues” (Brijlall & Maharaj, 2014:107). In support, the National Research Council (2001:116) argues that “mathematical proficiency” is the simultaneous and integrated acquisition of the following five kinds of mathematical competencies or ‘strands’:

Table 4.1: Five kinds of mathematical competencies or ‘strands’ (National Research Council, 2001:116)

COMPETENCY “STRAND”	OR	BRIEF EXPLANATION
Conceptual understanding		Comprehension of mathematical concepts, operations and relations
Procedural fluency		Skill in carrying out procedures flexibly, accurately, efficiently and appropriately
Strategic competence		Ability to formulate, represent and solve mathematical problems
Adaptive reasoning		Capacity for logical thought, reflection, explanation and justification
Productive disposition		Habitual inclination to see mathematics as sensible, useful and worthwhile, coupled with a belief in one’s own efficacy

Table 4.1 presents five strands of competence relating to mathematics. It is argued that students should be guided during the PGCE “along each of the five strands rather than by completely mastering any one individual strand” (Hiebert et al., 2003:204). By doing

so, students should be able to model such competence to learners as a NQT. The fourth point relating to clear goals (clear structure) is explored.

4.3.4. The assessment process

The assessment process, within the context of clear goals (clear structure), incorporates opportunities for “systemic reflection” followed by opportunities to “retry and improve” (Darling-Hammond, 2006a:308). Therefore, assessment is not a destination, but part of the journey that is the PGCE in learning how to teach (Hiebert et al., 2003:207). This journey starts by providing students the opportunity “to interrogate their past” experiences with the teaching profession, to explore the existence of specialised knowledge, skills and attitudes held by a good teacher (Geduld & Sathorar, 2016:50; Islam, 2012:23-24; Heeralal & Bayaga, 2011:101-103; Samuel, 2009:748-749; Grossman et al., 2008:278-279).

In realising assessment as a journey, it was found that successful ITE programmes required students to develop case studies to reveal specialised teacher knowledge, skills and attitudes. To clarify, successful ITE required students “to develop case studies on [learners], on aspects of schools and teaching, and on families or communities by observing, interviewing, examining [learner] work, and analysing data they have collected” (Darling-Hammond, 2006a:307-308). Complimentary continuous assessment opportunities can be given to students to guide them in developing case studies further. An example is guiding students to make and record observations while completing TP and attending contact sessions (Grossman et al., 2008:278-279).

To take advantage of the potential for learning in the field, faculty can design assignments that structure students’ observations and work in field settings (Grossman et al., 2008:278-279).

In addition to developing students’ observation skills, to learn how to teach by observing others, students can complete a daily journal for assessment purposes. Daily journals can be reflected upon to further develop case studies of practical examples of how to learn how to teach. By doing so, students themselves could reveal the successes and challenges of the PGCE in equipping NQTs to meet national policy expectations (Samuel, 2009:752). Specific attention could also be placed on assessing students’ ability to identify, develop and use resources to deliver quality lessons to diverse learners (Geduld & Sathorar, 2016:50; Heeralal & Bayaga, 2011:103; Grossman et al., 2008:2821; Vincent & Stacey, 2008:102). As a recommendation, all assessments could potentially be anchored within the aim of defining and categorising teacher knowledge,

skills and attitudes to summarise the development realised by all students. Such categories and definitions could serve as data influencing the development of a standardised framework of categories and definitions of teacher knowledge, skills and attitudes developed during a specific ITE programme. These could serve as insights on the overall impact realised and highlight further training and development needs. To summarise the discussion on clear goals (clear structure), Figure 4.1 and Table 4.2 are presented.

4.3.5. Summary

The preceding discussions aimed to clarify the step-criteria clear goals (clear structure) as the first in the process of learning to teach in and from practice. This clarification involved breaking the step/criteria down into four categories as illustrated below.

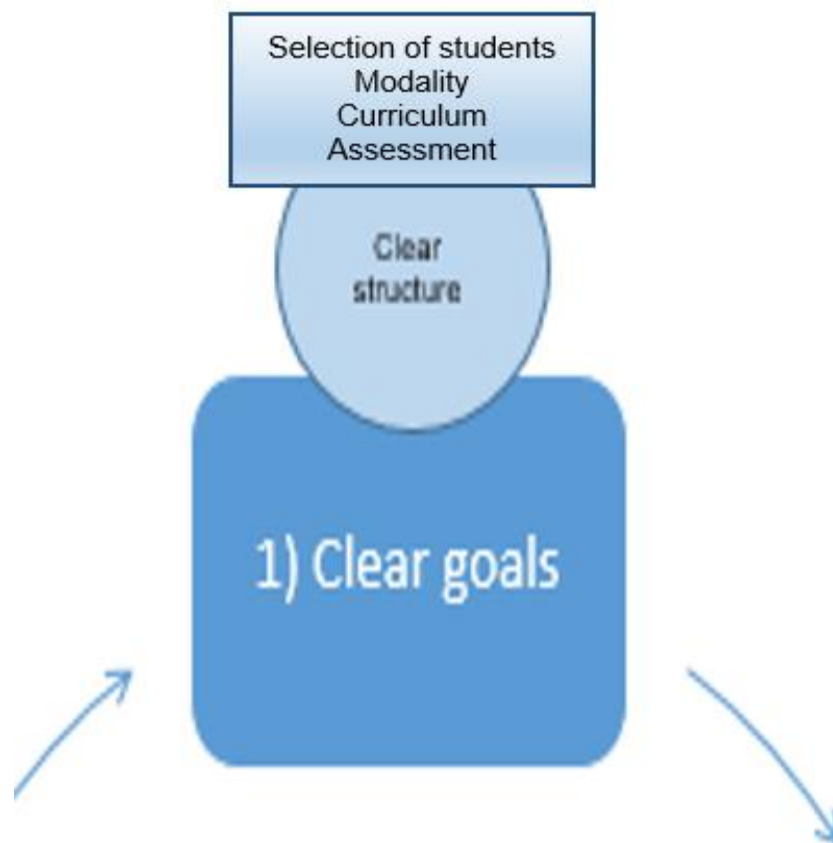


Figure 4.2: First criteria and step refined

The refinement of Figure 4.1, as presented above, is clarified in the Table on the next page. The content of this Table summarises the understanding presented and serves as initial categories to guide data analysis.

Table 4.2: Four points to explore the structure and goals of PGCE (Geduld & Sathorar, 2016:50; DHET, 2015:65; Robinson, 2015:22; Brijlall & Maharaj, 2014:107; DBE, 2014:1-2; Ingvarson et al., 2014:9; Reeves & Robinson, 2014:238; Christiansen, 2012:183-184; Islam, 2012:23-24; Heeralal & Bayaga, 2011:101; Matoti et al., 2011:1140-1141; Samuel, 2009:751-752; Ashby et al., 2008:63; Grossman et al, 2008:278-279; Darling-Hammond, 2006a:307-308; Philpot, 2006:297-298; Walkington, 2005:54; National Research Council, 2001:116)

The selection process followed to ensure suitability of students
A student completed a recognised three or four-year diploma or degree,
A Student selected PGCE on their application form,
Student revealed suitability for PGCE during an interview with the faculty,
Student has access to funding.
The modality of the training
Three approaches exist, namely: teaching theories before putting them into practice; 'constructing' theories or 'extracting' principles from practical experience; and teaching theories with practice.
Criteria for host school to deliver TP: functionality; geographical location (accessible to verify the potential of delivering coherent engagements); leadership; willingness of the school to host students; and availability of a mentor teacher teaching mathematics.
The teacher education curriculum
Student competence developed in the following five kinds of mathematical competencies: (1) <i>Conceptual understanding</i> : Comprehension of mathematical concepts, operations and relations; (2) <i>Procedural fluency</i> : Skill in carrying out procedures flexibly, accurately, efficiently and appropriately; (3) <i>Strategic competence</i> : Ability to formulate, represent and solve mathematical problems; (4) <i>Adaptive reasoning</i> : Capacity for logical thought, reflection, explanation and justification; and (5) <i>Productive disposition</i> : Habitual inclination to see mathematics as sensible, useful and worthwhile, coupled with a belief in one's own efficacy.
In addition to generic pedagogical knowledge, students are developed in the following PCK related aspects: (a) solution of inequalities, (b) domain and range of functions, (c) correct use of mathematical notation, (d) principle of squaring of real numbers, (e) undefined trigonometric expressions, (f) deductive reasoning, (g) conceptual understanding of the derivative, and (h) interpretation of graphs of derivative functions to deduce the properties of the respective original function.
During TP, the minimum tasks to be completed in a classroom context: (1) circulating materials; (2) assisting with specific individuals and groups; (3) managing individual or groups of learners' behaviour; (4) completing attendance registers; (5) teaching a section of a lesson planned by the mentor teacher; and (6) teaching a whole lesson planned alongside the mentor teacher.
During TP, students should be engaged as far as possible in school activities outside the classroom such as sports, drama and role-play, speech contests and poetry. Students should be guided to understand these informal spaces as opportunities to understand the learners' needs and interests as well as to build trust and relationships with learners.
The assessment process
Assessments should enhance students self-efficacy (purpose is not to 'crit' students) by assessing knowledge, skills and attitudes developed,
Observation sheets (designed by both teacher educators and mentor teachers) can be used by students to document observations relating to knowledge, skills and attitudes as modelled by teacher educators and mentor teachers during engagements,
Daily journals can be completed allowing students to document the process of developing teacher knowledge, skills and attitudes,
Portfolios compiled by students to present the different sources of evidence indicating the teacher knowledge, skills and attitudes developed,
Conducting research for the purpose of compiling case studies focusing on a specific aspect relating to teacher knowledge, skills and attitudes,
Assessments should be completed focusing on students developing competence relating to identifying, developing and using teaching resources.

Clear goals (clear structure) of the PGCE refined in the discussion above are summarised as follows:

[PGCE] programmes should include an explicit focus on issues such as how to form and maintain cohesive and productive learning groups; teacher educators (including tutors and mentors) need to model appropriate strategies for dealing with these issues and challenges, in order to facilitate [students'] experiential (if unconscious or implicit) learning; and all teachers in schools who receive [students] should have opportunities to prepare themselves for their part in providing a supportive and collaborative school ethos (Hobson et al., 2006:286).

In closing, the four headings used in the preceding discussions (and Table 4.2) are presented on top of this criteria/step (see Figure 4.1). These headings serve as themes to organise emerging categories from the data that answer the first sub-question: What can a student expect when pursuing the PGCE ITE route in terms of the selection process, modality, curriculum and assessment? The answers emerging from data are presented in Chapter 6: PGCE FET Mathematics Programme Structure and Goals.

The second criteria (monitor implementation) linked to a specific step (planning time), as presented in Figure 4.1, is extended upon in the section to follow.

4.4. Monitor implementation (planning time)

The preceding section presented insights about clear goals (clear structure). The section concluded with a refinement of Figure 4.1 (see Figure 4.2), along with a supporting data analysis framework (see Table 4.2) linked to the first sub-question and research objective (see Table 1.1). The discussion to follow serves as the first of three discussions to secure a data analysis framework that guides the completion of a second data analysis focused Chapter aimed at addressing the second sub-question and objective (see Table 1.1). To begin, the second criteria/step, as presented in Figure 4.1, requires a student to be able to develop and oversee the implementation of planned lessons (Hobson et al., 2006:265; Hiebert et al., 2003:207). To guide students in this, Darling-Hammond and Baratz-Snowden (2005:116) recommend that students should be exposed to the problems of complexity and enactment, and guided to overcome potential misconceptions about teaching while planning and monitoring lessons (Darling-Hammond & Baratz-Snowden, 2005:117). Understanding that it is potentially “difficult to find concrete examples of what [professional teacher knowledge] might look like and how it might be readily portrayed for others, by either teachers or academics” (Loughran et al., 2003:868), the following three discussions are presented with specific examples of experiences that potentially address one of the aspects identified by Darling-Hammond and Baratz-Snowden (2005).

4.4.1. Problem of complexity

Concerning the problem of complexity, students who are only told about “teaching strategies” and not exposed to “examples and models” might struggle to implement lessons they plan (Darling-Hammond & Baratz-Snowden, 2005:117). In an attempt to expose students to an example and model to guide further discussions focusing on teaching strategies, Goldstein (2005:8) elected to use “the hero journey metaphor”:

I elected to modify my [TP] course by incorporating the metaphor of the hero's journey,..., both because of the inherent power of the theme and because of its strong parallels to the process of becoming a teacher. Class sessions and course assignments linked to the hero's journey metaphor were spread across the semester, and efforts were made to link the metaphor to the central academic content and professional skills presented in the course (Goldstein, 2005:9).

To implement the “hero's journey metaphor”, Goldstein (2005:11) decided to use the *Star Wars* trilogy films because of her passion and knowledge of the films' content. To clarify, at no stage was being a teacher compared to being a “hero” who is able to achieve the impossible. Goldstein (2005:12) specifically focused on the “hero” journey to prevent students perceiving good teachers as an “independent, solitary figure”, as is stereotypical with most superheroes. Doing so, it was perceived, would prevent students developing the perception that they need to become “super-teachers who go above and beyond the normal expectations of their jobs” or that they need to be “savior-teachers who rescue their [learners] from administrative cruelty, gangs, poverty, or ignorance” (Goldstein, 2005:12). To clarify the rationale for using *Star Wars*, Goldstein (2005:12) argues that it was ideal because the central hero, “Luke Skywalker”, “is impatient, impetuous [and] immature” in the beginning and develops into a hero while making mistakes, being scared and desperately needing and accepting the help from others to overcome “dragons”. Therefore, the films served as a model to start discussing how perceived impossible challenges can be overcome.

Like Luke, they would make mistakes, get scared, and need help on their journeys toward their future careers and, also like Luke, they would succeed despite their apparent weaknesses (Goldstein, 2005:12).

Goldstein (2005:21) concludes that “no single metaphor could perfectly capture all facets of a teacher's experience”. In terms of the problem of complexity, it is argued that by exposing students to “the hero journey metaphor” such as “Luke Skywalker” (Goldstein, 2005:12), the university-based component of the PGCE can be enhanced

to introduce students to examples of how theory assists in overcoming certain challenges. Admittedly, it is argued that this will be challenging to realise. Nonetheless, it is presented as a starting point of an example aimed at overcoming the problem of complexity.

4.4.2. Problem of enactment

To overcome the problem of enactment, experiences should go beyond mere discussions on lesson planning. It should practically reveal how to successfully deliver the most suitable teaching strategy in a specific context (Darling-Hammond & Baratz-Snowden, 2005:117). An example of such an experience is well-designed TP that requires students to “handle ambiguous and challenging situations” by making “intelligent decisions” (Matoti et al., 2011:1140-1141). To do this, students do not necessarily have to complete TP in a school context. To clarify, Ortlieb (2008:477) found that a specific group of students felt that all they do is observe lessons during TP and that they rarely get to teach. When they finally get to teach, according to the sampled students, “it is for brief instances at a time”. To counteract this complaint, Ortlieb (2008:477) concluded that although a teacher educator can “not change the entire” programme, they can “change the logistics... to better situate it towards [students’] eminent needs” (Ortlieb, 2008:477). The challenge though is as follows:

Where would I find a population of [learners] with educational needs, who could use the one-on-one tutoring assistance of my [students], and who are accessible to my [student] body? (Ortlieb, 2008:481).

Ortlieb (2008:481-482) changed the logistics of TP for the specific group of students by organising tutoring sessions between students and pediatric cancer patients. It was a mutually beneficial relationship because the students had the opportunity to “experience the joy of teaching firsthand” and the “patients ranging from 7 to 17” had the opportunity to receive educational assistance (Ortlieb, 2008:484). Regarding the logistics:

[TP] experiences were directed towards tutoring cancer patients. To gain access to this group of [learners], all [students] attended one half-day volunteer workshop, required by the hospital, where they were trained and given tuberculosis shots, if they had not already been vaccinated within the last 10 years. These preliminary measures were necessary since the tutoring sessions would be taking place at the hospital. Patient families were identified, informed, given voluntary permission forms, and allowed to voice any concerns prior to giving consent for tutoring.

Throughout the entire process, I served as a liaison between the participatory patient families and the university's [students] (Ortlieb, 2008:482).

One student specifically noted that this approach to TP “allowed [them] to make a difference unlike any other opportunity [they] have ever had [and that] these sick children loved [them] coming every week”. In terms of overcoming the problem of enactment, students were exposed to dealing with learners’ strengths and weaknesses, and were able to “develop/execute a remediation plan, and interact with a [learner] for a considerable length of time” (Ortlieb, 2008:484).

4.4.3. Misconceptions about teaching

A potentially common misconception held by students entering the PGCE is that “teaching is merely transmitting information and enthusiastically encouraging students” (Darling-Hammond & Baratz-Snowden, 2005:117). The reality is that teaching is hard work that requires an individual to hold and continuously enhance/develop specialised teacher knowledge, skills and attitudes to realise a quality education for diverse learners (Christiansen, 2012:185). To ensure that students overcome misconceptions about teaching, they are required to design and deliver lessons. In doing so, students are guided to conclude that they cannot rely solely on past experiences of the teaching profession. The truth is that they need to reflect on theory and practical experiences (past and present) to create environments where diverse learners can learn (Christiansen, 2010:173). In an attempt to begin assisting students to overcome misconceptions they might hold about teaching, Islam (2012:23-24) organised TP in a rural context. TP was organised within the aim of challenging the following three misconceptions presented as statements to students before TP, namely: there is a lack of a culture of learning in rural schools; effective teaching is impossible in a low-resourced environment; and rural areas are generally seen through a lens of poverty, hardship, backwardness and deprivation. Following reflection during assessments and engagements after TP, all students found the above three statements to be untrue (Islam, 2012:23-24). In addition to overcoming the specific misconceptions about teaching, TP in the rural context also exposed students to “activities such as sports, drama and role-play, speech contests and poetry” as opportunities “to understand the [learners’] needs and interests as well as to build trust and relationships with [learners]” (Islam, 2012:23-24).

[T]he [students] explored multiple dimensions of a teacher’s work. It gives them an orientation that helped them understand the broader role of teachers, delimiting them from formal interaction with learners through classroom settings to in-formal

socialisation with the real lives of the learners. This enriched their vision of teaching and broadened their view on teaching and learning, especially in a rural context (Islam, 2012:24).

The influence of the discussions above on the conceptual framework (see Figure 4.1) being built is presented in the Figure below.

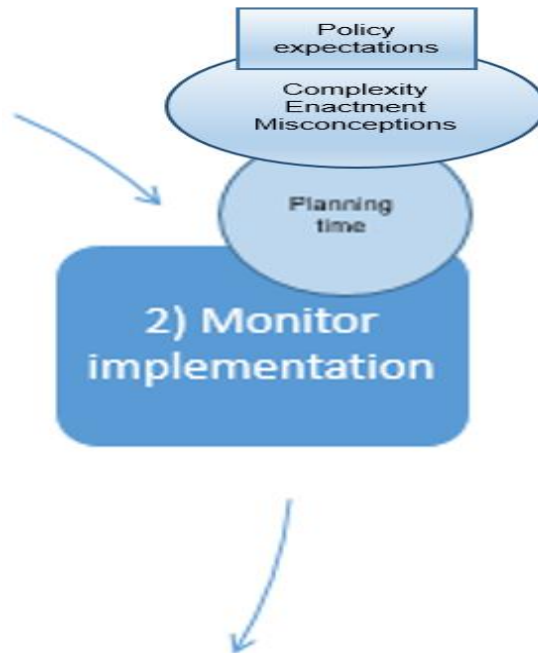


Figure 4.3: Second criteria and step refined

The three aspects identified by Darling-Hammond and Baratz-Snowden (2005:11) are summarised and presented in the sphere on top of the second criteria/step. To narrow the focus, a rectangle stating policy expectations is placed on top of the sphere. This is because of the assumption that the three aspects identified by Darling-Hammond and Baratz-Snowden (2005:11) are considered in the revised list of policy expectations placed on NQTs (see Table 2.9). This is due to the emphasis in the MRTEQ that teacher education must equip teachers with the ability to teach diverse learners in diverse contexts (DHET, 2015:9). Therefore, the revised policy expectations presented in Table 2.9 are to serve as the data analysis framework (along with the insights presented above) to answer the second sub-question of this study: What policy stipulated teacher knowledge, skills and attitudes were actually developed during the PGCE? The related answers emerging from data are presented in Chapter 7: Policy stipulated teacher roles developed in the PGCE.

The third step and linked criteria to learn to teach, as illustrated in Figure 4.1, is extended upon in the section to follow.

4.5. Collect feedback (resource time)

The preceding section presented insights into the process of transferring teacher knowledge, skills and attitudes within the context of delivering planned lessons, guided by set goals. This section focuses on the process of securing evidence that the approach taken was a success (or not) (Hiebert et al., 2003:207). To collect feedback, resources forming part of a planned lesson, to assist in the process of realising set goals, need to be identified, developed and used. This means that resources serve as tools to transfer the planned content and provide evidence that set goals were achieved (or not). This process requires PGCE designers to schedule resource time (Hobson et al., 2006:265) engagements focusing on the following as examples:

- Influencing students' ability to identify and develop resources (conceptual tools such as theories and ideas; practical tools such as textbooks, assessment tools, curriculum guides, et cetera); and
- Using resources to enhance the quality of teaching practices in a classroom (Darling-Hammond & Baratz-Snowden, 2005:122; Hobson et al., 2006:265; Feimann-Nemser, 2001:1016).

Resource time as a process should assist students in understanding how resources assist learners to "advance from where they are to where they [need] to be" (Darling-Hammond & Baratz-Snowden, 2005:112). As a starting point, Christiansen (2012:183-184) argues that students should be guided in using "textbooks and other materials appropriately" to transfer content and secure feedback on the success of the approach taken (or not). The ability to use and engage with textbooks and other resources is potentially a skill assumed to be in place in some PGCE programmes. For example, Christiansen (2012:183-184) identified this gap when analysing PGCE assessments focusing on mathematics as a school subject:

One question asked [students] to identify to what extent a textbook task fell within the mathematics literacy curriculum, but other than that, no questions examined students' ability to engage with teaching resources in any respect. It seems likely, then, that this is assumed to be a skill which students possess or develop, without explicit teaching, or that it is something they will 'pick up' while on [TP] in schools (Christiansen, 2012:183-184).

In support, Rezat (2009:1261) argues that the textbook is at the centre of interactions between teachers and learners. It is argued that a good mathematics teacher requires an advanced ability to use textbooks to assist learners in becoming mathematically

competent in all five ‘strands’ relating to mathematical competence (see Table 4.1) (Christiansen, 2012:183-184; Shield & Dole, 2013:183). Rezat (2009:1261) argues further that “a mathematics textbook should not be subject to analysis detached from its use”. It must be kept in mind that learners need to be able to “learn from textbooks” (Rezat, 2009:1261). Therefore, the correctness and relevance of the content and clarifications are essential to ensure that this can happen. The influence of the above on the conceptual framework (see Figure 4.1) is presented in the Figure below.

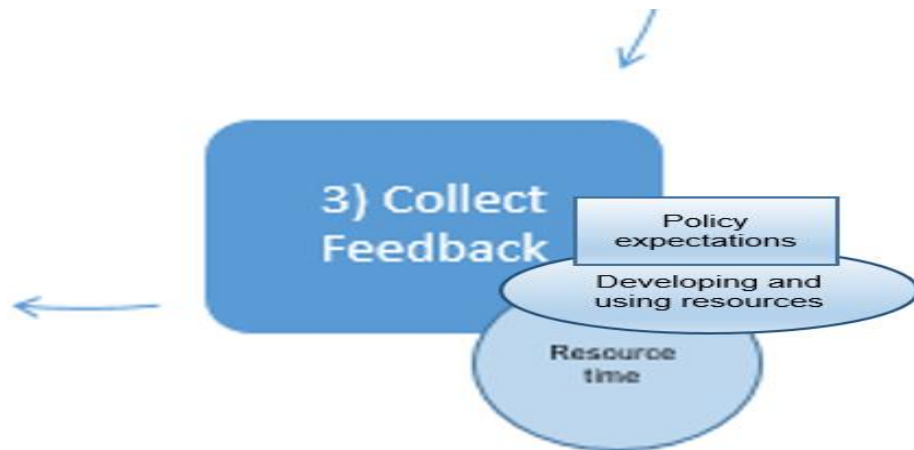


Figure 4.4: Third criteria and step refined

Reflecting on the discussion above, the conceptual framework focusing on the “how” in terms of transferring teacher knowledge, skills and attitudes is refined by adding a sphere for developing and using resources. This is done to narrow the focus of this criteria/step to focus specifically on experiences that develop a NQTs ability to identify, develop and use resources to introduce specific content and to secure feedback on impact realised. As with the previous step/criteria (see section 4.4.3), policy expectations as revised in Chapter 2 (see Table 2.9) are presented in a rectangle. This means that the second- and third criteria/step are to be analysed simultaneously to answer the second sub-question (see Table 1.1) of this case study. The fourth step and linked criteria to learn to teach as illustrated in Figure 4.1 is extended upon below.

4.6. Interpret feedback (reflection time)

Feedback should be analysed to identify strengths and weaknesses of the approach taken (Hiebert et al., 2003:207). Reflection time is incorporated into PGCE modules to guide students in using theory and exposure to the teaching profession, to make sense of collected feedback (Hobson et al., 2006:205). Students should apply theory, “analyse what happens, and to adjust their efforts” in a guided and supportive context (Darling-Hammond & Baratz-Snowden, 2005:122) during both university- and school-

based components of the PGCE (DHET, 2015:10-11; November, 2010:196). The importance of reflection time lies in the understanding that a teacher with “twenty years’ experience could actually have one year of experience twenty times” if they do not actively, persistently and carefully reflect on their actions “so as to continuously improve [their] practice as a teacher” (Gravett & De Beer, 2010:4). In other words, reflection time equips students with knowledge, skills and attitudes to learn how to become (and remain being) good teachers.

The focus in our lives tends to be on doing, and even if we stay aware of our doing it will not necessarily lead to learning. Reflection is essential to convert a life experience into a learning experience. We need to deliberately make ourselves aware of our thinking and ideas about our experiences, and draw out learning points to help guide our future actions (Gravett & De Beer, 2010:4).

All students are exposed to the teaching profession during the process of completing their schooling. The perception exists that students develop conceptions of teacher knowledge, skills and attitudes during their schooling years because they observe and experience teaching first-hand. This period of observation is perceived by some as having a greater influence on a student in relation to the formal preparation delivered during ITE (Akyeampong et al., 2011:71; Ashby et al., 2008:14; Sinclair, 2008:92; Hammerness et al., 2005:366; Feiman-Nemser, 2001:1016).

As learners in classrooms, [students] could not see the ways in which their teachers made thoughtful decisions to plan for and respond to students in the moment. As a result, as we begin learning to teach we may underestimate or misunderstand the processes that underlie teaching (Baxan & Broad, 2017:4).

Within the PGCE context, students are further exposed to the teaching (or rather lecturing) profession for at least three years while completing the undergraduate qualification granting access into the PGCE (DBE, 2014:1-2). Therefore:

[The core] challenge for [the PGCE] is to help [students] to deal with the dissonance between their own conservative experience as [learners/students] and the transformed demands of the teacher[/lecturer], between their own lack of agency as a [learner/student] and the authority of the teacher[/lecturer]. Induction into the profession means ‘rendering visible’ previous experiences, the unconscious and latent models that students bring with them when they start their training programmes (MacBeath, 2012:17).

Concerning the above challenge, it is understood that “[l]earners at school observe what [their] teachers are doing, but have no pedagogical framework within which to locate and explain [these] teachers’ actions” (Hammerness et al., 2005:363-7). This means that various students enter ITE with sophisticated versions of what they perceive as being professional teacher knowledge, skills and attitudes without clear links to educational theory (Dyment & Hill, 2015:22; Deacon, 2012:4; MacBeath, 2012:17; Chong et al., 2011:51; Morrow, 2007:159; Flores & Day, 2006:223). In addition, the perception exists that students’ attitudes/beliefs/values are potentially inflexible and engagements during the PGCE are often used to confirm (rather than challenge) existing attitudes/beliefs/values (Darling-Hammond & Baratz-Snowden, 2005:117; Dede & Karakus, 2014:806; Hatting & De Kock, 2008:321; Kagan, 1992:154; Samuel, 2009:749).

The dilemmas of supporting candidates to learn to teach by unlearning some understandings about teaching, connecting theory and practice in practice, and developing metacognitive capacities lie at the heart of teacher learning but also at the heart of initial teacher education program design (Baxan & Broad, 2017:5).

As an example of a pedagogical framework to guide students during reflection time and to interpret collected feedback, Table 4.3 is presented on the next page. Concerning Table 4.3, the pedagogical framework was developed by Alexander (2015:6) to analyse qualitative and quantitative classroom data when exploring “the nature of teaching”. Therefore, it is to be reflected upon when analysing data focusing on reflection time and interpreting feedback relating to knowledge, skills and attitudes comprising engagements during the PGCE.

Table 4.3: Pedagogical framework (Alexander, 2015:6).

TEACHING AS AN ACT: Teaching, in any setting, is the act of using method x to enable [learners] to learn y;	
i	the act itself, subdivided into the planned learning tasks, the activities and interactions through which tasks are mediated and the judgements by which [learners’] needs, progress and attainment are assessed;
i	the form by which units of teaching are bounded (usually the lesson); and
iii	the organisational, curricular, epistemic and temporal elements of its frame.
TEACHING AS IDEAS: Teaching has structure and form; it is situated in, and framed by, space, time and patterns of organisation, and it is undertaken for a purpose	
i	classroom (ideas relating to [learners], learning, teaching and curriculum that enable teaching on a day to day basis);
ii	system/policy (ideas about schooling, curriculum, assessment and other matters that formalise or legitimise teaching); and
iii	cultural/societal (ideas about community, culture and self that locate teaching).

The influence of the discussion above on the conceptual framework being built in this Chapter is presented below.

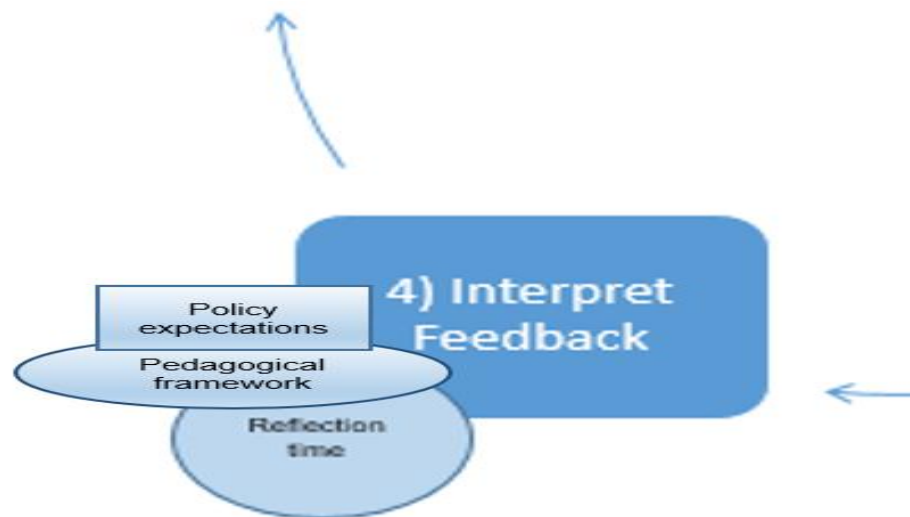


Figure 4.5: Fourth criteria and step refined

The conceptual framework is refined by including a sphere for a pedagogical framework, placed on top of the fourth criteria/step. This is done to narrow the focus of this criteria/step. A second refinement is made in the form of a rectangle for policy expectations. This is done as the revised policy expectations presented in Chapter 2 (see Table 2.9) include reflection as part of the clarifications of the seven roles used as themes. Therefore, the second, third and fourth criteria/step as presented in Figure 4.1 along with Table 2.9 serves as the data analysis framework to answer the second sub-question of this case study: What policy stipulated teacher knowledge, skills and attitudes were actually developed during the PGCE? The fifth step and linked criteria to learn to teach as illustrated in Figure 4.1 is extended upon below.

4.7. Improve future practice (dedicated staff): programme coherence

The successful delivery of the PGCE is dependent on the availability of dedicated teacher educators and mentor teachers (Naylor & Sayed, 2014:9-10) and the context of the HEI and host schools (Nomlomo & Sosibo, 2016:212). “[T]he major responsibility for learning to teach is with the university offering the award” (Walkington, 2005:53). National policy also “encourages teacher educators to become engaged with curriculum design, policy implementation and research” (DHET, 2011:9 & 2015:10-11) for both the university- and school-based component of ITE (Robinson, 2015:2). Teacher educators are also required to participate during the assessment of students during the school-based component (Canrinus et al., 2015:11; Hammerness, 2006:1241; Darling-Hammond, 2006a:306). In doing so, teacher educators are given the opportunity to guide students on the processes available to improve their future practices when they enter a classroom as a NQT (Hiebert et al., 2003:207). Concerning the PGCE as an experience, the process of improving future practice is argued to be

achievable by measuring the extent of programme coherence. Programme coherence is a key ingredient in delivering a strong and effective PGCE. Programme coherence does not occur on its own. It occurs by designing clear and intended links between modules to realise set goals comprising the PGCE. It also requires clear and intended links between the university- and school-based component (Canrinus et al., 2015:11; Hammerness, 2006:1241; Darling-Hammond, 2006a:306). Guided by the above understanding, the following headings are used to organise discussions to follow, to extend the understanding of the fifth criteria/step presented in Figure 4.1: support for mentor teachers; characteristics of an intensely coherent programme; professional standards that promote programme coherence; checklist to guide the journey towards enhancing programme coherence; and aspects restricting programme coherence.

4.7.1. Support for mentor teachers

Behrstock-Sheratt et al. (2014:10) found that programme coherence between modules and TP are greatly enhanced when the following two characteristics are present, namely: training is offered to mentor teachers to clarify expectations; and mentor teachers are experienced in the subjects for which they are selected to offer mentoring. Specifically focusing on the quality of mentoring during TP, Hudson (2010:31-33) identified the following characteristics required by mentor teachers:

- Personal attributes: A mentor should have the ability to encourage students in a supportive manner by establishing the groundwork for a relationship to be developed allowing for open communication to occur;
- System requirements: A mentor should be able to clearly inform students about the content and importance of the “aims, policies and curricula required” by the South African education system;
- Pedagogical knowledge: Lessons presented by a mentor should be implemented and reflected upon in such a manner that students could benefit and learn from these practices. Concerning reflection, specific focus should ideally be placed on resources available that enhanced the lesson, problems that occurred during the lesson and how such was addressed, teaching strategies, structure of lessons and PCK, SMK and TPACK relating to the component of the curriculum that was transferred to learners (or students) during the lesson;
- Modelling: A mentor should be able to show passion and excellence in handling the requirements attached to teaching to prove how “best practices” facilitate quality teaching and learning practices. For example, using appropriate classroom

language, effective hands-on lessons, classroom management and well-designed lessons as proven by clear, concise and flexible lesson plans; and

- Feedback: A mentor teacher should clearly communicate (by means of written and oral communication) their expectations backed-up with constructive and clear advice to students when reviewing lesson plans and lessons taught by the student (Hudson, 2010:31-33).

Reflecting on the above, mentor teachers are expected to complete various specialised tasks on top of their existing teaching workload. Within this context, Luneta (2006:17) investigated how mentor teachers can benefit from TP. It emerged that by engaging mentor teachers in mentorship training before supervising students during TP, “they were in fact involved in continuous professional development that sharpened their instructional skills”. This, in turn, ensured that students were supervised by an informed mentor teacher in terms of realising programme coherence (Luneta, 2006:17).

Mentorship assisted mathematics teachers to reconceptualise and reflect on their instructional skills and critically evaluate their teaching strategies as they interacted with students (Luneta, 2006:17).

To clarify the approach taken by Luneta (2006:17-23), a “cyclic action research” approach was used during TP interactions with students after completing mentorship training. Challenges experienced by students were identified and followed by a collaborative approach to find potential solutions. The proposed solutions were then implemented, followed by reflecting on the outcomes achieved as a unit. The mentor teachers revealed that “it was the engagement and reflection” alongside students that they considered “as professional development”. The exposure to mentorship training allowed mentor teachers “to understand and appreciate their roles as [a mentor teacher]”. In doing so, they revitalised their own “instructional analytical and guidance skills, making TP “a real act of professional development for teachers” (Luneta, 2006:17-23). In addition, mentor teachers were able to enhance the probability of giving students positive and coherent experiences during TP when they were part of the design of the TP. By being involved in the design process of TP, mentor teachers revealed that they found it easier “to embrace it as their own and run with it” (Luneta, 2006:23).

Achieving programme coherence is the responsibility of all stakeholders involved. This responsibility begins by the HEI clearly communicating (by means of written sources, meetings, orientation and workshops) the programme structure to develop teacher knowledge, skills and attitudes to all involved. Following such communication, the

structure should allow frequent opportunities for teacher educators, mentor teachers and students to enter and sustain “open dialogue”, to maintain the desired level of programme coherence and improve future practice where needed (Canrinus et al., 2015:12). As a recommendation, such a dialogue could be guided within the aim of developing a standardised framework of teacher knowledge, skills and attitude categories, along with definitions for each category consisting out of the inputs received from all involved. This developed framework could serve as the HEIs annual formal contribution (preferably in the form of a published academic journal article) towards developing a universal conceptualisation of professional teacher knowledge, skills and attitudes. It could also serve as a written source to influence coherence of future PGCE programmes by clarifying the HEI’s common understanding of professional teacher knowledge, skills and attitudes. For example, serving as the starting point when delivering workshops to mentor teachers in preparation for their role during TP to enhance the probability of realising the desired level of programme coherence.

To understand the meaning behind the most desired level of programme coherence, the following discussion is presented.

4.7.2. Characteristics of an intensely coherent programme

Darling-Hammond (2006a:300) argue that the twelve characteristics presented in Table 4.4 below reveal an “intensely coherent” programme. These twelve are linked to one of the five criteria identified by Hobson et al. (2006:265) to refine the understanding presented in Figure 4.1 within the context of improving future practice.

Table 4.4: Characteristics of an intensely coherent programme (Darling-Hammond, 2006a:306)

1	Carefully sequenced based upon a strong theory of learning to teach [Reflection time] ,
2	Modules are designed to intersect with each other [Clear structure] ,
3	Modules are aggregated into a well-understood landscape of learning [Planning time] ,
4	Modules are tightly interwoven with the advisement process and students’ work in schools [Clear structure] ,
5	SMK is brought together with PCK through modules that treat them together [Reflection time] ,
6	Programme sequences also create cross-course links [Clear structure] ,
7	Faculty plan together [Dedicated staff] ,
8	Syllabi are shared across university divisions as well as within departments [Dedicated staff] ,
9	Virtually all of the closely interrelated courses involve applications in classrooms where observations or student teaching occur [Resource time] ,
10	Classrooms are selected because they model the kind of practice that is discussed in modules and advisement [Clear structure] ,
11	Core ideas are reiterated across courses [Clear structure] ,
12	Theoretical frameworks animating courses and assignments are consistent across the programme [Clear structure] .

With Table 4.4, Darling-Hammond (2006a:300) identified a list of characteristics to overcome the perception “that teaching requires little formal study”, thereby contributing to “frequent disdain” for teacher education programmes. In other words, the characteristics are presented in an attempt to promote the delivery of strong, effective and coherent ITE. Due to this, Table 4.4 is reflected upon to refine understanding presented under Figure 4.1 to clarify the conceptual framework as a data analysis tool. This process allowed for six characteristics to be linked to the criteria ‘clear structure’, two to ‘reflection time’ and ‘dedicated staff’ respectively, and one to ‘resource time’ and ‘planning time’ respectively. The linking of characteristics (Darling-Hammond, 2006a:306) with criteria (Hobson et al., 2006:265) is purely done for analysis purposes. This means that the process of linking presented characteristics with one of the criteria as linked to a specific step presented in Figure 4.1, is for the purposes of identifying initial categories to organise and analyse improve future practice related data. The section to follow explores clear goals in the PGCE context.

4.7.3. Professional standards that promote programme coherence

In addition to the above characteristics, a coherent programme linked to “professional teacher standards” is considered to be strong and effective (Hammerness, 2006:1263). Promoting coherence requires that standards should not be generic. For example, “teachers know the subject matter and how to teach it” or “teachers use a range of teaching methods”, are not particularly helpful standards to designers of ITE programmes in pursuit of programme coherence (Ingvarson et al., 2014:9). Ideally, standards should be “elaborated for each specialist field of teaching” or at least be more descriptive than the two examples stated above (Ingvarson et al., 2014:9). Generic standards are a good start, but to promote coherence in programmes perceived as strong and effective for specific and/or scarce skills, specialist specific standards should be stated (Ingvarson et al., 2014:10). Within this understanding, focus is placed on standards stipulated in South African teacher education policy.

To begin, Reeves and Robinson (2014:248) summarised the DHET (2011:11-12) policy stipulations for the five types of knowledge (see Table 2.6 in Chapter 2) as follows: Disciplinary learning: “the study of education and its foundations; the study of specific specialised subject matter”; Pedagogical learning: “general as well as specialised pedagogical content knowledge”; Practical learning: “learning in and from practice”; Fundamental learning: “communicative competence in a second language, ICT skills, academic literacy”; and Situational learning: “knowledge of various learning contexts, including policy, political and organisational contexts; learning to work with diverse

challenges” (Reeves and Robinson, 2014:248). These policy standards serve to guide HEIs, teacher educators and mentor teachers in delivering strong, effective and coherent ITE programmes. In addition, the eleven policy expectations placed on a NQT (see Table 2.8 in Chapter 2) and the prescribed seven collective roles of the teacher (see Table 2.7) serve as further guidelines concerning standards (DHET, 2015). The aim of such standards is to allow all students access to quality ITE, which adequately prepares them to meet policy expectations placed on NQTs (Ingvarson et al., 2014:9; Darling-Hammond, 2006a:312). The above policy stipulations were discussed in Chapter 2 (see section 2.5), which concluded in a revised list of policy expectations placed on NQTs (see Table 2.9). This revised list is already part of the study’s two conceptual frameworks (see Figure 3.2 and Figure 4.9). Overall, it is argued that the need to have revised policy expectations placed on NQTs (see Table 2.9) supports the perception that achieving programme coherence is a continuous journey and should not be perceived as a destination.

[C]oherence should be understood as... a continuing and necessary effort of adjustment, revision, and calibration (Hammerness, 2006:1263).

Building on the above, it is understood that teacher educators and HEIs are granted flexibility with the teacher education curriculum (DHET, 2015). Because of this flexibility, Liakopoulou (2011:73) found that most teacher educators draw “from a variety of knowledge resources” to compile their own teacher education curriculum. In searching for a written standardised curriculum for teacher education, Reeves and Robinson (2014:237) found that “the different epistemological positions, philosophical traditions, and theoretical assumptions and beliefs driving [ITE] may be more implicit than explicit”. Examples of this include:

[T]hree dominant patterns of interaction and experience shape our teacher education pedagogies: cultural dimensions of self – ways of being; intellectual dimensions of self – ways of knowing; social dimensions of self – ways of interacting with others... We envisage the growth of the whole person (not a facet of a person) in relations with others... teacher education is a process and a vision for life in schools, institutions, society and beyond (Geduld & Sathorar, 2016: 42-43).

In short, a written national standardised teacher education curriculum does potentially not exist due to the nature of how ITE has been delivered in the past. According to Reeves and Robinson (2014:248), recent policy acknowledges this practice and therefore includes the five types of knowledge (see Table 2.6 in Chapter 2) as a policy

stipulation to guide teacher education curriculum: “[S]pecific mixes of these five types of learning and knowledge depend on the purpose of the qualification and provide the basis for the design of curricula for specific learning programmes” (DHET, 2011:12).

Reflecting on the above, it is argued that policy stipulations relating to a teacher education curriculum is a move into the right direction. To assist such policy stipulations, it is argued that frequent reviews and amendments are needed to ensure that policy stipulations guide teacher educators in delivering a quality coherent programme. To assist in the process of identifying potential amendments to policy stipulations, focus is placed on a tool to identify the level of programme coherence.

4.7.4. Checklist to guide the journey towards programme coherence

Understanding that programme coherence is a journey and not a destination, a checklist revealing the extent to which a programme is coherent is presented.

Table 4.5 Checklist when designing/re-designing/revising ITE (Darling-Hammond, 2006b: 276).

Well-designed programs have:	
1	Coherence, based on a common, clear vision of good teaching grounded in an understanding of learning, permeates all coursework and clinical experiences [Clear structure] ,
2	A strong core curriculum, taught in the context of practice, grounded in knowledge of child and adolescent development, learning in social and cultural contexts, curriculum, assessment and subject-matter pedagogy [Dedicated staff] ,
3	Extensive, connected clinical experiences that are carefully developed to support the ideas and practices presented in simultaneous, closely interwoven course work [Planning time] ,
4	Well-defined standards of professional knowledge and practice are used to guide and evaluate course work and clinical work [Dedicated Staff] ,
5	Explicit strategies that help students (1) confront their own deep-seated beliefs and assumptions about learning and [learners] and (2) learn about the experiences of people different from themselves [Reflection time] ,
6	An inquiry approach that connects theory and practice, including regular use of case methods, analyses of teaching, and learning, and teacher research applying learning to real problems of practice and developing teachers as reflective practitioners [Reflection time] ,
7	Strong school-university partnerships that develop common knowledge and shared beliefs among school- and university-based faculty, allowing candidates to learn to teach in professional communities modelling state-of-the-art practice for diverse learners and collegial learning for adults [Dedicated staff] ,
8	Assessment based on professional standards that evaluates teaching through demonstration of critical skills and abilities using performance assessments and portfolios that support the development of ‘adaptive expertise’ [Resource time] .

Concerning Table 4.5, the aspects in the checklist are linked to one of the criteria identified by Hobson et al. (2006:265) to enhance understanding of Figure 4.1 as a data analysis tool within the context of improving future practice. ‘Clear structure’ is linked with one criterion from the checklist, ‘dedicated staff’ with three, ‘planning time’ and ‘resource time’ with one each, and ‘reflection time’ linked with two. In exploring the checklist, it is advised “to examine coherence from the perspective of students” and

teacher educators to ensure programmes are revised with a clear understanding of “the learning experiences of new teachers” (Grossman et al., 2008:283). To build on the understanding and analyses tools presented, focus is placed on the engagements comprising an ITE programme such as the PGCE.

4.7.5. Linking theory with practice (student engagement)

The preceding section presented a checklist for programme coherence. This section explores student engagement within the context of programme coherence, guided by the following definition as a point of departure:

Student engagement can be defined by two key components: first, what students do (the time and energy they devote to educationally purposive activities), and second, what institutions do (the extent to which institutions employ effective educational practices to induce students to do the right things) (Strydom & Mentz, 2010:3).

To clarify, student engagement is discussed within the assumption that it is linked to the three criteria focusing on time presented in Figure 4.1, namely: reflection-, planning- and resource time. The discussion is further guided by the understanding that “there is no quick fix, there is no shortcut, no holy grail to our education challenges” (O’Connel, 2013:142). “The painful truth” is that each NQT should understand that they “must go through the same struggle of understanding what the challenges are”, where they as an individual stand in relation to the challenges being experienced and what they “must do to bridge the gap” from NQT to an experienced professional teacher (O’Connel, 2013:142). Students should take advantage of opportunities available and take responsibility for their own development.

The process of learning to teach has been recognized as highly complex, personal, life-long and fraught with challenge (Baxan & Broad, 2017:4).

It is argued that at the very least, NQTs should “not deepen the crisis in public schooling in South Africa” by being unable to meet expectations placed on NQTs (Mutemeri & Chetty, 2011:515-516). To avoid this, it is recommended that ITE should engage students with coherent experiences that reveal the reality and core challenges restricting a quality education for all learners in South Africa:

[I]t is essential to initiate [students] into the great problems involved in the education system for which they will be responsible, no less than into the methods

whereby it is proposed to solve them, so that they may be able to make up their own minds with a knowledge of the issues involved (Durkheim, 1977:3-4).

To explore student engagement within the context of a coherent programme that links theory with practice, five benchmarks are used to organise the discussion:

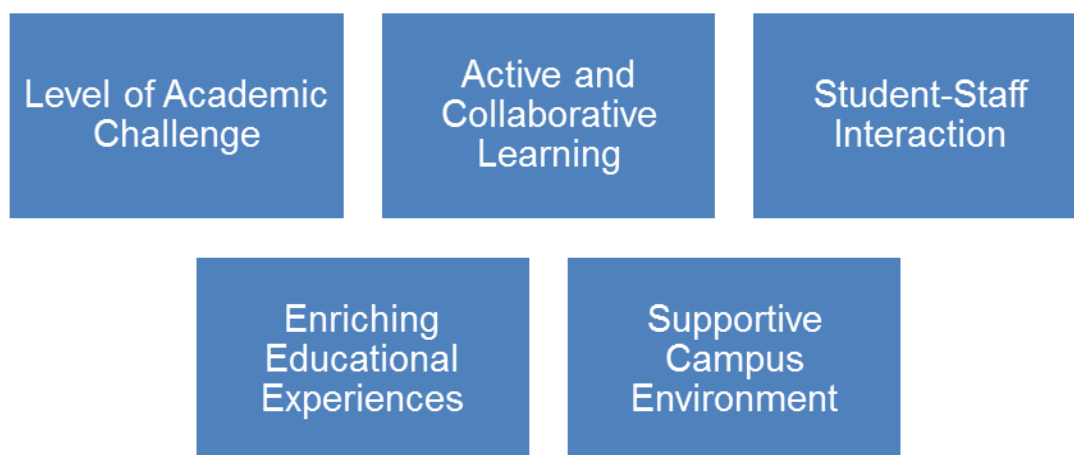


Figure 4.6: The five benchmarks to explore the level of student engagement realised (Strydom, Basson & Mentz, 2012:43-44; Strydom & Mentz, 2010:38-40 & 18-23)

Concerning Figure 4.6, the HEQC of the CHE used the five benchmarks as a model for the second cycle of quality assurance concerning the South African Survey of Student Engagement – 2010 project. To clarify, these were used by the HEQC of the CHE to analyse quantitative data on the level of student engagement realised in specific HEI programmes (which included ITE programmes such as the PGCE) (Strydom et al., 2012:43-44; Strydom & Mentz, 2010:38-40). These five benchmarks are briefly clarified below.

4.7.5.1. Level of academic challenge

The first benchmark is clarified as “challenging intellectual and creative” engagements to promote “high levels of student achievement by emphasising the importance of academic effort and setting high expectations for student performance” (Strydom et al., 2012:43). Examples of activities and conditions to clarify this benchmark include: time spent/required on preparing for the school- and the university based component; time spent/required to complete academic related tasks; working harder than expected to meet lecturers’ high expectations; various prescribed and recommended readings; assignments of differing length; and coursework requiring analysing, synthesising/integrating, making judgements and applying theories and concepts (Strydom et al., 2012:43).

4.7.5.2. Active and collaborative learning

The second benchmark is clarified as engagements that allow students to be “actively involved in their education and have opportunities to think about and apply what they are learning in different settings” (Strydom et al, 2012:43). Additionally, students should be allowed to collaborate “with others to solve problems or master difficult materials” as a strategy to prepare them “to deal with the messy, unscripted problems they will encounter daily during and after university” (Strydom et al., 2012:43). Examples of activities and conditions to clarify this benchmark include: frequency of opportunities to ask questions or contribute in class discussions; conducting a presentation to the class; group work; tutoring other students (paid or voluntary); participating “in a community-based project as part of a regular course”; and discussing “ideas from readings or classes with others outside of the class (students, family members, co-workers, et cetera) (Strydom et al., 2012:43). Students could also be allowed to tutor fellow students, complete group work, make presentations, and/or participate in community-based initiatives (Domalewska, 2014:22; Strydom et al., 2012:43; Strydom & Mentz, 2010: 38-39 & 19).

4.7.5.3. Student-staff interaction

The third benchmark is clarified as engagements that allow students to observe “first-hand how experts think about, and solve problems by interacting with staff members inside and outside the classroom” (Strydom et al, 2012:44). These interactions should allow students to perceive staff members as “role models, mentors and guides for continuous, life-long learning” (Strydom et al., 2012:44). Examples of activities and conditions clarifying this benchmark include: discussions concerning completed assignments and marks achieved; career planning and advice; discussing readings or ideas outside of class with teacher educators; work with teacher educators on projects “other than coursework (committees, orientation, students life activities, et cetera)”; prompt and frequent “feedback (written or oral) from [teacher educators] on performance”; and working “with a staff member on a research project” (Strydom et al., 2012:44). By completing the PGCE, students are engaging “first-hand how experts think about, and solve problems” (Strydom et al., 2012:44). Engagements occur by means of observation, discussions, receiving feedback and working alongside experts on specific education related projects (Strydom et al., 2012:44; Strydom & Mentz, 2010: 39 & 20).

4.7.5.4. Enriching educational experience

The fourth benchmark is clarified as “complimentary learning opportunities inside and outside the classroom” to “augment” the academic programme and to allow for the learning gained to become a part of who the students are (Strydom et al, 2012:44). In the classroom, such experiences can include using technology and focusing on content that reveals insights about diversity. Outside the classroom, these experiences can take the form of internships or community service “with opportunities to synthesis, integrate, and apply their knowledge” (Strydom et al., 2012:44). Examples of activities and conditions clarifying this benchmark include: engaging with individuals “with different religious beliefs, political opinions, or values”; engaging with individuals “from different economic, social, and racial or ethnic background”; “using electronic technology to complete assignments”; and participating in: “internships or field experience; community service or volunteer work; foreign or additional language coursework; study abroad; study of a subject or course for non-degree purpose; the development of a community project using knowledge obtained at university; co-curricular activities; and academic societies (law, psychology, et cetera.) (Strydom et al., 2012:44).

It is understood that students should be exposed to “complimentary learning opportunities inside and outside the classroom”, allowing learning to become a part of who students are” (Strydom et al., 2012:44). Reeves and Robinson (2014:249) argue that such experiences should not be delivered by means of a separate subject, but should rather form part of the existing subject structure. To deliver enriching education experiences, students can be granted opportunities to participate/complete the following related experiences: community-based volunteer work; complimentary courses/workshops; and participating in sport, culture and/or academic societies (Reeves and Robinson, 2014:249; Strydom et al., 2012:44; Strydom & Mentz, 2010: 39 & 22).

4.7.5.5. Supportive campus environment

The fifth benchmark is anchored in the understanding that students should be exposed to campus environments “that are committed to their success and cultivate positive working and social relations among different groups on campus” (Strydom et al., 2012:44). Examples of activities and conditions to clarify this benchmark include: support structures to assist students “succeed academically”; support structures to help students “cope with non-academic responsibilities (work, family, et cetera); support

structures are in place to help students “thrive socially”; students are able to develop “quality relationships with other students”, teacher educators, mentor teachers and administrative personnel/offices (Strydom et al., 2012:44). In addition, a supportive campus environment is evident when a HEI has “various forms of support and development opportunities” scheduled/available from the beginning (starting during registration and ending at graduation) of the year to assist students realise success (CHE, 2015:43). Such opportunities are perceived to be anchored within the understanding that student “success does not arise by chance”. It requires “a clear template for the actions of all its members: students, faculty and staff a like” ... “to control events shaping student success rather than merely responding to events” (Tinto, 2012:116-117). The CHE (2015:25) found two key support categories to enhance the probability of students achieving academic success:

- Academic support and development (“helping students successfully execute the tasks required to succeed in their academic programme”, for example, “training in study skills, activities to develop academic literacies and additional support related to specific courses, such as tutoring”); and
- Non-academic support and development (“helping students successfully navigate the challenges associated with being a university student and with life in general”, for example, “training in life skills, such as time and stress management, peer mentoring, lifestyle and psychological counselling and special services needed by students with disabilities”).

In addition, the CHE (2015) identified the following eight dimensions that reveal the process followed when an HEI decides on support and development structures.

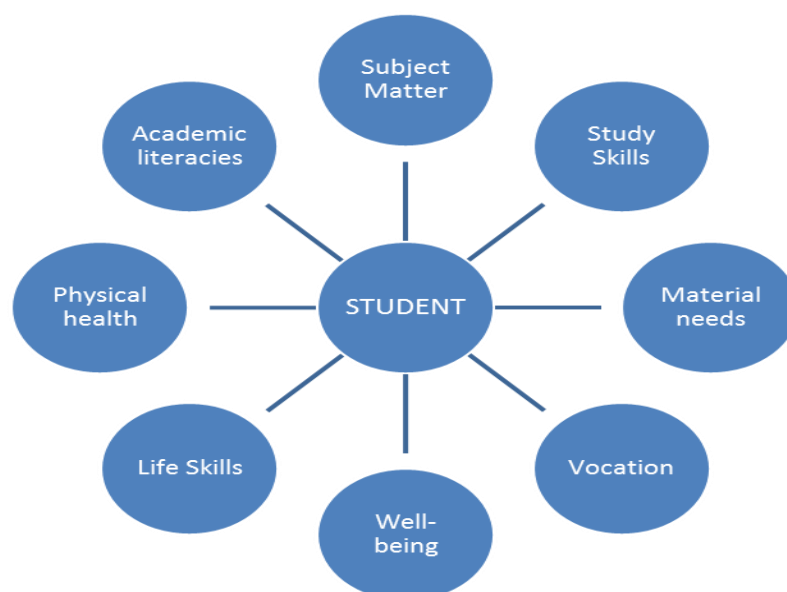


Figure 4.7: Dimensions of students’ lives that affect their success at university (CHE, 2015:23)

Concerning Figure 4.7, the CHE (2015:23) found that various HEIs in South Africa “do not have the resources” to offer support and development for all eight dimensions. Therefore, HEIs “select what support they are able to offer” based on perceived necessity (CHE, 2015:23).

4.7.5.6. Closing

In closing the discussion above, the first four benchmarks on student engagement (see Figure 4.6) are linked to the three criteria focusing on time, namely: reflection-, planning- and resource time (as presented in Figure 4.1). The fifth benchmark is linked to the criteria dedicated staff as presented in Figure 4.1. The decision made is to change this criteria title from ‘dedicated staff’ to ‘supportive HEI environment’ (see Figure 4.8 below section 4.7.6). This was done to emphasise that focus of this specific criteria is to be on the HEI as a whole in terms of support provided to realise programme coherence. The section to follow identifies key challenges restricting the realisation of a strong and coherent PGCE.

4.7.6. Key aspects restricting programme coherence

Programme coherence does not occur when the university-based component only delivers theory and all practical aspects of teaching assumed to be developed during the school-based component (Canrinus et al., 2015:12; Darling-Hammond, 2006a:307). It also does not occur when there is a weak partnership between teacher education (teacher educators) and schools (mentor teachers) (Canrinus et al. 2015:4; Heeralal & Bayaga, 2011:101-103; Mutemeri & Chetty, 2011:505; Maphosa et al., 2007:355-356; Walkington, 2005:63).

Data suggests that the relationship that pertains between some [HEIs] and schools is one sided, the school is the passive recipient of [students] and almost all the power lies with the [HEI] (Mutemeri & Chetty, 2011:514).

To elaborate, Mutemeri and Chetty (2011:514) found that 65 percent of sampled teacher educators assumed that classroom management and record keeping practices would be imparted during TP, while “schools expected to receive knowledgeable and skilled [students]”. Additionally, it was found that 60 percent of sampled teacher educators took the role of the school for granted “without making deliberate and clearly spelt out links” between PGCE modules and TP (Mutemeri & Chetty, 2011:514). This scenario restricts the achievement of a strong, effective and coherent programme:

However, leaving some skills to be learnt at school during [TP] was one of the issues that [students] reacted with strong emotions. [Students] felt that it is these aspects that they are left to go and learn at school that make them very uncomfortable as they tend to lose confidence when they get to schools. [Students] argued that “if all we needed was learnt at school, then why should we waste huge sums of money for courses that would not benefit us; we would rather go straight into the schools and learn from there” (Mutemeri & Chetty, 2011:515).

Concerning the responsibility of the HEI, it is argued that mentor teachers are not always adequately guided or trained about the expectations attached to TP (Maphosa et al., 2007:356; Walkington, 2005:63). This means they potentially rely “solely upon their own core beliefs and experiences as the basis for support and evaluation of [student] learning” (Walkington, 2005:63). This is a concern as TP is then potentially delivered without clear and intended links with the diverse modules comprising the PGCE (Canrinus et al. 2015:4; Heeralal & Bayaga, 2011:101-103; Mutemeri & Chetty, 2011:505; Maphosa et al., 2007:355-356; Walkington, 2005:63). The above situation is further ‘promoted’ when a large component of teacher educators are appointed on a part-time basis. Therefore, these part-time teacher educators are “not part of a faculty-wide conversation about preparation, nor do they have a sense of coherent program[me] into which their efforts might fit” (Darling-Hammond, 2006a:310). Because of the large number of students enrolled in ITE, most HEIs appoint “external contract staff” to conduct school visits on their behalf to assess various students during TP (Robinson, 2015:48). The above is perceived as a key factor that restricts programme coherence and which indicates a need to rethink the delivery approach to TP and the assessment thereof. In support, Heeralal and Bayaga (2011:103) found that it is potentially unrealistic to expect a PGCE student to “include all aspects” of teacher knowledge, skills and attitudes in the limited time available for TP. The popular assessment process of completing a teaching practice file/portfolio was also found to be perceived by students as being a waste of time. Specifically, various students do not see the benefits achievable from completing it. As an example:

There is so much that goes into this file and at this level where we have other expectations, the file appears unnecessary (cited in Heeralal & Bayaga, 2011:101-103).

Specific complaints were made on the daily “lesson planning [being] a tedious task” and unnecessary. Additionally, students complained that the HEI is potentially “not fully aware of a real school day” and that the expectation placed on them is to “work magic some days, and do what they expect” within unrealistic deadlines (Heeralal & Bayaga,

2011:101-103). A key frustration experienced by some students during TP was “the amount of interruptions during the day” and that there was “not enough time to teach” as the mentor teachers seemed rushed and distracted by other tasks (Heeralal & Bayaga, 2011:101-103). In short, the core “challenge” restricting the delivery of coherent PGCE engagements is the perceived limited time available:

It's such a condensed year. We call it a PGCE year but it's not a year at all it's really sort of 8/9 months and it goes a bit fast doesn't it. I wish it was a two-year programme really (Cited in Hobson et al., 2006:266).

Note that time is perceived as a challenge because of the comparison made with the time granted in the B. Ed. To clarify, the B. Ed. grants teacher educators four years in which they can expose students to “the process [and resources] of teaching and learning” and to reflect on this “to design lessons that are effective, interesting and suitable for a variety of learning situations” (Robinson & Lomofsky, 2010:32). During the PGCE, teacher educators (and mentor teachers) are expected to deliver experiences that develop the same level of understanding in a year full-time or over two-years part time for students who have completed a non-teaching undergraduate qualification. Please note that the above does not argue that the B. Ed. is successful and the PGCE is not. It is understood that both ITE routes experience challenges in developing the desired quality and quantity of confident and competent mathematics teachers (Taylor, 2014:23).

Reflecting on the discussion above, it is argued that certain experiences delivered during the B. Ed. are potentially duplicated in a ‘copy-paste’ format in the PGCE. This occurrence potentially causes the perception that there is inadequate time to achieve the desired level of programme coherence. This is because the B. Ed. content is designed to be delivered over a longer period than is available in the PGCE and is therefore not perfectly suitable for the PGCE context. To start overcoming this challenge, it is argued that the PGCE requires uniquely formulated coherent experiences to develop teacher knowledge, skills and attitudes during the perceived limited time of one-year (or two-years part-time). The influence of the above discussion on the conceptual framework being built in this Chapter is presented below.

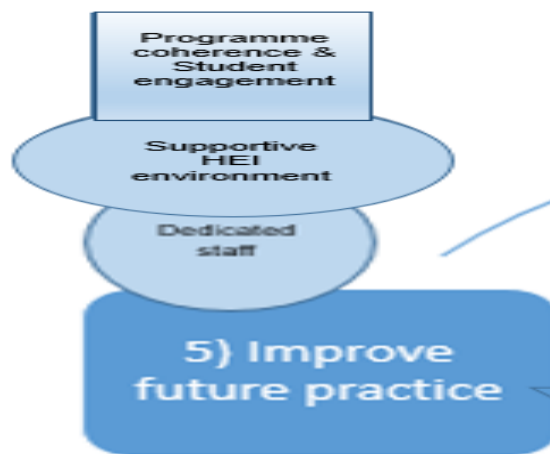


Figure 4.8: Fifth criteria and step refined

The Figure above presents the refinements made to the fifth criteria/step as presented in Figure 4.1. The title was changed to 'supportive HEI environment' to emphasis the focus on the delivery of the PGCE programme as a whole. To narrow the focus, a second refinement is made in terms of the rectangle stating 'programme coherence and student engagement'. This criteria/step is to serve as the starting point to address the third sub-question: What are the constraints of the PGCE FET mathematics programme as identified by those who undertook and facilitated it? The theme aspects restricting programme coherence is to assist in the process of organising emerging categories in Chapter 8: Constraints in the PGCE FET mathematics programme. The refinements made to the conceptual framework as a whole are presented next.

4.8. Conceptual framework on learning how to teach

The conceptual framework is presented to guide the completion of four data analysis chapters. The first three of these chapters were mentioned under the 'snipped' components of the conceptual framework presented above (see discussions below Figures 4.2 – 4.5 & 4.8). The star presented in the centre of Figure 4.9 is included to highlight the "golden thread" (teacher knowledge, skills and attitudes as elaborated upon and contextualised in Figure 3.2) that links literature, methodology and data analysis (Ngulube et al., 2015:46-47; also see Maxwell, 2013:9). By doing so, Figure 4.9 summarises the preceding chapters and concludes the literature review component of this study. Figure 4.9 (and Figure 3.2) will be elaborated and contextualised during Chapter 9: Equipping NQTs for the Classroom Context to answer the overall research question: How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher?

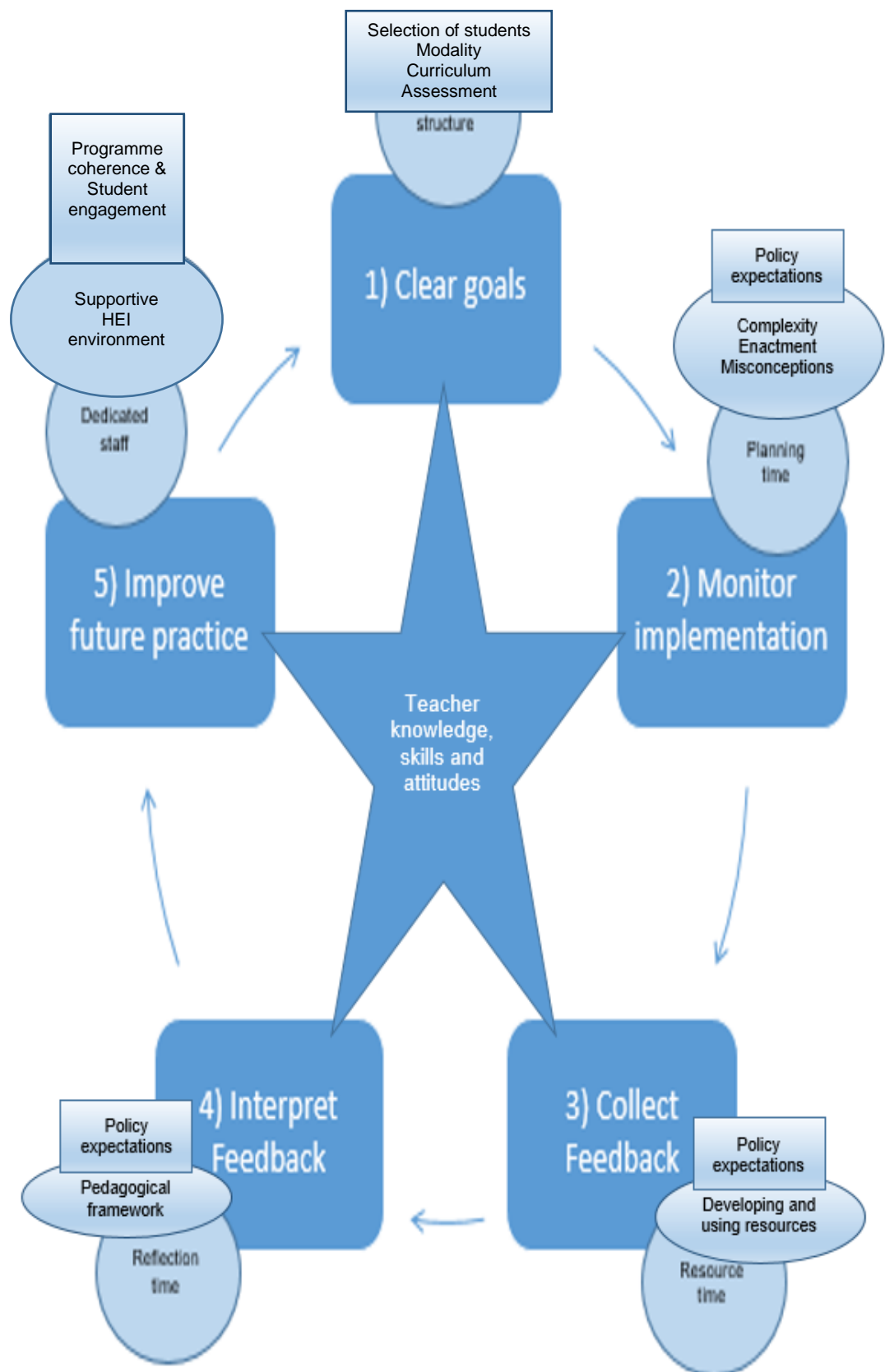


Figure 4.9: Conceptual framework to learn how to teach

In terms of learning how to teach, most HEIs adhere to a traditional breakdown involving four elements, namely: general education theory; PCK; SMK; and TP (Naylor & Sayed, 2014:9-10; Reeves & Robinson, 2014:237). Although the B. Ed. curriculum serves as the core curriculum guiding the delivery of PGCE, the PGCE could offer valuable insights to influence the B. Ed. curriculum. In support, Verbreek (2014:48) argues that the PGCE “provides an important challenge and valuable opportunity for teacher educators to identify what is essential” (Verbreek, 2014:48). In addition, teacher educators appointed in the PGCE are exposed to experiences in which they are required to develop a student into a NQT in the limited period of a year. During this process, teacher educators are also students as they engage with students developing into NQTs. Within this context, the four elements comprising the traditional breakdown are used to elaborate on Figure 4.9 as a conceptual framework on learning how to teach.

The first, general education theory, involves “a range of general theories of education, schooling, and development related to teaching” (Reeves & Robinson, 2014:237). Theories included are those that focus on “learning about the social and historical contexts of education systems” and “theories of human and child development and learning” (Naylor & Sayed, 2014:9-10). General education theory is included in “foundation courses” focusing on “the psychology, history, philosophy and sociology of education” (Reeves & Robinson, 2014:237). In addition to realising the above, the overall aim of introducing general education theory is to influence NQTs ability to address the following question: “How can I organise systematic learning in this context and these conditions, whatever the context and conditions are?” (Morrow, 2007:20).

Concerning the second, PCK, common practice has been to deliver the PGCE by focusing on both general pedagogy and subject pedagogy (Naylor & Sayed, 2014:9-10; Reeves & Robinson, 2014:237). General pedagogy “focuses on basic teaching techniques such as general strategies and skills or procedures for teaching, for example, classroom discipline and management”. Subject pedagogy “focuses on how particular subjects are taught, and how to deal with common misconceptions or problems [learners] have in understanding the particular subject” (Reeves & Robinson, 2014:237). In delivering the above, two approaches exist, namely: (1) “pedagogical theory and skills [are] generic and applicable within and across subject domains”; and/or (2) pedagogical theory and skills are anchored “within a particular subject domain” (Reeves & Robinson, 2014:244). Delivering PCK as if it is transferable across subjects involves exposure to an array of pedagogical theories, principles and approaches. Students are then expected to decide which theories, principles or

approaches are relevant to their existing SMK and the school context in which they complete TP (and secure employment after graduation) (Reeves & Robinson, 2014:245; Reeves & Robinson, 2010:7-33; Davis et al., 2007:1-28; Ensor, 2004:225). A critique of this approach is anchored in the perception that it reduces the status of subject specific pedagogical knowledge as a form of professional teacher knowledge (Davis et al., 2007:1-28).

A further critique is that this position can lead to the notion that how to teach, is more important than a student's [SMK]-base, and can downplay the role of teachers' [SMK] (Reeves & Robinson, 2010:7-33).

Delivering PCK within a subject domain involves emphasis on SMK as the core foundation from which teaching-learning practices occur (Reeves & Robinson, 2014:246). Criticism of such an approach is that it potentially "ignores the complexities of transforming this knowledge into appropriate opportunities for learning in school classrooms" (Adler et al., 2002:151).

Concerning the third element, it is understood that the PGCE does not focus specifically on SMK; it focuses on the "relationships between [PCK] and [SMK]" (Reeves & Robinson, 2014:237). This means that the PGCE requires students to link existing SMK (CCK and SCK) with PCK (KC[L] and KCT) and general education theories introduced. It is noted that there is a lack of clarity between the exact differentiation between SCK and PCK (see section 2.3.2 in Chapter 2) (Petrou & Goulding, 2011:17). Because of this, the current practice of presenting PCK as professional teacher knowledge in the PGCE context most likely includes aspects which can be classified under SCK. One example is equipping students with the ability to "analyse errors" made by students and "diagnose misconceptions for remediation purposes" (Ndlovu et al., 2017:69). In support, a common practice when delivering SCK as part of PCK related engagements in the PGCE has been to focus on (1) "how particular subjects are taught, and [(2)] how to deal with common misconceptions or problems [learners] have in understanding the particular subject" (Reeves & Robinson, 2014:237). Although SCK might be included during PCK engagements, it is recommended to deliver engagements specifically focusing on developing SCK separate from PCK engagements:

"[T]he challenge is not only about developing content knowledge; attention should also be directed to intensifying their abilities and making explicit the importance of combining CCK and SCK to solve and diagnose mathematics learners' misconceptions and errors for effective teaching" (Ndlovu et al., 2017:70).

Ndlovu et al. (2017:70-71) found that final year B. Ed. mathematics students “could solve problems correctly and analyse errors but they could not diagnose misconceptions for remediation purposes”. Understanding that the PGCE relies on B. Ed. content as its curriculum, the following related recommendation is most likely applicable to the PGCE context:

[M]ore time should be allocated to learner error analysis approaches. Continually exposing [students] to activities where they engage with learners’ errors would probably improve their knowledge of school mathematics and their SMK. The use of a learner error analysis approach is also useful for those who teach future teachers as it reveals specific misconceptions, slips and inabilities that should be corrected before final year students are sent out as specialist mathematics teachers (Ndlovu et al., 2017:70-71).

In addition to the above, engagements focusing on developing SCK could start by focusing on the use and selection of textbooks to transfer mathematical content during didactics. This could be followed by engagements focusing on designing extra notes when the textbook content is found wanting (Rezat, 2009:1261) to address common learner errors (Ndlovu et al., 2017:70).

Concerning the fourth element, policy stipulates that eight to twelve weeks are to be dedicated to supervised and formally assessed TP during PGCE (Nomlomo & Sosibo, 2016:200; Zeichner, 2010:90). During these weeks, students are required to practice their newly developed teacher knowledge, skills and attitudes (Naylor & Sayed, 2014:9-10) while being supervised and assessed by mentor teachers and teacher educators (Reeves & Robinson, 2014:237). In support, students are assumed to be exposed to the “groundwork” of the profession along with opportunities to “question, pose alternatives and reflect” on TP (Walkington, 2005:57). To encourage critical reflection, TP should allow students opportunities to deal “with classroom situations that exist in reality, and not just deal with ideal situations” (DBE, 2011:109). Examples include exposure to: “an authoritative classroom presence”; “good radar for watching what many different [learners] are doing and feeling at each moment”; “skills for explaining, questioning, discussing, giving feedback, constructing tasks, facilitating work, and managing the classroom – all at once” (Darling-Hammond & Baratz-Snowden, 2005:117).

In closing, “rather than comparing graduates with different types of [ITE], the significant specific contributions and challenges of each qualification model should be recognised” (Verbreek, 2014:48). In other words, the PGCE grants an opportunity to secure data to

influence the impact of all ITE programmes. PGCE is a concentrated version of B. Ed. excluding SMK. Due to completing a diploma or degree with a mathematics focus, it is argued that PGCE students hold CCK, but still need specific experiences to develop SCK alongside PCK and general education theories. The assumption held that students are SMK experts potentially restricts the delivery of experiences focusing on SCK to assist in the process of merging existing CCK with newly acquired PCK (KC[L] and KCT).

4.9. Closing

This Chapter concluded the literature review component of the case study focusing on the process of becoming a teacher by following the PGCE ITE route. This was done by building a conceptual framework focusing on learning to teach and teaching. The foundation of this conceptual framework is the conceptual framework built during Chapter 2 and 3 (see Figure 3.2) and is illustrated as a 'star'. The 'star' has five arms to illustrate that it is to be reflected upon at each stage of the process of learning to teach and teaching (see Figure 4.9). The conceptual framework built in this Chapter (Figure 4.9) began by merging two models to serve as the skeleton to guide the discussions to follow focusing on learning how to teach and teaching. The five steps/criteria were refined for the purpose of identifying key aspects to serve as the coding scheme to guide data analysis. This allowed for the three sub-questions of this case study to be linked with specific aspects in the built conceptual framework. Specifically, the refinement of the first step/criteria (clear structure/goals) revealed four themes to guide the analysis of data to answer the first sub-question: What can a student expect when pursuing the PGCE ITE route in terms of the selection process, modality, curriculum and assessment? The second, third and fourth step/criteria were refined and the code 'policy expectations' was identified to guide data analysis of all three steps/criteria using seven themes based on refined policy stipulated NQT roles (see Table 2.9): specialist in a phase, subject discipline or practice; learning mediator; interpreter and designer of learning programmes and materials; leader, administrator and manager; scholar, researcher and lifelong learner; assessor; community, citizenship and pastoral role. These are to guide the analysis of data to answer the second sub-question: What policy stipulated teacher knowledge, skills and attitudes were actually developed during the PGCE? The fifth step/criteria was refined and retitled 'supportive HEI environment'. During refinement of this step/criteria the code 'programme coherence' was identified to guide the analyse of data to answer the third sub-question: What are the constraints of the PGCE FET mathematics programme as identified by those who undertook and facilitated it? The answers of the above three

sub-questions are to be reflected upon to refine/contextualise Figure 4.9 to present the insights gained on experiences of learning to become a FET mathematics teacher by completing the PGCE route. Although, Figure 3.2 built during Chapter 2 and 3 is included in Figure 4.9 by means of the 'star' in the centre. It is also refined/contextualised to allow for PGCE context specific descriptions of teacher knowledge, skills and attitudes to be presented. By refining/contextualising Figure 4.9 and 3.2, an answer to the research question (How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher?) can be presented. The Chapter to follow contextualises the research methodology used.

CHAPTER 5

RESEARCH METHODOLOGY

5.1. Introduction

Research is “a systematic process of collecting, analysing and interpreting” data to enhance understanding of a selected phenomenon (Leedy & Ormrod, 2010:1; Kraus, 2005:764; Babbie & Mouton, 2001:270; Denzin & Lincoln, 1998:3). The first step is to gain a clear understanding of what is known about the selected phenomenon (Maxwell, 2013:41; Chenail, 2011:1184; Welman & Kruger, 2001:33). This step was addressed during the previous chapters by reviewing relevant literature, allowing two complimentary conceptual frameworks to be ‘built’ (see Figure 3.2 and 4.9) (Ngulube et al., 2015:46-47; Maxwell, 2013:41; Jabareen, 2009:51). The next step requires an action plan to collect and analyse data, to deepen the understanding that has been gained (Maxwell, 2013:39; Leedy & Ormrod, 2010:1; Welman & Kruger, 2001:33). Within this context, the following is presented and discussed: qualitative research design and methodology; dimension one: philosophical stance (including positionality and reflexivity); dimension two: purpose of the research; dimension three: sampling; dimension four: data collection techniques; data analysis; trustworthiness; ethical considerations; and the limitations of the study. To begin, an overview of the rationale behind the action plan is presented.

5.2. Qualitative research design and methodology

Qualitative research can be defined as being “multimethod in focus, involving an interpretive, naturalistic approach to its subject matter... attempting to make sense of... phenomena in terms of the meanings people bring to them” (Denzin & Lincoln, 1998:3). Qualitative researchers “recognise that the issue they are studying has many dimensions and layers, and so they portray the issues in its multifaceted form” (Leedy & Ormrod, 2010:135). Reflecting on the above, it is argued that qualitative research is a suitable “fit” to meet the aims and objectives of this research (Bless et al., 2013:44; Patton, 1990:97). The main argument is that the purpose of this research is to investigate students’ experiences during the PGCE FET mathematics programme offered by a HEI (Chenail, 2011:1176; Leedy & Ormrod, 2010:135; Babbie & Mouton, 2001:270). The experiences of students during the PGCE FET programme need to be understood, not merely explained; the findings need to emanate from the personal experiences of teacher educators and students/NQTs, through their beliefs, thoughts, assessments, study-guides, and policies – not by identifying quantitative trends of the selected phenomenon (Nastasi & Schensul, 2005:187; De Vos et al., 2002:79).

[T]he nature of social process is sufficiently complex and interdependent that they are seldom easily represented along some set of unidimensional quantitative scales. Nor can quantitative dimensions and scales provide the kind of details that is necessary for blueprints of programme processes where the descriptions of those processes are to be used in constructing models for purpose of replication and demonstration. Thus qualitative methods are particularly appropriate for process issues and questions (Patton, 1990:97).

It is argued further that qualitative data is suitable to study the selected phenomenon as the aim/purpose is not to generalise findings (Luker, 2008:103). The aim/purpose is rather to offer a 'collage' of the phenomenon in a specific context and time-frame by exploring a case reasonably representative of the phenomenon (Creswell, 2009:193; Luker, 2008:103; Krauss, 2005:764; Nastasi & Schensul, 2005:187). The case in question is a specific purposively sampled HEI that offers the PGCE with a FET mathematics focus, and which grants access to a career as a mathematics teacher (Leedy & Ormrod, 2010:135; Creswell, 2009:193; Luker, 2008:103; Henning et al., 2004:40; Babbie & Mouton, 2001:310). The focus is on the PGCE as it is offered over one year. Therefore, focus can be placed on all modules comprising the PGCE to reveal and explore the diverse engagements relating to the specific programme, as offered by a specific HEI.

To collect related data, a qualitative case study research methodology with a tracking element by means of an emerging research design has been selected (Leedy & Ormrod, 2010:135; Henning et al, 2004:40; Caelli et al., 2003:4). Such a methodology, it is argued, ensures that understanding the process of becoming a teacher following the PGCE ITE route could be gained "in its natural state and context" with data portraying "rich, textured and in-depth accounts of the case" (Rule & John, 2011:61). To clarify, an emerging design allows the case to direct the process to be followed instead of attempting to "fit" it into a specific pre-designed research process. In support, Lincoln and Guba (1985:225) argue that "some qualitative designs cannot be given in advance; it must emerge, develop and unfold". Although an open mind was kept, the case subsequently directed itself to emerge as a generic qualitative case study research design. This emerged after reflecting on the following four dimensions of an emerging research design: (1) Philosophical stance (including positionality and reflexivity); (2) Purpose of the research; (3) Context or situation within which the research is conducted; and (4) Data collection techniques (Terre Blanche et al., 2006:37). The decisions taken in this regard are clarified below.

5.3. Dimension one: Philosophical stance (including positionality and reflexivity)

As a point of departure, this research takes the assumption that understanding student experiences during the PGCE FET mathematics programme involves a complex process best revealed by those directly involved in the PGCE, namely, teacher educators and students/NQTs. Guided by this assumption, the research draws on the interpretivist paradigm. This paradigm sees reality as socially constructed from the subjective meanings that individuals and groups develop and communicate within a specific context in an attempt to understand their world (Leedy & Ormrod, 2010:135; Creswell, 2009:8; Krauss, 2005:764). As recommended by Babbie and Mouton (2001:33), the following is acknowledged to realise an interpretivist approach, to guide the “unfolding” of a research design:

- The epistemology involves exploring the meanings, intentions, values and beliefs held by participants and serves as data to gain insight into the phenomenon under investigation; and
- The researcher fulfils a subjective role, as there is a need to build relationships with participants. This is to encourage openness and enhance the “thickness” of responses during interviews, to allow access to relevant documents. The approach is to be open and honest about the purpose of the research during all communication (see Appendices A-H) and to show genuine interest in the individual during the research process, as far as possible.

Drawing on the interpretivist paradigm, a qualitative research methodology is the obvious choice to allow the researcher to become “involved in a sustained and intensive experience with participants” (Creswell, 2009:177). Such an approach does not come without challenges as the very nature of such a process “introduces a range of strategic, ethical and personal issues” that need to be addressed (Creswell, 2009:177). Within the above paradigm, “the researcher must acknowledge the possibility that alternative interpretations are possible” with the data collected and analysed (Harding, 2013:139). In other words, qualitative data analysis is “always shaped to some extent by the researcher’s standpoint, disciplinary knowledge and epistemology” (Braun & Clarke, 2013:175 also see Bourke, 2014:2).

With these concerns in mind, inquirers explicitly identify reflexively their biases, values, and personal background, such as gender, history, culture, and socioeconomic status that may shape their interpretations formed during a study (Creswell, 2009: 177).

To address the above, the positionality and reflexivity is briefly reflected upon in the sub-section to follow.

5.3.1. Positionality and reflexivity

To begin, Bourke (2014:1) argues that the act of “examining the research process in the context” of one’s positionality can be perceived as reflexivity. Researchers should critically reflect on the effects and impact that they have on participants (and the research environment). Positionality indicates the position the researcher is in, compared to the position the participants find themselves in during research engagements (D’Silva et al., 2016:97; Bourke, 2014:5). The position in which researchers find themselves whilst conducting research influences the way they perceive the world and analyse data (D’Silva et al., 2016:97). It is therefore important to communicate one’s positionality to allow the reader to understand the assumptions held by the researcher while collecting and analysing data (D’Silva et al., 2016:97).

Our own biases shape the research process, serving as checkpoints along the way. Through recognition of our biases, we presume to gain insights into how we might approach a research setting, members of particular groups, and how we might seek to engage with participants (Bourke, 2014:1).

Concerning values, gender, history, culture and socioeconomic status, the researcher is a white, Afrikaans-speaking, middle-class, Christian born in 1982 with a decent education, who had access to meaningful employment. The researcher grew up in a capitalist context, emphasising the need for a return on investment when energy, time and resources were used. Within this context, the researcher took this study as an opportunity to become orientated with the inside workings of an ITE programme in preparation to enter a HEI (or similar institution) as a teacher educator or researcher. This influenced the study, as all components of the thesis were perceived as needing to produce a product. This is a key reason why two conceptual frameworks were built during the literature review (see Figure 3.2 and 4.9). This is also the reason why the two conceptual frameworks undergo further refinements/contextualisation during the data analysis component of this case study. The researcher’s position in terms of influencing engagements with participants is explored further below.

It is important to be constantly aware of how you are positioned in relation to the study context and participants, and how such positioning may influence the study and its overall quality... Your status and authority may influence the data you are able to generate. Being sensitive to how one’s status, power and relationship may

impact on the study, and planning to minimise such influences, help to improve the quality of the study. Being transparent about one's positionality and its possible effects contributes to the credibility and confirmability of the study (Rule & John, 2011:113).

Concerning existing relationships with the HEI offering the PGCE, it needs to be noted that the researcher is a stranger to the specific HEI as he did not complete any previous qualification there (nor in the Western Cape Province where the HEI is located). As a result, the researcher holds no preconceived ideas or expectations about the PGCE FET experiences at the HEI. Additionally, the researcher's route into teaching as a career did not involve the PGCE or B. Ed. A National N Diploma allowed the researcher access into a TVET College as a lecturer. Only after securing a lecturing position, was a teacher's qualification pursued in the form of a National Professional Diploma in Education (NPDE) (via distance education). Various other qualifications were completed by means of distance learning, which granted access to a D. Ed. programme. The researcher was able to reflect on his own experiences in completing an alternative route with limited to no contact sessions, in comparison to individuals who took one of the more conventional routes with frequent contact sessions. Admittedly, this process has revealed various gaps in the researcher's knowledge of teaching-related theories and practices. The researcher thus takes on the role of a student during the research process to fill in the identified knowledge gaps. In short, the PGCE as an experience is truly an unknown phenomenon to the researcher and the participants are, in the eyes of the researcher, experts concerning the PGCE FET.

You should offer yourself as someone who does not understand the situation you find yourself in and must be helped to grasp even the most and obvious aspects of that situation (Babbie & Mouton, 2001:290).

As far as possible, the researcher undertook to enter the world of the participants by scheduling engagements at a participant's place of employment. The assumption is held that by engaging with participants on their 'home-ground', they would be granted a position of power and feel that they are the experts 'welcoming' the researcher and sharing their expertise (Mertens, 2012:256; Creswell, 2009:117).

In a further attempt to grant participants more power than the researcher during engagements, the researcher presented himself, first, as a student who is completing a D. Ed. and who worked as a teacher in high schools and a lecturer in TVET colleges in the past. This was done in an attempt to present the researcher as someone who has been in the 'battlefield' in which the NQTs find themselves, and for which teacher

educators are preparing students. Only when specifically prompted did the researcher reveal that he is currently employed in the administration component of the Parliament of R.S.A. as a Public Education Practitioner. This was because of past experiences where individuals engaged differently with the researcher because of his employment at the Parliament of R.S.A. It has to be noted that when this information was prompted (please note that it rarely was) and provided, the researcher experienced that the 'atmosphere' in the room changed and this encouraged the conversation to 'go-off track'. To clarify, participants who prompted tended to focus on matters relating to Parliament of R.S.A. instead of focusing on their experiences in the PGCE during 2014. The aim of qualitative research "seeks to provide an understanding of a problem through the experiences of individuals, and the particular details of their lived experiences" (Bourke, 2014:3). By sharing current employment status when prompted, the researcher held the assumption that focus and power could be maintained on the participant and their experiences relating to the PGCE to secure data realising the aims and objectives of this study. It can be argued that the above potentially undermined honesty and transparency which are key to an interpretivist approach (Creswell, 2009:177). The counter argument presented is that the information was not withheld, only provided when prompted in an attempt to ensure that the engagements is as far as possible about the participant being the expert. In addition, the researcher only fulfilled the role of D. Ed. student during engagements with the participants, as this is a self-funded independent study. The second aspect to allow for an emerging research design to be realised is presented.

5.4. Dimension two: Purpose of the research

In support of the above, the researcher needed to define what the study was going to focus on to reduce the potential of it 'going off track' (Chenail, 2011:1188; Maxwell, 2013:23) and to help communicate the purpose of the research to participants (Babbie & Mouton, 2001:33). The first challenge to overcome involved formulating research questions.

Research questions are the signposts that guide researchers on their journey through the territory of the study. These questions help you to take the right turns and to ignore diversions which, however interesting, will not fulfil the purpose of your study. They help you to know where to look and what to look for. As the researcher conducts the study, the key research questions should always be kept in mind (Rule & John, 2011:25).

The research questions serve as the “unit of analysis” to anchor the focus of the research throughout the process (Baxter & Jack, 2008:545). This starts with the research aim and objectives within a specific context and period. These are then converted into research questions and communicated to others (Leedy & Ormrod, 2010:135; Creswell, 2009:193; Luker, 2008:103; Henning et al, 2004:40).

Guided by the above understanding and engaging with the study’s supervisor (Professor Yusuf Sayed), the following research questions, aims and objectives emerged:

Table 5.1: Intention of the project

RESEARCH AIM	RESEARCH QUESTION
To examine experiences delivered to students in a specific PGCE FET mathematics programme in relation to knowledge, skills and attitudes to function as a classroom teacher.	How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher?
OBJECTIVE ONE	SUB-QUESTION ONE
To examine the PGCE ITE route to gain background information and to understand what the programme entails in terms of selection process, modality, curriculum and assessment.	What can a student expect when pursuing the PGCE ITE route in terms of the selection process, modality, curriculum and assessment?
OBJECTIVE TWO	SUB-QUESTION TWO
To examine the policy stipulated teacher knowledge, skills and attitudes developed during the PGCE FET mathematics programme.	What policy stipulated teacher knowledge, skills and attitudes were actually developed during the PGCE?
OBJECTIVE THREE	SUB-QUESTION THREE
To identify the constraints in the PGCE FET mathematics programme as experienced by those directly involved in it.	What are the constraints of the PGCE FET mathematics programme as identified by those who undertook and facilitated it?

The research questions, aim and objectives (see Table 5.1) were completed to finalise the purpose of this research (Henning et al, 2004:40) and to serve as the ‘signposts’ for the study’s focus during decision-making (Maxwell, 2013:23; Baxter & Jack, 2008:546; Miles & Huberman, 1994:25). Table 5.1 reveals that the case is an empirical inquiry investigating “a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used” (Yin, 2003:23).

5.5. Dimension three: Sampling

With the research questions, aims and objectives formulated (see Table 5.1), the next step challenge is sampling. Sampling can be defined as a strategy to identify and gain access to specific data sources (such as individuals, communities and documents)

linked to the phenomenon or case under investigation (Bold, 2012:120; Luker, 2008:103; Terre Blanche et al., 2006:37). This case (the process of becoming a teacher by following the PGCE ITE route) calls for purposive sampling of a specific HEI, offering the PGCE FET mathematics programme, that is accessible and willing to grant access to relevant teacher educators, documents and students/NQTs. To clarify, purposive sampling involves a strategy whereby participating individuals and institutions are specifically selected for their accessibility and direct involvement in the phenomenon being explored (Bold, 2012:120; Luker, 2008:103; Terre Blanche et al., 2006:37). It is vital to identify gatekeepers to the data sources, as they are “the best ticket into the setting, and sometimes the only ticket” (Schurink, 1998:258).

Gaining entry to a setting does not automatically guarantee access to all the situations within that setting. As the study progresses and the need arises to gain access to other situations, the researcher needs to renegotiate the conditions of access (Schurink, 1998:259).

To contextualise, HEIs in the province were briefly analysed by exploring their official websites to establish their suitability for the case context. Suitability was based on the HEI offering the PGCE FET mathematics programme to both school teachers and TVET college lecturers (due to the researcher’s work experience in both high schools and TVET colleges), and the HEI’s accessibility within the limited resources available to the researcher to conduct this research (Rule & John, 2011:64).

[O]ur data are often derived from one or more cases and it is unlikely that these cases will have been selected on a random basis. Very often a case will be chosen simply because it allows access (Silverman, 2000:102).

The challenge after purposively sampling a HEI is to secure a sample of teacher educators and students/NQTs directly involved in the PGCE FET mathematics programme. A purposive strategy was used to secure a sample of willing teacher educators and students/NQTs from the purposively sampled HEI (Bold, 2012:120; Luker, 2008:103; Terre Blanche et al., 2006:37). This decision is justified as the specific case study involved a specific small population (teacher educators=11 & NQTs=26), potentially allowing for all participants to take part as purposefully selected data sources to explore the case (Bless et al., 2013:172; Luker, 2008:103; Silverman, 2000:104).

A case study researcher... is not interested in representativeness of the sample but in its ability to generate data which allows for a full, in-depth and trustworthy

account of the case. People are therefore selected because of their relevant knowledge, interest and experience in relation to the case. The size of the sample for a case study is likewise influenced by the purpose of the study and the resources available (Rule & John, 2011:64).

To contextualise, the teacher educators were sampled first, as they were to be interviewed to gain understanding of the specific PGCE FET and to secure relevant documents revealing insights concerning the case. Contact was made with the FET Faculty of Education of the HEI, inviting the HEI to participate in the study. On this invitation, a list of the teacher educators involved in the PGCE FET 2014 was requested. These teacher educators had to have contact sessions with the students who had FET mathematics as a module.

A list of teacher educators (n=11) was released by the Faculty with their e-mail addresses (preferred form of contact) as evidence of the HEI's willingness to participate in the research. E-mails were sent to all 11 teacher educators, inviting them to participate in the study along with the required attachments (see Appendices A, B, C, D & G).

From the 11 teacher educators, five volunteered to take part. Once their interviews were finalised, the five teacher educators also made the study guides available for the PGCE FET module, which they facilitated in 2014. The teacher educators who served as the PGCE FET programme co-ordinator and teaching practice co-ordinator also allowed for access to be granted to specific policies and the Programme Guide.

Two teacher educators also made available a set of portfolios, kept for moderation purposes, containing the assessments of a sample of NQTs for the PGCE modules 'Professional Studies' and 'Mathematics Didactics'. A brief background of the five teacher educators who made themselves available is presented in Table 5.2 on the next page.

In this table, each teacher educator has a unique code to ensure anonymity. Teacher educators are abbreviated to TE. A number is allocated in line with the sequence of the interviews. As an example, TE1 is used for the first teacher educator interviewed, and so forth (Bold, 2012:120-121; Luker, 2008:103).

Table 5.2: Background on the sampled Teacher Educators

Sample	Background
TE1	In 2014 she served as the Teaching Practice Co-ordinator for FET and facilitated the PGCE Module Language Development and Communication . Her Background is as an English teacher/lecturer and 2014 was her first year working for the HEI. Her workload in 2014 included first year B. Ed. and the PGCE FET. Before joining the HEI, she was an English First Additional Language TVET College lecturer “for about five years” and served as the “e-learning co-ordinator across the TVET College’s Campuses”. Additionally, she worked in a “primary school for about twelve years” and during this time offered Grade 12 evening classes (extra lessons). She holds the following qualifications: Masters in Linguistics Second Language Acquisition; BEd Honours in Guidance and Counselling; BA in English and Psychology; and a Teachers Diploma (the old HDE).
TE2	In 2014 he served as the PGCE Programme Co-ordinator and facilitated the PGCE Module Professional Studies . He stated the following: “I was the co-ordinator of the PGCE since its inception in 2003 and prior to 2003 I was the co-ordinator of what was then called the National Higher Diploma Secondary”. Because of this background he was actively involved in “designing the internal curriculum for the PGCE FET” and has been working at the HEI for over twenty years. Before joining the HEI he worked in a TVET College. He holds the following qualifications: PhD; Masters; B. Ed; and a Higher Diploma in Commerce. He also revealed that “there are four or five things that [he has] published already”.
TE3	In 2014, he facilitated the PGCE Module Mathematics Didactics . He has facilitated this Module since 2011 when he started at the HEI. Before joining the HEI, he served as a Curriculum Advisor for the Provincial Department of Education after serving as a classroom teacher. He holds the following qualifications: D. Ed; M. Ed; B. Tech Education Management; and a Teachers Diploma. He also revealed that the focus in his M. Ed. and D. Ed. “has not been on mathematics education; but more on education management (more focused on school effectiveness)”.
TE4	In 2014, she facilitated the PGCE Module Perspectives in Education and has been facilitating it since 2011. Specifically, she facilitated Inclusive Education and Psychology of Teaching which is two of the three components included in Perspectives in Education . She has been working for the HEI since 2005 and is currently employed in the GET B. Ed. programme. She stated: “So I am one of those people who are in the Faculty who also helps with the PGCE [FET] even though my employment primarily is in the GET”. She holds the following qualifications: PhD; Masters in Education; and a B. Ed. in Education Psychology and Special Education.
TE5	In 2014, she facilitated the PGCE Module Introduction to Research . She stated: “I was identified as someone who is suitable to teach this class because I am theoretically and practically involved in research”. She holds the title Professor and is also involved in “developing the research capacity” of her colleagues in the HEI. She was a High School Teacher “many years ago” before serving as a Teacher Educator in a Teacher College. She left the country to study abroad and lecture in different Universities before returning to South Africa. She holds the following qualifications: Doctorate in Adult Education; Masters in Adult Education and Curriculum Development; Postgraduate Diploma in Education; BA Honours in Afrikaans Linguistics; and a BA in Education and Afrikaans. Concerning publications she revealed the following: “Eleven are out and about six are under review and three or four are in the pipeline”.

To secure a sample of students who completed the PGCE in 2014 and entered a classroom in 2015 as a NQT, a request was submitted to the administration of the HEI for a list of names with contact details. The original request was made by physically going into the administration department of the campus, as recommended by the FET Faculty secretary. An identified contact person requested a ‘formal request for a list of names with contact details’ to be sent to her via e-mail. This e-mail was sent as requested. The original contact then forwarded the e-mail to a senior administrative staff member on another campus of the HEI. This required an additional e-mail to be sent, containing the ethical clearance documents for the specific study, along with a declaration that the requested list only be used for the research purposes and not distributed to any third party.

Upon the submission of the above documents, it was revealed that a list containing the graduates for PGCE FET Mathematics 2014 was not finalised at that point in time. To move the process forward, a request was made for a list of all the students who were registered in 2014 for PGCE FET mathematics programme. This list was released. Students' (N=26) title, initials, surname, contact numbers, and student HEI e-mail addresses were provided.

To establish contact, each student on the list was sent an e-mail inviting them to participate. After three days, no responses were received. The decision was made to send a text message (see Appendix H) to the provided cell phone numbers of the NQTs to invite them to participate. This was relatively successful and yielded responses from twenty NQTs who text messaged their non-HEI e-mail addresses in response. The twenty NQTs were forwarded an e-mail inviting them to participate, along with the required attachments (see Appendices A, B, E, F & G). Frequent follow-up phone calls occurred to secure a sample from the list of contacts. In the end, only six NQTs availed themselves to be interviewed (Bold, 2012:141; Luker, 2008:103; Flick, 2007:27; Shenton, 2004:65). A brief background of the six NQTs as revealed during the interviews is presented in Table 5.3 on the next page.

In this table, each student has a unique code to ensure anonymity. The abbreviation 'NQT' is used with a number to indicate the sequence of the interviews. As an example, NQT1 represents the first NQT to be interviewed, and so forth (Bold, 2012:120-121; Luker, 2008:103).

In closing, a purposive sampling strategy was used to secure a sample of five (n=11) willing teacher educators (from a staff list of PGCE FET mathematics programme teacher educators provided by the participating HEI) and six (n=26) willing NQTs (from a class list of PGCE FET mathematics students provided by the participating HEI) (Luker, 2008:103; Flick, 2007:27; Shenton, 2004:65). Contact was made with all potential participants and all those who showed a willingness to participate in the study were included in the sample, to serve as representatives of the case (Luker, 2008:103; Marrow, 2005:255; Shenton, 2004:65).

Table 5.3: Background on the sampled NQTs

Sample	Background
NQT1	In 2015, she revealed that she is teaching at a high school in Limpopo and is responsible for the following: Grade 8 and 9 Natural Sciences; Grade 9 Mathematics; and Grade 10 Physics. She stated: 'Right now I am more a physics than a maths teacher in the school'. Her Didactics in the PGCE FET during 2014 was Mathematics and Economics . She was registered as a full-time student in 2014. The qualification that allowed her access in the PGCE FET was a National Diploma Mathematical Technology (NDMT) . Concerning work experience, she revealed that she didn't have any experience except for in-service training for six months during the completion of the NDMT and her current teaching position.
NQT2	In 2015, he revealed that he is teaching in a primary school in the Western Cape and is responsible for Grade 5 Social Sciences. He explained that Grade 5 Social Sciences include history, geography, natural sciences and technology. His Didactics in the PGCE FET during 2014 was Mathematics and Physics . He was registered as a full time student in 2014. The qualification that allowed him access in the PGCE was a National Diploma Mathematical Technology (NDMT) . Concerning work experience, he revealed that teaching at the primary school was his first job and the in-service training project that lasted for two months during the completion of the NDMT.
NQT3	In 2015, he revealed that he is teaching in a high school in the Eastern Cape and is responsible for Grade 10, 11 and 12 Physical Sciences. His Didactics in the PGCE FET during 2014 was Mathematics and Physics . He was registered as a full time student in 2014. The qualification that allowed him access in the PGCE FET was a National Diploma Mathematical Technology (NDMT) . Concerning work experience, he revealed that before the PGCE FET he was "just a general worker somewhere" in the Western Cape.
NQT4	In 2015, he revealed that he is working in a TVET College in the Western Cape and is responsible for Mathematics, Engineering Science, Electrical Trade Theory and Industrial Electronics NATED N1 to N3. His Didactics in the PGCE FET during 2014 was Mathematics and Electrical Engineering . He was registered as a full-time student in 2014 and he was employed on a full-time basis. The qualification that allowed him access in the PGCE was a Diploma in Electrical Engineering (completed in the eighties and awarded by a Technikon which merged and became one of the campuses of the HEI). Concerning work experience, he revealed that he previously worked as a specialist in the telecommunications industry for different telecommunication companies before starting his own business. The business unfortunately did not go well and he was unable to secure employment in the industry. He was advised to apply at a TVET college and secured a lecturing position before pursuing the PGCE FET in 2014.
NQT5	In 2015, he revealed that he is working in a TVET College in the Western Cape and is responsible for Mathematics and Mathematical Literacy for NC(V) Level 2 to 4 and NATED N1 to N3. His Didactics in the PGCE FET during 2014 was Mathematics and Physics . He was registered as a full-time student in 2014 and he was employed on a full-time basis. The qualification that allowed him access in the PGCE FET was a National Diploma Mathematical Technology (NDMT) . Concerning work experience, he revealed that he was working in the Eastern Cape but what he was "doing there was not developing or growing" him. He decided to move to the Western Cape and advertised extra mathematics classes by means of a poster on a TVET College notice board. He was noticed by the TVET College and invited to lecture. At first, his contract to lecture was for two weeks, then one month, then three months, then for six months. At this point he decided to pursue further studies to become a qualified teacher and enrolled for the PGCE FET in 2014.
NQT6	In 2015, he revealed that he is working in a primary school in the Western Cape and he is responsible for Grade 7 Natural Sciences, Grade 6 Natural Sciences and Technology, Grade 6 Life Skills, and Grade 4 Social sciences. His Didactics in the PGCE FET during 2014 was Mathematics and Economics . He was registered as a full time student in 2014. The qualification that allowed him access in the PGCE was a National Diploma Mathematical Technology (NDMT) . Concerning work experience, he revealed that immediately after graduating with a NDMT he worked for a month in one of the large clothing stores. He then worked for nine months in a warehouse of one of the large grocery stores. He also revealed that he completed the required in-service training for six months during the NDMT.

The techniques used to secure data from the sample are contextualised in the section to follow.

5.6. Dimension four: Data collection methods

Reflecting on Table 5.1, data collection methods were needed to allow for “the human part of the story” to emerge from the sample, as clarified above (Jacob & Furgeson, 2012:1). In identifying suitable data collection methods, “the purpose of the study, the key research questions... and resource constraints” were identified as the core guiding variables (Rule & John, 2011:6). It was kept in mind that data collection methods should allow for “multiple facets of the phenomenon to be revealed and understood” by means of diverse lenses (Baxter & Jack, 2008:544; also see Leedy & Ormrod, 2010:135).

It is a poor study that uses only one source of evidence... Multiple sources allow for triangulation through converging lines of inquiry, improving the reliability and validity of data... (Burns, 2000:469).

It is understood that data needed to be secured from various data sources relating to the case “for the purposes of triangulation” (Rule & John, 2011:63).

A word of caution here is that all studies have limits in terms of resources and these limits will influence the amount of data that could practically be assembled in any study (Rule & John, 2011:72).

To access the needed data, two data collection methods were decided upon, namely: (a) semi-structured interviews with teacher educators and NQTs; and (b) reviewing relevant documents (Baxter & Jack, 2008:544; Burns, 2000:469). Observation as a data collection method was not included as the researcher gained access to teacher educators at the end of 2014, and students/NQTs at the beginning of 2015. To clarify, the focus was on student experiences which occurred during 2014 (the past) and how these experiences were perceived as useful by the NQTs and teacher educators in 2015 (present and future). Within this context, the researcher was unable to identify specific aspects which could be observed to reveal answers to the research questions. The process followed to secure data is contextualised below.

5.6.1. Document review

Data collection started during the sampling stage of this research with securing relevant documents published on the selected HEI’s official website (Rule & John, 2011:67). These documents focus on the PGCE FET as offered by the HEI, the FET Faculty of the HEI and background information on the HEI (Mouton, 1988:18). After securing the

above documents and conducting interviews with teacher educators (discussed in the section to follow), access was gained to the following supporting documents:

- *Study guides*: Language Development and Communication, Professional Studies, Mathematics Didactics, Perspectives in Education & Introduction to Research.
- *General Information*: Faculty Handbook 2014, Programme Guide 2014 & the HEI's CHE QEP Institutional Submission: Phase 1.
- *Faculty Policies and Procedures*: Teaching Practice Policy & Faculty of Education Assessment Policy.
- *Student Portfolios held back for moderation*: Professional Studies & Mathematics Didactics.

The above documents were made accessible at various stages of the data collection phase of this research, with the understanding that it “may specify events and issues in greater detail than interviewees can” (Burns, 2000:467). All documents made accessible were included as data sources. The aim of securing documents was to gain access to “text (words) and images that have been recorded without a researcher's intervention” (Baven 2009:27). Additionally, a wide variety of documents were secured to triangulate data and to identify potential contradictory evidence (Leedy & Ormrod, 2005:135; Marrow, 2005:255; Shenton, 2004:65; Burns, 2000:469). The inclusion and analysis of documents are guided by the understanding that first, “the original purpose of the document” is to be considered. Second, “the context in which it was produced and the intended audience” is reflected upon to establish relevance (Baven, 2009:38). The second data collection method used is discussed below.

5.6.2. Interviews

Interviews were used as support to expose core issues as quickly and in as much depth as possible (Bold, 2012:119; Leedy & Ormrod, 2010:146; Simons, 2009:43; Flinders & Richardson, 2002:1160; Babbie & Mouton, 2001:289):

As qualitative researchers... we collect people's life stories in order to study various aspects of the human experience and the primary way we gather stories is by interviewing people (Jacob & Furgerson, 2012:1).

The first decision that needed to be made was the type of interview to be used to realise the above. This required reflection on “characteristics of interviewing before designing, applying and analysing interviews” (Alshenqeeti et al., 2014:40). Structured interviews were considered as they involved an interview schedule containing a “set of field

questions” from which the researcher did not deviate to achieve a degree of standardisation (Rule & John, 2011:65). Reflecting on the aim and objectives of this research, it was decided that a level of flexibility was required to reveal the individual perceptions of participants during interviews:

Given that case studies try to capture the uniqueness and complexity of the case; some level of flexibility is desirable. We recommend that an initial set of field questions, derived from the key research questions, are developed to initiate discussion. The researcher should then pursue specific lines of enquiry by adding questions during the interview which allow for new insights, deeper probing and clarification (Rule & John, 2011:65).

The decision was made to use a semi-structured interview, described as “an interaction between an interviewer and a respondent in which the interviewer has a general plan of inquiry” (Rule & John, 2011:65). This allowed the respondent to do most of the talking, while at the same time allowing the researcher to maintain a degree of control with the discussion, by means of probing questions (Jacob & Ferguson, 2012:1; Creswell, 2007:129; Babbie & Mouton, 2001:289; Fontana & Frey, 2000:645). To realise the above it was understood that an interview schedule containing “[g]ood field questions” needed to be finalised to answer the formulated research questions (Rule & John, 2011:37). Examples of probing questions to support field questions included things like “How is that?” “In what ways?” “How do you mean that?”, as well as looking and listening expectantly and letting the interviewee “fill in the silence” (Babbie & Mouton, 2001:289). All questions were included on the interview schedule (and included as the interview is conducted and the need for additional probing questions arises) for the core purpose of allowing an individual to offer in detail their “interpretation of the meaning of the described phenomena” (Kvale, 1983:174). This also allows the researcher to conduct an interview that is not “illustrative, but reflective and critical” due to probing deeper when needed (Ashenqeeti et al., 2014:41).

Criticism of semi-structured interviews comes mainly from positivist thinkers, who consider it to be unscientific (Anyan, 2013:2). This is due to data not necessarily secured in a form that is “numbered, quantified or measured” (Kvale, 1983:174). It is understood that semi-structured interviews are “neither an objective nor a subjective method” (Kvale, 1996:1). Understanding of this criticism emphasised the need to secure depth in the data, to ensure that the human side of the story was revealed, which may not always be possible within quantitative-linked paradigms (Barbour, 2014:113-114; Bold, 2012:26; Henning et al., 2004:79; Kvale, 1996:1).

Following from the above, the next decision was how to conduct interviews. Three suitable options to conduct interviews with participants were identified, namely: face-to-face interviews; telephone interviews; and online interviews (Szolnoki & Hoffmann, 2013:57; Novick, 2008:1; Meho, 2006:1284). Face-to-face interviews are perceived as being the more suitable approach as it allows for the researcher to take cue from gestures and voice tone, to assist in the process of probing to ensure understanding is gained and data depth is fully realised (Meho, 2006:1284). Telephone interviews are generally the second option available for participants who are not accessible or available for a face-to-face interview. It is generally a second option, as a telephone interview does not allow the researcher access to gestures, facial expressions and body language that are observed during face-to-face interviews (Novick, 2008:8). A third option exists in the form of online platforms, which use text-based applications to ask questions, receive responses and probe where needed to clarify responses or to secure further details. This is the most affordable option to conduct an interview with participants who are not physical accessible. This is also the last option considered because of the loss of access to gestures and tone of voice during the interview process (Opdenakker, 2006:4). With the above understanding, the process below was followed to finalise the semi-structured interview schedules.

The purpose of the study came about by reflecting on the research questions, aim and objectives of this research (see Table 5.1). The first draft of questions for the semi-structured interview was discussed with the study's supervisor and the recommended changes were made. This revised interview schedule was then piloted. To this end, two individuals with an interest in teacher education were approached to serve as the pilot sample for the teacher educator interview schedule. Two individuals who completed an ITE qualification were also identified to serve as the pilot sample for the NQT interview schedule. This process revealed that the interviews, by means of face-to-face, could be conducted in less than one hour. It was perceived as allowing participants adequate opportunity to reveal data relevant to the aim and objectives of this study. In addition, it was understood that questions needed to be as clear and comprehensive as possible for it to be useable in conducting, if the need arose, telephone or online interviews reliant on text-only engagement (Meho, 2006:1290). The interview schedules, with minor changes deemed necessary after piloting and reflection, were forwarded to the study's supervisor for further comment and recommendations. The final interview schedules are presented as Appendix D (teacher educators) and Appendix F (NQTs) (Jacob & Furgerson, 2012:2-6).

Concerning Appendices D and F, the questions are grouped under headings directly linked to the research aim and objectives as presented in Table 5.1. Specifically, Objective One is linked to the heading “Curriculum Design and Teaching Approach”. Objective Two is linked to the heading “Skills and Knowledge”. Objective Three is linked to the heading “Support and Resources”. The remaining headings, namely “General-Introduction (Background Information)” and “Concluding Question” are linked to the overall aim of the study, as the purpose of these questions was to calm participants by allowing them to speak about themselves. It also granted participants the opportunity to make a closing statement and allow the interview to be formally concluded.

When others open up their lives for us to investigate, it is a gift for both the speaker who is heard and for the listener who learns something from the investigation (Jacob & Furgeson, 2012:9).

Various supporting documents (see Appendix A: Research Information Sheet; & Appendix B: Consent Form) were finalised in preparation for conducting semi-structured interviews. This was done to ensure that the participants were adequately informed of the research purpose and knew what was expected from them during this process (Leedy & Ormrod, 2010:102; Du Plooy, 2001:91).

To contextualise, the teacher educator face-to-face interviews all started with an introduction thanking the participant for their willingness to take part. Consent forms (see Appendix B) were then signed and the interviewee was informed that two voice recording devices would be used. The first question on the interview schedule (Appendix D) served as the official opening of the interview. The interview schedule also served as a checklist to ensure that the purpose of the interview was maintained and that all participants were probed for the desired data. As far as possible, the aim was to show genuine care, concern and interest, and to actively listen for key concepts that required further probing. The teacher educators were approached as experts who held unique knowledge of the phenomenon under investigation. The researcher deliberately took a “less powerful role” to realise as far as possible the context of a conversational approach (Hoffman, 2007:321). Probing questions were also used to re-direct the interview when the conversation seemed to be going off-track from the purpose of the study. The last question on the interview schedule helped close the interview by allowing the participant to provide additional data to ensure that they felt heard as far as possible. This question also allowed for data that potentially might have been excluded to be collected:

Because there is a natural storytelling urge and ability in all human beings, even just a little nurturing of this impulse can bring astonishing and delightful results (Melon, 1998 in Jacob & Furgeson, 2012:1).

The NQTs required flexibility with the process of collecting data. To clarify, the first NQT (NQT1) was interviewed over the phone as she was working and living in the Limpopo Province. NQT2 was interviewed in his classroom at his school of employment in a coastal town in the Western Cape Province. NQT3 was interviewed over the phone as he was working and living in the Eastern Cape Province. NQT4 and NQT5 both worked for the same TVET College but on different campuses in the Western Cape. Both were individually interviewed on the same day at their respective campus of employment. NQT6, who lived and worked in the Western Cape Province, stated that he would only participate if the interview could be conducted via text messaging. Specifically, the request involved conducting the interview using the application 'WhatsApp'. NQT6 also requested for the interview to be conducted in Afrikaans. Both requests were agreed to as the interview schedule was formulated with these potential requests in mind:

The medium where interaction takes place may be modified, based on the study population, to enhance the exchange of ideas and remove obstacles (Mason & Ide, 2014:41).

The approach taken with NQT6 was the same taken as with the face-to-face and telephonic interviews, except that the questions were translated by the researcher and typed instead of spoken. This allowed NQT6 to reflect on the question (and supporting probes) before answering by means of a text message:

[C]reating the most natural realistic environment... to share their 'selves' has an improved chance of eliciting the most candid answers (Mason & Ide, 2014:42).

The above request was the only issue of language which occurred during interviews. Fortunately, Afrikaans is the researcher's mother tongue, which allowed for the accommodation of both Afrikaans and English during interviews.

The data secured from face-to-face, telephonic and 'WhatsApp' interviews was perceived as being sufficient in depth and thickness and was therefore included as data sources to answer the research questions.

In actual research situations, you sometimes have to weigh up sufficiency (the amount of data you need to collect in order to answer your key questions) against

feasibility (the amount of data you can actually collect given the constraints) (Rule & John, 2011:73).

It is noted that the telephone interviews took half the amount of time that the face-to-face interviews required. The 'WhatsApp' interview required around three times the amount of time compared to the face-to-face interviews. Although online interviews are perceived as being more affordable in comparison to telephone interviews, such interviews are 'expensive' in terms of the time required to answer all questions included in the interview schedule. The process followed to make sense of the collected data is explored below.

5.7. Data analysis

The researcher transcribed the interviews to become familiar with the data, considering it as part of the process of data analysis. During this process, the researcher kept in mind that analysis requires data to be "codified into words, phrases, sentences or paragraphs" (Ngulube, 2015:138). This was also done to start the process of thematic analysis by "identifying themes and patterns of meaning across a dataset in relation" to the research questions (Braun & Clarke, 2013:175).

[T]he key research questions developed at the start of study should serve as a guiding force in the analysis process. The analysis must allow you to respond to these questions (Rule & John, 2011:75).

Additionally, this process allowed the researcher to begin thinking about how the data can be "broken down, conceptualised, and put together in new ways" (Strauss & Corbin, 1990:57). In support, the following questions were reflected upon during transcribing to start thinking about how to present "a thick description" of the case: "What were the elements of the case (participants, policies, structures, programmes, activities)?", "How did these elements relate to each other?", "How were they shaped by the internal and external contexts of the case?", "How did they shape these contexts?", and "What were the participants' understandings of the case?" (Rule & John, 2011:118):

Some researchers prefer not to work with data in disassembled, small parts; rather, they work across sets of data in an integrated fashion (Rule & John, 2011:78).

After completing the transcribing process as discussed above, the decision was made to use Tesch's coding method to analyse the multiple sources of data secured by

means of interviews and document review (Tesch, 1990:142-145). The core logic behind this decision was that the following two minimum requirements concerning a data analysis method were needed. Firstly, a method was needed to reduce/combine the multiple sources to one single document to bring the data together. Secondly, a method was needed to allow for codes, common themes and categories to emerge (Flick, 2007:100-101; Henning et al., 2004:127-128). Table 5.4 is presented to guide the discussion to follow.

Table 5.4: Tesch’s coding method briefly contextualised for orientation purposes (Tesch, 1990:142-145)

Coding method:	
1.	All collected data (after being transcribed where applicable) will be read to reveal the extent and richness of the data collected.
2.	All collected data will be combined and compiled as a single document. The original source documents will be filed for safekeeping.
3.	The compiled document will be read with the aim of allowing codes, themes and categories to emerge. As the original source documents are safely filed away, the newly compiled document can be printed, highlighted and written on for analysis purposes.
4.	The level of theoretical saturation should be established by revealing initial findings answering the research questions that emerged from the specific collected data and by no more new categories emerging.
5.	The original source documents will be re-read for the purpose of identifying data potentially overlooked and excluded during the process of merging data onto one document as completed in step 2. This process will be repeated (and adjusted as needed) until the research questions are adequately addressed and the data analysis reaches saturation.

Tesch’s coding method (Tesch, 1990:142-143), as summarised in Table 5.4, was used as the core reference point to guide the data analysis process. It was understood that the collected qualitative data needed to be analysed to reveal its “richness and holism, with strong potential for revealing complexity” (Miles & Huberman, 1994:10). Within this context, the decision was made to implement data analysis within the following definition:

Data analysis is a systematic search for meaning. It is a way to process qualitative data so that what has been learned can be communicated to others. Analysis means organising and interrogating data in ways that allow researchers to see patterns, identify themes, discover relationships, develop explanations, make interpretations, mount critiques, or generate theories. It often involves synthesis, evaluation, interpretation, categorisation, hypothesizing, comparison, and pattern finding (Hatch, 2002:148).

To begin, teacher educators’ interviews were transcribed immediately after they were conducted to maintain closeness to the data. The transcribed versions were grouped together in a single document. The documents made available by the teacher educators (policies, study guides and the Programme Guide 2014) were read and the

relevant content/statements were copied onto another single document. The documents secured from the HEI's official website were also read and relevant content/statements were copied onto a separate single document. This was followed by reading the Faculty Handbook 2014 and copying relevant content/statements on to another single document. The NQT interviews were also transcribed immediately after the interviews were conducted to maintain closeness to the data. The interview conducted via 'WhatsApp' was re-typed during the interview process. The transcribed interviews were grouped together onto a single document. The official website of the HEI was re-visited to secure additional content/statements which were copied onto another single document. The portfolios (assessments) were analysed last to secure content/statements and were copied onto a single document. All the above documents were merged into one document by presenting it under every month for 2014 and the beginning part of 2015 (January-March). This process ended with a single document consisting of 190 pages that presented data in a time-line format for further analysis.

[T]he researcher first reads through the entire set of data. After doing so, the researcher chunks the data into smaller meaningful parts. Then, the researcher labels each chunk with a descriptive title or "code". The researcher takes pains to compare each new chunk of data with previous codes, so similar chunks will be labelled with the same code. After all the data have been coded, the codes are grouped by similarity, and a theme is identified and documented based on each grouping (Leech & Onwuegbuzie, 2007:565).

With the 190 pages in hand, the researcher re-read the document organised in a time-line format and allocated a code, theme and category to specific data (words, paragraphs or sentences) (Flick, 2002:178; Rule & John, 2011:77).

Codes are tags or labels for assigning units of analysis to the descriptive or inferential information compiled during a study. Codes are attached to "chunks" of varying size – words, phrases, sentences, or whole paragraphs, connected or unconnected to a specific setting (Miles & Huberman, 1994:56).

The understanding secured during Chapter 2, 3 and 4, which allowed for a conceptual framework to be "built", served as initial codes to group data (Ngulube et al., 2015:54; Barbour, 2014:118; Bold, 2012:141; Henning et al., 2004:127-128). By using codes and themes that formed part of the conceptual framework, the researcher was able to conduct literature control by linking the understanding gained from literature with the understanding secured by analysing data (Creswell, 2009:70; Henning et al., 2004:127; Miles & Huberman, 1994:10).

Once all themes and categories from the conceptual framework were addressed and the research questions were answered, the assumption was made that theoretical saturation had occurred and the data was analysed to its full potential within the perimeters of this study's aim and objectives (see Table 5.1) (Ngulube, 2015: 143; Hatch, 2002:148; Babbie & Mouton, 2001:493; Silverman, 2000:86). The section to follow highlights the decisions taken to enhance the trustworthiness of data.

5.8. Trustworthiness

In enhancing the validity and reliability of this qualitative study, focus was placed on establishing the trustworthiness of the study by using Guba's model (1981) of trustworthiness (credibility, transferability, dependability and confirmability) (Shenton, 2004:63-73; Krefting, 1990:215-217). An overview of this model is presented below.

Table 5.5: Guba's four criteria of trustworthiness (Shenton, 2004:73).

QUALITY CRITERION	POSSIBLE PROVISION MADE BY RESEARCHER
Credibility	Adoption of appropriate, well recognised research methods, Development of early familiarity with culture of participating organisations, Sampling of individuals serving as informants, Triangulation via use of different methods, different types of informants and different sites, Tactics to help ensure honesty in informants (participate on a volunteer basis), Iterative questioning in data collection dialogues, Negative case analysis, Debriefing sessions between researcher and superiors, Peer scrutiny of project, Use of "reflective commentary", Description of background, qualifications and experience of the researcher, Member checks of data collected and interpretations/theories formed, Thick description of phenomenon under scrutiny.
Transferability	Provision of background data to establish context of study and detailed description of phenomenon in question to allow comparisons to be made.
Dependability	Employment of "overlapping methods" (the research design may be viewed as a "prototype model"). In-depth methodological description to allow study to be repeated (and not necessarily achieve the same outcomes but rather be able to repeat the same process).
Confirmability	Triangulation to reduce the effect of investigator bias, Admission of researcher's beliefs and assumptions, Recognition of shortcomings in study's methods and their potential effects, In-depth methodological description to allow integrity of research results to be scrutinised, Use of diagrams to demonstrate "audit trail".

In addressing credibility, investigators attempt to demonstrate that a true picture of the phenomenon under scrutiny is being presented. To allow transferability, they provide sufficient detail of the context of the fieldwork for a reader to be able to decide whether the prevailing environment is similar to another situation with which he or she is familiar and whether the findings can justifiably be applied to the other

setting. The meeting of the dependability criterion is difficult in qualitative work, although researchers should at least strive to enable a future investigator to repeat the study. Finally, to achieve confirmability, researchers must take steps to demonstrate that findings emerge from the data and not their own predispositions (Shenton, 2004:63).

Guided by the above, a discussion is entered to contextualise the decisions and actions taken to establish trustworthiness:

- **Credibility:** Triangulation of data was employed (Creswell, 2009:191). Firstly, two data collection methods (interviews and document review) were used. Secondly, various individuals (six NQTs and five teacher educators) were interviewed and various documents (policies, study guides, portfolios, etcetera) were analysed to allow for triangulation to occur by means of various data sources pointing towards the same or similar conclusions (Leedy & Ormrod, 2010:99). The researcher holds the perception that data collected and analysed by the means stated above allowed for a “true picture of the phenomenon under scrutiny” to be presented in the chapters to follow (Shenton, 2004:63).
- **Transferability:** The findings of this qualitative study are perceived as being specific to the participants in the unique context and time-frame. Therefore, it is impossible to demonstrate that the potential “findings and conclusions are applicable to other situations and populations” (Shenton, 2004:71). Rather, concerning transferability, two “collages” of the phenomenon in two specific contexts and time-frames (one from a teacher educator perspective to gain background information and the second from a NQT perspective to examine the usefulness and potential gaps in the experiences during initial education) are presented. This is done to influence the quality and impact of future PGCE FET mathematics programmes and related professional development (Creswell, 2009:193; Luker, 2008:103). Additionally, the participants (see Table 5.2 & 5.3) were introduced to the reader with a brief glimpse of their background (Payne & Williams, 2005:296).
- **Dependability:** Two conceptual frameworks (see Figure 3.2 and 4.9) were built during the literature review section of this case study. These are reflected upon and used to secure initial themes to organise emerging categories during data analysis. These are also reflected upon to link theory with data findings to contribute to the existing body of knowledge (Creswell, 2009:193; Lincoln & Guba, 1985:290). The two conceptual frameworks are also refined/contextualised in the closing data analysis Chapter (see Chapter 9) to summarise the contribution (agreements and disagreements) with the literature reviewed (Krefting, 1990:217). These two

frameworks are also presented to guide similar future case studies (Shenton, 2004:73).

- **Confirmability:** Data was presented in direct quotes secured from three sources (teacher educators, NQTs and documents) to promote neutrality (Marrow, 2005:252) and triangulation as far as possible (Shenton, 2004:73). It is believed that open-ended questions enhanced data neutrality allowing participants to translate questions to present their understanding and perceptions (Barbour, 2014:132; Bold, 2012:26; Leedy & Ormrod, 2010:191; Henning et al., 2004:40). The inclusion of direct quotes and a contextualised description of the process followed, to secure a research design guided by the needs of the case study, serve to prove integrity of data and to encourage comparison and confirmation by other researchers (Bold, 2012:29; Creswell, 2009:190-191).

5.9. Ethical considerations

In addition to the above considerations to enhance validity and reliability, it is acknowledged that research is also “about people and relationships” and not only a technical process of “collecting, analysing and interpreting data” (Rule & John, 2011:113).

Rigour and creativity characterise its treatment of data, while ethics and professionalism guide its dealings with people (Rule & John, 2011:113).

The understanding reflected upon, and approaches taken when engaging with participants to meet the research aim and objectives (see Table 5.1), are presented below.

5.9.1. Protection from harm

Participants were never subjected to “unusual stress, embarrassment or loss of self-esteem” (Leedy & Ormrod, 2010:102) or any form of harm (“physical, emotional or psychological”) (Le Roux, 2015:94). The NQTs and teacher educators were allowed to withdraw from the research at any stage if they felt that they were placed under undue emotional turmoil. Additionally, participants were given copies of transcribed interview scripts during the data analysis phase of the research. This allowed participants to request the removal of a specific quote or statement that they believed could potentially cause them harm (Bold, 2012:71).

5.9.2. Informed consent

Participation throughout this study was voluntary. An informed consent form (Appendix B) and information sheet (Appendix A) was forwarded to all selected NQTs and teacher educators (Le Roux, 2015:92; Leedy & Ormrod, 2010:102; Du Plooy, 2001:91). These forms contained all the relevant information that are custom with such documentation. In addition, participants also had “the right not to answer specific questions” during the interviews (Le Roux, 2015:92).

5.9.3. Right to privacy/anonymity

All participating NQTs and teacher educators (including the HEI) names were changed to a code to assure anonymity as far as possible (Le Roux, 2015:94; Leedy & Ormrod, 2010:102; Du Plooy, 2001:91). Responses of all participants were presented under common themes and categories. When a specific quote was stated, the code was used to acknowledge the source.

5.9.4. Honesty with professional colleagues

All thoughts, ideas or words of another were referenced to acknowledge indebtedness to such individuals (Leedy & Ormrod, 2010:102; Du Plooy, 2001:91). The findings of this study were reported honestly, namely that the researcher wished to study this topic further in order to meet the requirements of post-doctoral research. This motivation ensured that no fabrication of data (conflict of interest) occurred. This also ensured that professional colleagues’ (professors, teacher educators, universities, government officials, school principals, teachers, NQTs and students) agreement with the findings of this study was of the utmost importance (Le Roux, 2015:105).

5.9.5. Permission

Ethical clearance was obtained from the ethics committee of the Cape Peninsula University of Technology (CPUT) and the Western Cape Department of Education (WCED). The Faculty Academic Ethics Committee and the WCED would have been informed immediately of any substantive changes to the project impacting ethical clearance. (Le Roux, 2015:99). This situation did not occur.

5.9.6. Data management

Recordings of interviews and transcripts will be deleted five years after the graduation date. All printed data sources will be destroyed by means of a paper shredder and electronic copies of such will be deleted upon notice of graduation. The secured student portfolios will be returned to the Faculty of Education upon notice of graduation.

5.10. Limitations of the study

Qualitative research is subjective in nature due to the process of measurement being dependent on the discretion of the researcher (Zikmund, 2003:132). The concern of qualitative researchers involves understanding rather than explaining; naturalistic observations instead of controlled measurement; and the subjective exploration of reality from an insider's perspective instead of the predominant outside perspective in the quantitative paradigm (De Vos et al., 2002:79). The aim of this research was to examine experiences delivered to students in a specific PGCE FET mathematics programme in relation to knowledge, skills and attitudes to function as a classroom teacher. This aim was achieved by using a generic case study methodology with a tracking element within the interpretivist paradigm that is common amongst qualitative researchers (Creswell, 2009:8). Therefore, the following restrictions of qualitative exploratory research, as identified by Zikmund (2003:132), are relevant to this study:

- (a) Interpretations of collected data are based on the judgement of the researcher; and
- (b) The possibility of generalisations concerning findings emerging from collected data are limited as the study is restricted to a specific context, sample and time-frame.

The purpose of analysis in qualitative research is to enquire deeply into the meaning of different situations and different people's understandings of the world. It often takes place with small numbers of participants, in a particular context, and for a specific purpose related to a change in practice or an improvement in social conditions. It cannot usually be generalised, yet when small research projects are shared others have similar experiences and stories to tell. Thus it is valid and reliable, in the sense that it is purposeful for the context in which it took place and it has significance for others in similar contexts and places (Bold, 2012:120-121).

5.11. Closing

This Chapter served as an overview of the research methodology that was used to meet the purpose of this study. Qualitative methodology was chosen to explore and

describe the perceptions of teacher educators and NQTs to gain understanding of experiences during a PGCE FET mathematics programme as offered by a specific HEI. The in-depth process of data collection and data analysis used in this study was contextualised. The analysed data is presented in the chapters to follow.

CHAPTER 6

PGCE FET MATHEMATICS PROGRAMME STRUCTURE AND GOALS

6.1. Introduction

The preceding Chapter presented the methodology of this study. This Chapter addresses the first sub-question: What can a student expect when pursuing the PGCE ITE route in terms of the selection process, modality, curriculum and assessment? The logic behind this Chapter is to provide an overview of what the PGCE as a process entailed in terms of its overall structure and goals. All data sources (teacher educator interviews; NQT interviews; Faculty Handbook; HEI Official Website; PGCE Study Guides; Programme Guide; Student Portfolios; and faculty policies) offered insights and are referenced in the Chapter to follow. The presentation of data was organised by using the discussion headings presented under first step/criteria (clear goals (clear structure)) in the study's conceptual framework (see Figure 4.9) as themes, namely: the selection of students; the modality of the PGCE; the PGCE curriculum; and the assessment process. The selection of students as a theme allows for data to be highlighted on PGCE inputs in relation to the individuals who are granted access. The modality of the PGCE highlights the broad strategy used in the PGCE to develop a student into a NQT. The PGCE curriculum as a theme explores the content of the qualification as stated in the relevant study guides and programme guide. The assessment process allows for data to be presented on how the PGCE verifies that a student has developed into an NQT as a result of the PGCE modality and curriculum. This Chapter broadly presents the inputs associated with the PGCE FET mathematics programme comprising the case of this study. The first of the four themes are presented below.

6.2. Selection of students

The HEI used four criteria to select students: student choice(s) of a qualification/programme; the availability of space; the entrance requirements of the qualification; and access to funding (QEPIS:P1). Categories emerging from these criteria are presented below.

6.2.1. PGCE (teaching) was chosen by those in need of a second career option

Three reasons for choosing the PGCE emerged:

- (1) Many NQTs chose the PGCE because they were unable to secure meaningful employment with their diploma with a mathematics focus.

Ek het nie werk gekry met my qualification nie. En toe 'jump' ek sommer in die onderwys [Translation: I was not able to secure employment with my qualification. So I decided to 'jump' into teaching] (NQT6 interview).

For a vast majority of people the PGCE is a second option... As the economy goes down the PGCE enrolments has been going up (TE2/programme coordinator interview).

- (2) Some NQTs chose the PGCE because of a desire to complete further studies relating to mathematics that was not linked to a technical profession.

I wanted to do something that will keep me going in terms of doing maths... If I go to a field or maybe an industry, I would be doing some practical and not continuing with maths now (NQT2 interview).

- (3) Unqualified employed teachers/lecturers who left a technical profession chose the PGCE to allow them to earn a higher salary once they qualified as a professional teacher.

So in order for them to pay me a better salary I have to do a teacher's diploma. So I said kwaai [cool] man (NQT4 interview).

The above reasons support the research findings of teaching not being the sampled NQT's first choice of career (Taylor, 2014:9; Jansen, 2013:91; DBE, 2011:68), as they initially completed a diploma granting access into a technical career. The above also supports the perception that the PGCE is, in many cases, a second opportunity to pursue an alternative career linked to a completed undergraduate qualification (Deacon, 2012:43; Thomson et al., 2012:326; Ashby et al., 2008:5; Watt & Richardson, 2008:409).

6.2.2. PGCE spaces increase annually due to DHET and HEI demands

Due to more students choosing the PGCE and being accepted, the HEI increases PGCE spaces annually (HEI Official Website 2014; QEPIS:P1; TE2/programme coordinator interview). The increase is mainly as a result of demands placed on the HEI by the DHET:

[HEI] decided to increase the intake of PGCE... there is a shortage of teachers and the emphasis of the [DHET] is the PGCE... by 2030 there should be so many teachers (TE5 interview).

To meet the above DHET demand, the PGCE programme coordinator conducted targeted marketing over the last 20 years to increase student numbers (QEPIS:P1).

I was [and am] involved in the marketing [of the PGCE]. I pushed the numbers up from less than 10 students [in 1994] to this year [2015] I think we have accepted 207 (TE2/programme coordinator interview).

Targeted marketing focused on two school subjects, namely mathematics and business studies, which were perceived as being needed by all schools and TVET colleges. These school subjects are also the focus (or part thereof) of most qualifications (non-education related) offered by the HEI (HEI Official Website). By focusing on these subjects, the PGCE has been able to achieve an increase by attracting HEI graduates from HEI faculties with a focus on business or mathematics related fields. For this reason, the PGCE is in line with HEI demands:

[T]he way in which we structure the PGCE internally is to focus on what [HEI] want. Our major product is business teachers and secondly mathematics teachers (TE2/programme coordinator interview).

In 2014, the PGCE attracted just over 100 students (NQT5 interview; TE1/TP coordinator interview; TE2/programme coordinator interview; TE5 interview), of which at least 26 (number secured from the list used for sampling released by the HEI) were registered for the PGCE FET mathematics programme. The amount of 26 is perceived as a dramatic increase. This is because the PGCE had only attracted between 3 to 7 qualifying students during previous years (TE2/programme coordinator interview; TE3 interview). The increase in qualifying students occurred when diploma graduates were granted access to the PGCE.

For the past couple of years the maths has expanded as well because one of the faculties... offers a course called [National Diploma] in Mathematics Technology... so they end up with a maths and a major in general science or something similar (TE2/programme coordinator interview).

The PGCE has increased the number of FET mathematics teachers because of an increase in diploma graduates pursuing the PGCE and gaining access (DHET,

2015:26; Taylor, 2014:10; CHE, 2006:1). The key assumption in the PGCE is that the initial qualification that grants access had developed adequate SMK (DHET, 2015:25; Taylor, 2014:10; CHE, 2006:1). This assumption is potentially anchored within the practice of Bachelor Degree holders gaining access to the PGCE (CHE, 2006:1). As a result of an increase in diploma graduates gaining access to the PGCE, there is a need to rethink the validity of the above assumption. For example:

But even that, mingling, combining students with a diploma and a degree. I don't think it is appropriate because a person with a diploma doesn't have the same amount of knowledge as a person who has a degree. But the assumption is that they do (TE5 interview).

There is also potentially a need to test the level of existing SMK as part of the selection process. Existing SMK can be verified with a formal assessment in the beginning of the PGCE to identify the need for additional modules focusing on SMK. The HEI is currently implementing this practice for sports-focused diploma graduates from the HEI, who pursue the PGCE with life orientation and business studies as didactics. This is the reason why the PGCE Timetable (see Appendix I) schedules additional business management contact sessions on Tuesdays (12:30-13:15) and Thursdays (12:30-14:00), and life orientation contact sessions on Tuesdays (14:00-15:30) and Wednesdays (11:00 – 12:30). If the practice exists for sports-focused diplomas, there is no reason why the same cannot be scheduled for mathematics-focused diplomas. Additionally, during an informal conversation with TE3 in 2017, it was mentioned that some mathematics-focused diploma graduates were found to struggle with SMK in the PGCE context. Qualifications granting access into the PGCE are explored below.

6.2.3. HEI diploma graduates meet PGCE entrance requirements

Two key entrance requirements were used to establish the suitability of students, to fill the increased number of spaces in the PGCE (HEI Official Website 2014; QEPIS:P1; TE2/programme coordinator interview). The first requirement is a Grade 12 certificate with two higher-grade “passes in two of the eleven official languages, one of which must be... English” (Faculty Handbook 2014). The second is a “three-year diploma or four-year degree” completed at a “recognised institution” (Faculty Handbook 2014). The completed qualification needs to contain at least two school/didactic subjects (or closely related) up until second year at university level (Faculty Handbook 2014; TE2/programme coordinator interview). The programme coordinator checked the qualification’s suitability by verifying the existence of desired SMK for the PGCE context (Faculty Handbook 2014; TE2/programme coordinator). As examples of suitable

qualifications, NQT4 completed a diploma focusing on electrical engineering at the HEI in the 1980's. NQT1, -2, -3, -5 and -6 completed a National Diploma Mathematical Technology (from here NDMT) at the HEI. At least another five NDMT graduates from the HEI registered for the PGCE FET mathematics programme in 2014:

With me I think... about 10 [NDMT graduates] (NQT5 interview).

As a whole, around 10 percent of 2014 PGCE students were NDMT graduates from the HEI. This justifies the need to explore the NDMT. An overview of the NDMT is presented in Table 6.1 below. NQT1 and NQT6 revealed that their didactics in the PGCE were mathematics and economics (linked to Option 2: NDMT (business)). NQT2, NQT3 and NQT5 revealed their didactics were mathematics and physics (linked to Option 1: NDMT (applied science) or Option 2: NDMT (chemical industry)). This means that all three NDMT options serve as feeder qualifications for the PGCE FET mathematics programme. Interestingly, there is no mention of becoming a teacher at a school or a lecturer at a TVET college with the listed career opportunities presented in Table 6.1. This is of interest as the trend is an increase in PGCE students choosing mathematics due to an increase in the number of NDMT graduate applicants over the last couple of years (TE2/programme coordinator interview).

Table 6.1: NDMT Overview (HEI Official Website 2015)

OVERVIEW		
We offer a three-year diploma in Mathematical Technology, the first of its kind in South Africa. This qualification empowers you to acquire valuable theoretical knowledge, critical thinking and problem-solving skills as well as attitudes and values necessary to operate confidently in the workplace... Graduates become skilled in applied mathematics, statistics, programming and numerical methods, and are helped to pursue their career choices in business or applied science or chemistry.		
OPTION 1: NDMT(applied science)	OPTION 2: NDMT (business)	OPTION 3: NDMT (chemical industry)
Graduates of the applied sciences stream can find employment in health laboratories, government departments, the biotech industry, environment and pollution control and monitoring, forestry and nature conservation as well as fisheries and marine management.	Employment opportunities for graduates of the business stream exist in the insurance and banking industry, in financial services, Statistics SA as well as actuarial, stock markets and business data management.	Employment opportunities for graduates of the chemical industry stream exist in petroleum, pharmaceutical, fertilizer, explosives and plastics industries. Graduates can also work as forensic analysts, quality assurance agents, chemical plant operators and process engineers.

The NDMT is an example of a diploma with an applied mathematics syllabus which is “not perfectly suitable as a basis for teaching [m]athematics, but is acceptable” as stipulated in recent policy (DHET, 2015:68). Although not perfectly suitable, NDMT graduates gain access into the PGCE. The PGCE FET mathematics programme

potentially only attracted between 3 and 7 students per year in the past because of the practice of preferring/targeting mainly Bachelor degree holders as candidates (DHET, 2015:65). Although the NDMT is accepted for access into the PGCE, some NQTs hold the perception that a PGCE student should first gain some experience in a school or college before pursuing the PGCE:

PGCE is not there to teach you how to teach, for me.... I mean you cannot go there straight from class, not really class but straight from [a] diploma finished [and] PGCE immediately (NQT6 interview).

Considering the increase to 26 students, the recent policy stipulation of allowing diploma graduates access into the PGCE in scarce specialisations such as mathematics has yielded positive results (DHET, 2015:68). In short, the HEI has increased the number of qualified mathematics teachers being produced as needed by the schooling system (CDE, 2015:3; Chetty, 2014:92; Spaul, 2012:12). This was achieved by revising access requirements as stipulated in policy. The financial demands attached to the PGCE are explored below.

6.2.4. Bursaries are available for most (not all) qualifying students

The total cost of the PGCE tuition fees was between R14 000 and R20 000 in 2014. A minimum payment of R3 700 was required for “day students” and R5 400 for “students staying at residence” (HEI Official Website 2014). To meet such financial demands, funding support was available for qualifying students:

The [HEI] assists students with accessing a wide variety of financial aid and funding for study-related costs such as fees, accommodation and books (HEI Official Website 2014).

There is financial support like Funza Lushaka bursaries. I know there is a portion there for PGCE students... And then there is NSFAS... Funza Lushaka is a meritorious bursary, not everybody will get it and those who want to get it will have to work hard, which is a good thing (TE4 interview).

All the interviewed NQTs revealed that they received a bursary. This does not mean that all who gain access into the PGCE FET mathematics programme qualify automatically for a bursary. One individual responded during sampling that he unfortunately had to decline an interview, as he was unable to complete the PGCE because of financial reasons. In support, the HEI revealed that it “does not have

sufficient funds” to offer all students “financial aid” (QEPIS:P1). The second theme regarding the structure and goals of the PGCE is explored.

6.3. Modality of the PGCE

The section above presented insight into reasons for entering and the selection process of students in 2014. The section to follow focuses on how the PGCE was to be delivered (inputs) in 2014. To begin, the PGCE consists of two components, namely: the contact sessions of the various modules (see Appendix I: 2014 PGCE Timetable) and two TP sessions (Faculty Handbook 2014; HEI Official Website 2014; Programme Guide 2014; TE1/TP coordinator interview; TE2/programme coordinator interview; TPP 2014). These two components are reflected upon to secure categories for organising and presenting modality related data.

6.3.1. PGCE is maximum eight months in duration to deliver engagements equivalent to a four year B. Ed.

According to the “Academic Programme for 2014”, lectures commenced on 3 February 2014. The first term was 8 weeks in duration. The second term was almost 11 weeks long. The third term was close to 7 weeks and the fourth, 11 weeks. The dates for TP in the PGCE were as follows: (1) “First five weeks of term 2”; & (2) “First four weeks of term 3” (Programme Guide 2014) Faculty Handbook 2014; Programme Guide 2014). The last contact session for mathematics didactics was on the 28th of October (MDSG 2014). November was used to finalise assessment and to conduct re-assessment where needed/allowed (Faculty Handbook 2014). The last scheduled assessment was on the 6th of November (language development and communication test) (LDCSG 2014). Therefore:

[Y]ou have eight months to get a person moving from say a cook to a cooking teacher. You have to go through the whole introduction, mature, decline relationship process in eight months (TE2/programme coordinator interview).

Some teacher educators argue that the allocated time is actually shorter than eight months:

Remember they spend time going to the field. There are university holidays, three weeks and four weeks in December. There are one weeks holiday every term. You end up with something like four or five months in class (TE5 interview).

The above supports Hobson et al. (2006:266), who found that the PGCE is delivered in no more than eight to nine months. This means that teacher educators are expected to equip a NQT with all the knowledge, skills and attitudes transferred during the four year B. Ed. in eight months to PGCE students. This perceived limited amount of time raised doubt in some teacher educators on the ability of the PGCE to develop a quality teacher, as they perceive as being possible in the B. Ed. time frame. To make best use of the limited time available, it is essential that those who gain access hold the desired existing SMK and academic literacy to ensure that they are able to engage at the desired academic level from the beginning of the year (Ingvarson et al., 2014:8; ODE, 2013:301). The perception that time is limited in the PGCE was created when teacher educators engaged with PGCE students and discovered that they are lacking in SMK and academic literacy skills, which are assumed to be in place. In addition, some students lacked the skills to access additional support or content offered to make best use of the limited time available:

[T]hese people were afraid to tell me that we do not know what e-mail is: 'We don't know this so we don't have any of those things'. They missed out on a lot of opportunities (TE4 interview).

The lack of specific knowledge and skills of some students restricted the level and quality of engagements that could occur during contact sessions (Ingvarson et al., 2014:8; ODE, 2013:301). This also potentially restricted the academic achievement achievable leading to a failing mark.

But there you pick up the problem... they end up with 43 percent at the end of the year (TE2/programme coordinator interview).

The section to follow explores the overall approach during the PGCE to develop a FET mathematics teacher.

6.3.2. PGCE modality is guided self-study

Because there are only eight months to complete the PGCE, the modality is guided self-study. For example:

The methodology of this subject can be described as 'GUIDED SELF-STUDY'. Each session will involve introductory and concluding lectures, feedback on assignments and what is required from forthcoming assignments (PSSG 2014).

In support, Appendix J presents allocated contact periods and recommended self-study for the various modules of the PGCE. The 2014 PGCE Timetable (see Appendix I) scheduled three to four contact periods per module. This means that for every 45-minute contact period, an additional 45 to 90 minutes of self-study were required. Therefore, the PGCE requires students to hold a certain level of academic maturity to work independently with limited supervision.

[T]here is an acceptance that you are working with a graduate student and that is communicated with them. We work with adults and if you are not going to work with us as adults we are going to pick up a problem (TE2/programme coordinator interview).

To clarify guided self-study with the assumption that students are able to work independently with limited supervision, the following is stated:

[I]t is not leaving students to do their own thing. It is providing them with the scope and parameters within which to operate. With the PGCE we need to give them the scope to be able to do... their minds flow where it wants to go (TE2/programme coordinator interview).

The modality of guided self-study is explored further.

6.3.3. Guided self-study anchored in three assumptions (potential misconceptions)

The modality of guided self-study starts by introducing students to the relevant school curriculum. This is done to allow students to identify potential gaps in their SMK:

Within the first term, before [TP], you will be introduced to the school curriculum in its entirety. All you as a person should be able to do is say: I know that, I know that. Oops, I do not know that. Let me go and study (TE2/programme coordinator interview).

The above takes place during the first contact sessions scheduled for didactics:

Your two didactics looks specifically at the application of your subject matter expertise into pedagogic expertise... So we develop your subject specific pedagogical knowledge within the didactics (TE2/programme coordinator interview).

This means that didactics served as the foundation on which knowledge, skills and attitudes were to be developed by means of guided self-study in the diverse modules comprising the PGCE:

[T]here is the broader subjects which is the focus on the broader knowledge component of you as a teacher... the broader issues, the management issues and the theory of education issues and so forth, we develop in the other subjects which is education (TE2/programme coordinator interview).

Therefore, students were introduced to specific theories, followed by a discussion facilitated by a teacher educator to link existing SMK with newly acquired PCK (LDCSG 2014; TE3 interview; TE5 interview). For example:

[T]here is a topic we do... we deal with differentiation. We talk about problems and learning et cetera. I try to draw examples from as many subjects as possible and off-course I am not a mathematician. So I have to believe what [students] tell me is true. Somebody will have to stand up and tell us how I would differentiate this task for a learner who is at a lower level of understanding as opposed to one who is at a higher level of understanding (TE4 interview).

PGCE is not there to teach you how to teach, for me. It puts more on what you can call embedded knowledge on what you already have (NQT6 interview)

The quality of discussions and engagements during the PGCE is therefore dependent on the students' ability and willingness to take initiative (participate actively in guided self-study). For example:

The only person that can fail you is yourself by you not working. By you not being involved... or you weren't participating or you weren't in class (TE3 interview).

Guided self-study further requires students to familiarise themselves with HEI "rules and procedures for assessment at the beginning of the academic year" (Faculty Handbook 2014). Students are also required to identify SMK gaps to be included in their didactics by engaging with relevant curriculum documents within the first two weeks (TE2/programme coordinator interview; TE3 interview; MDSG 2014). In addition, students are expected to identify a school or college within the first two weeks in which to complete TP (TE1/TP coordinator interview; TPP 2014). In short, the first two weeks require students to make critical decisions which influence the quality of the PGCE to be delivered. Overall, students are required to conduct self-study to equip themselves with the knowledge, skills and attitudes to critically engage with teacher

educators and fellow students during contact sessions and mentor teachers during TP (TE2/programme coordinator interview; Programme Guide 2014). The PGCE's quality is thus highly dependent on the students' ability and willingness to conduct self-study.

Reflecting on the above, the modality of guided self-study was anchored in three assumptions about students. The first: students were assumed to be SMK experts who could link the newly introduced educational theories with their existing SMK. Second: students were assumed to hold the skill and motivation to conduct self-study to enhance their understanding of the educational theories introduced and to prepare for future contact sessions. Third: students are assumed to hold the ability to convert educational theories into examples of how to differentiate SMK to diverse learners during compulsory modules' contact sessions (Reeves & Robinson, 2014:237-238; Philpot, 2006:300). In summary, students are assumed to be able and willing to contribute during contact sessions to merge existing SMK with newly introduced PCK and/or educational theory. Unfortunately, not all students were willing to do so. For example:

[W]ell they won't really talk much about their didactics whatever they do practically there (TE4 interview)

It was argued previously that there is doubt that all students who gain access into the PGCE hold the desired level of SMK and academic literacy to engage at the desired level to gain full advantage of the PGCE as an experience. Based on this, it is argued that it is not unreasonable to say that some students might not hold the desired level of maturity to engage successfully in the modality of guided self-study.

Guidance offered outside the lecture room is explored in the section to follow.

6.3.4. Guided self-study assumed to be supported by one-on-one consultation sessions to an ever increasing body of students

To guide students during self-study, teacher educators were allocated specific time slots to hold one-on-one consultation sessions. Teacher educators were allowed to adjust the allocated time slot on their prescribed schedule to accommodate student availability because of attending classes in the afternoon (see Appendix I):

In fact, I was telling PGCE students that on my subject guide there are consultation hours, there are two slots for that. But I am aware that they happen too early in the day. That is 14:00 – 15:00. But I have a special slot for PGCE students and we

always agree on which day works best for them. So then that is when they can come in much later in the afternoon (TE4 interview).

In addition, all NQTs stated that the teacher educators were also available after a contact session to discuss challenges. For example:

I could go up to my lecturers and talk to them about what they were saying (NQT1 interview).

It is noted that the scheduling of consultation sessions does not automatically mean they are available to all students. There were 26 mathematics didactics students and 100 PGCE students as a whole. The consultation session involved an hour to accommodate all the students, for example “14:00 – 15:00” (TE4 interview). The large number of students in the PGCE might have discouraged some students in cases where there were large numbers queuing outside the teacher educator’s office.

They are dealing with over a hundred students... and they only have limited time (NQT4 interview).

Guidance offered to prepare and inform students of the PGCE modality is explored under the category to follow.

6.3.5. Orientation assumed to adequately clarify demands attached to the PGCE modality

Before the contact session started, programme orientation was done to clarify the year ahead. This involved a two-hour session focusing on the following:

- 1) Students were reminded that they are SMK experts because they completed a relevant diploma or degree. Therefore, students were expected to link their existing SMK with newly acquired PCK by means of guided self-study:

I explain to them how they got in and to warn them that they are subject matter specialists. If a person stands in class and says I don't know [specific SMK] ... then you have no right to be there (TE2/programme coordinator interview).

- 2) Students were informed that the PGCE is delivered by means of guided self-study and assessed by means of continuous assessment. Students had to complete and pass all assessments to achieve a year mark above 50 percent to graduate:

They need to realise that they can fail. They need to realise that there is such a thing as plagiarism. I am not just going to sit out eight months and then get my certificate (TE2/programme coordinator interview).

Students were also provided with a programme guide to support the discussions during programme orientation:

I have developed over the years quite a heavy [programme] guide... about 30 pages long (TE2/programme coordinator interview).

During the first contact sessions, teacher educators clarified their expectations to students and allowed students to voice their expectations. For example:

My first lecture is always about expectations. So what do I expect from you and what do you expect from me (TE4 interview)?

During the first contact sessions, students were encouraged to become actively involved and complete all tasks (attend class, complete assessments, do self-study) to allow guided self-study to be effectively realised. For example:

One of my first comments at the beginning of the year would be: I am not here to fail anybody. The only person that can fail you is yourself by you not working. By you not being involved could mean that in the end of the day you are failing. Not me failing you because I don't like you or out of spitefulness. But because you haven't submitted something or you weren't participating or you weren't in class (TE3 interview).

In addition to the above, two modules (language development and communication & introduction to research) scheduled library orientation sessions. Teacher educators for both modules stated that it was a struggle to conduct library orientation because of the large number of students in 2014. Concerning orientation as a whole, there is potentially a need to rethink the communication and delivery. For example:

I wasn't aware of the orientation program. I went to sit with the B. Eds in their assembly (NQT6 written response on course evaluation questionnaire).

The NQT above experienced the B. Ed. orientation as sufficient. The challenge of providing orientation to the ever-increasing students accepted in the PGCE will continue. The information transferred during programme and library orientation might be better delivered by using an E-learning format to transfer generic information

applicable to all students. The HEI is investing in infrastructure to accommodate such initiatives:

[HEI] has also invested considerably in E-learning support to address the needs of students on all campuses and in residences (QEPIS:P1).

In addition, the HEI used an online registration system for the first time in the 2014 academic year across all campuses:

Online registration was piloted in 2012 and was introduced across the University in 2014. Student and staff satisfaction surveys indicate that it is a successful move. In 2013 only 540 students registered online. This grew to 24 956 in 2014 (QEPIS:P1).

In support, 88 percent agreed about the “speed and effectiveness of application process”; 84 percent about the “speed and effectiveness of registration”; 76 percent for “How accessible and clear was information on programme registration”; and 84 percent for “How helpful and user friendly were staff during application and registration process” (NQT2; NQT4; NQT6; NQTsD9; NQTsD13). Additionally, the following was stated:

I like the new online registration; it avoids at least one wait line... It's a good thing to put lab assistance during registration (NQT6 written response on PGCE course evaluation questionnaire).

Reflecting on the above, it seems that the HEI is moving generic administrative activities onto online platforms. The next logical step is to use online platforms to transfer generic information to students such as orientation-related aspects. The school-based component's modality is explored below.

6.3.6. Guided self-study during TP assumed to be supported by three HEI templates and a TP coordinator to promote programme coherence

Coherence between the university-based and school-based component of the PGCE was influenced by requiring students to complete three HEI templates. The first is a lesson plan template (see Appendix K) requiring a student to focus on lesson outcomes, teaching methods, media/resources, learners existing knowledge, time slots, lesson phases, actions of educator and learners' activities (Mathematics Didactics Portfolio; Professional Studies Portfolio). The second is an assessment plan template (see Appendix L) requiring students to focus on the learning being assessed,

analysis of potential assessment mechanisms and feedback after each assessment activity (Professional Studies Portfolio). The third is a reflection template (see Appendix M) requiring students to identify aspects from activities that were successful and unsuccessful, identify ways to improve unsuccessful aspects, and identify the reason why an activity was successful or not (Mathematics Didactics Portfolio; Professional Studies Portfolio). The logistics in terms of placement was supported by an appointed TP coordinator (and a TP administrator) and the Teaching Practice Policy (from here TPP 2014).

I am the coordinator so you come to me if you have any concerns like wanting to switch schools for whatever reason. We accommodate that. There is also a teacher practice administrator who also assist. There is the two of us (TE1/TP coordinator interview).

Students were required to identify and communicate their preference in terms of a host school/college for TP within the first two weeks in February (Programme Guide 2014). Although students could state a preference, the willingness and availability of space in a host school/college was the deciding factor for placement.

The TP Co-ordinator will make every effort to accommodate student preferences, within the parameters of school's placement availability (Programme Guide 2014).

Students were placed in either a high school, technical high school or a TVET college (Mathematics Didactics Portfolios). TVET colleges show a preference of hosting PGCE students (instead of B. Ed.) to complete TP because they hold technical diplomas (TE1/TP coordinator interview). Students employed in 2014 completed TP in their school/college of employment (Programme Guide 2014). In addition to placing students, the TP coordinator was responsible for conducting TP orientation and reflection sessions (PSSG 2014; TE1 interview). TP orientation/reflection focused more on TP process issues. The expectations concerning teaching-learning practices and administration during TP was assumed to be developed during modules focusing on such, and therefore not covered during TP orientation. For example:

There is a focus on pedagogy and teaching all the administration that goes with teaching... that would be addressed in professional studies (TE1/TP coordinator interview).

Concerning guidance in terms of how to engage with a mentor teacher and what to expect from them during TP to gain maximum benefit, the TP coordinator stated the following:

[W]e do talk about the mentor teacher. How do they need to go about, negotiating, interacting with that person. What their duties are as a student. What they could ask of the mentor teacher. But it is very brief in that orientation (TE1/TP coordinator interview).

It is noted that TP was delivered as a standalone module requiring students to take a lead in the learning and development that occurs during TP (TE2/programme coordinator interview). TP modality in the PGCE is potentially anchored within the assumption that students hold a level of maturity that allows them to develop a professional relationship with a mentor teacher(s) in the limited period of 5 and 4 weeks. TP is also delivered with the assumption that the three HEI templates (see Appendix K- M) are relevant and applicable in diverse contexts in which students complete TP. Another assumption is that students are able to identify a school/college most suitable to their development needs within the first two weeks of the year. This assumption is potentially flawed as some students completed TP in a school/college that did not allow them to complete all the required tasks related to TP portfolio assessments. For example:

I could not do my assessments as asked because my mentor told me that they are behind with CAPS document, also their June performance was very low they need to do intervention tasks with their learner. I cannot do project and investigation because that will waste time they do not have (NQT3 approach MD TP2).

The impact of TP in the PGCE context is potentially limited because of some students' inability to identify the most suitable school/college to allow them to complete all related tasks forming part of the formal assessment programme of the PGCE. Alternatively, there are not a sufficient amount of willing host schools to host PGCE students to complete the assessments linked to didactics. A third conclusion is that PGCE assessments are potentially not in line with the reality of the school/college environment in which students are expected to complete TP. In summary, the above indicates that there is potentially a weak relationship between the HEI and the host schools/colleges in terms of the PGCE TP (Canrinus et al. 2015:4; Heeralal & Bayaga, 2011:101-103; Mutemeri & Chetty, 2011:505; Maphosa et al. 2007:355-356; Walkington, 2005:63). The third theme as part of the conceptual framework built in Chapter 4 (see Figure 4.9) is explored below.

6.4. PGCE curriculum

The section to follow presents emerging categories of data relating to scheduled content and expected outcomes.

6.4.1. PGCE mission is to convert a graduate in a specific field of expertise into a teacher by only focusing on PCK

The mission of the PGCE was stated as:

So what we are effectively doing is we are moving from one identity environment to another identity environment... Every minute of every day of the PGCE is aimed at that (TE2/programme coordinator interview).

The PGCE had two main objectives indicating a specific focus on developing PCK, namely: (1) to provide students with “necessary theory and practical expertise” needed by “efficient and effective educators”; and (2) “to give [students] thorough knowledge and background for competent offering of the subjects in GET, FET and HET bands” (HEI Official Website 2014). To meet the above objectives, the PGCE was designed broadly as follow:

Internally I designed the course. All we really do is we introduce the pedagogical knowledge skills and values which they then attach to their content knowledge (TE2/programme coordinator interview).

The above supports literature stating that the PGCE merges existing SMK with newly acquired PCK to allow an individual to call themselves a qualified teacher (Deacon, 2012:20; Czerniawski, 2011:432; Dahlgren & Chiriac, 2009:2; Parker, 2009a:80-1; Carl, 2008:30 Rots, 2007:1; CHE, 2006:1; Darling-Hammond, 2006a:307; Flores & Day, 2006:220; Beiljaard et al., 2004:113; Hiebert et al., 2003:201). It would be a challenge to include all the knowledge, skills and attitudes in the PGCE that are perceived to be needed by a teacher. Therefore, “rational knowledge selection choices must be made” to enhance the probability of delivering a coherent programme (Rusznyak, 2015:7) meeting pre-set objectives. To explore the rational choice made in the PGCE context, Table 6.2 is presented on the next page.

Table 6.2: Secured PGCE study guides content overview (PGCE Study Guides)

	PS	LDC	PE	IR	MD
FEB	Background to teaching as a professional practice	Orientation: The basics of Communication Theory; Barriers to communication.	Component A: Introduction to the module; Theoretical explanations continued; International and local developments.	What is research? Identifying a research topic.	Part A: Behaviourism and constructivism; Learning with understanding Piaget's types of knowledge.
MAR	The national curricula, background & planning; Teaching, learning and media use; Orientation for Teaching Practice.	Barriers to communication.	Component A: Models for intervention and theoretical explanations; Barriers to learning; Risk, resilience, barriers to learning and the teacher's role.	Research Problem; Types of research.	Classroom culture, and teachers and learners' role and expectations; Co-operative learning; Computer technology in mathematics education.
MAY	Teaching Practice; Curriculum theory - design and development.	Oral communication; The teacher as communicator.	Component B: Introduction to the module; Implications of theoretical explanations for learners and learning.	Research Methodology.	Part B: Subject organisation; Assessment Portfolio Lesson Plans.
JUN	Assessment and Evaluation; Orientation for Teaching Practice.	Business correspondence.	Principles of human learning; Factors in effective teaching; Reflection: Theoretical explanations and specific contextual realities.	Academic literacy; Data collection methods.	Part B: Subject organisation; Assessment Portfolio Lesson Plans.
AUG	Teaching Practice; Reflection for Teaching Practice; Managing the learning environment.	Business correspondence.	Closing the module discussion and course evaluation; Component C: Frameworks of thinking (Philosophical lenses) & South African education – past and present – and how frameworks of thinking impose on education.	Library search; Data analysis.	Part B: Subject organisation; Assessment Portfolio Lesson Plans.
SEP	Managing the learning environment; Teaching philosophies & teaching portfolios; Electronic learning.	Business correspondence; Academic writing.	Engendering critical and creative citizens - the aim of education in South Africa; Multicultural education and challenges presented by diversity.	Literature review; Ethical considerations.	Part B: Subject organisation; Assessment Portfolio Lesson Plans.
OCT	Electronic learning; Closure Reassessment.	Intercultural communication.	Adulthood and citizenship; Indigenous Knowledge and Education; Modern Society and schooling.	Referencing; Wrapping up.	Part B: Subject organisation; Assessment Portfolio Lesson Plans.

The included content involved a focus on PCK only to equip NQTs with knowledge, skills and attitudes to enter a classroom and start the process of becoming a professional teacher (González & Gómez, 2014:13). This is because the content includes “a range of general theories of education, schooling, and development related to teaching” (Reeves & Robinson, 2014:237). Specifics introduced include “learning about the social and historical contexts of education systems” and “theories of human and child development and learning” (Naylor & Sayed, 2014:9-10). It is noted that there is no specific content focusing on SMK (CCK and SCK) included in the PGCE.

[T]here is no specialised mathematical knowledge introduced only needed to be known by mathematics teachers (TE3 interview).

The content knowledge, you can't find it on the PGCE (NQT2 interview).

Although no SMK (CCK and SCK) was included, most NQTs stated that they do not believe that additional content was needed or could be added. All NQTs perceived the included content as complimenting their existing knowledge and skills gained during previous qualifications, work experiences and/or being a learner. In addition, all NQTs stated that the PGCE content was more challenging than initially anticipated. For example:

[E]k het total en al iets anders verwag. Ek het gedink ek sal relax deur die course. Maar die course was tough vir my gewees [Translation: I expected something completely different. I thought I would relax and pass the course with ease. But the course was tough] (NQT6 interview).

As a whole, the PGCE content aimed to influence students' teaching philosophy to realise the conversion from diploma graduate to that of a NQT (TE2/programme coordinator interview). The content comprising the PGCE seems to have achieved this from the perspective of all the NQTs. For example:

[I]t introduced me to what teaching is all about (NQT1 interview).

The PGCE was, from the perspective of NQTs, successful in "capping" their existing knowledge, skills and attitudes by "developing [PCK] reflexively grounded in educational theory" (CHE, 2006:1). For example:

[T]hey've got everything in that is relevant. The law, the country law, the basic law, the law of a teacher, the rights of a teacher, the rights of a child, a student, a parent... You know when you come out... what is expected from you (NQT4 interview).

The section to follow explores further influences on the content delivered during the PGCE.

6.4.2. PGCE curriculum specifics is dependent on teacher educators' discretion, policy guidelines and student expectations

Concerning the delivery of educational theory relevant to the topics presented in Table 6.2, it is noted that teacher educators had autonomy in terms of the extent they would elaborate on a specific stated topic. For example:

If I haven't covered enough of whatever I was teaching last week I am able to go back and start from there (TE5 interview).

Teacher educators compiled their own study guides in the format of their choice as all the secured study guides looked different and used unique headings. The content stated in the study guides was also dependent on the relevant teacher educator's discretion and perspectives. For example:

[C]urriculum design is very flexible in the sense that there is no blue print that says in PGCE you must... you know like in schools... also use my discretion on how much students can process at a particular time... bring my own perspective in the curriculum (TE5 interview).

Teacher educators using their discretion with the PGCE curriculum is the norm in higher education, according to TE2/programme coordinator. Teacher educators revealed that they are guided by policy in terms of the amount of contact sessions available to transfer content relating to PCK. Teacher educators are also guided by the programme coordinator, Head of Department, written PGCE-related communication and student expectations (TE2/programme coordinator interview). For example:

Any Higher Education course involves a compromise between what the coordinator wants, what the students want and what the subject specialist thinks they should have (TE2/programme coordinator interview).

To support teacher educators and to establish the suitability of decisions made in terms of content included, frequent re-curriculation as requested by the DHET is done.

We are always re-curriculating and off-course re-curriculation comes from the Department of Higher Education (TE4 interview).

Most teacher educators also stated that they use B. Ed. content as they aim to deliver the same quality believed to be produced in the B. Ed.

I built up my mathematics curriculum on the B. Ed. 4 subject didactic for mathematics (TE3 interview).

Interestingly, none of the teacher educators mentioned the seven roles that policy places on teachers (see Table 2.6), the eleven policy expectations placed on NQTs (see Table 2.8) or the five types of knowledge (see Table 2.6) as influencing the content included in their module of the PGCE. This potentially indicates that teacher education policy mainly influenced the amount of time a teacher educator dedicates to a module without directly influencing the quality and quantity of content introduced to students. Alternatively, the policy expectations criteria is assumed to be covered by the content included in the PGCE due to most of it coming from the B. Ed. curriculum/content developed for related modules. Although it seems that the B. Ed. curriculum serves as the core curriculum guiding the delivery of PGCE, the PGCE could offer valuable insights which could influence the B. Ed. curriculum. In support, Verbreek (2014:48) argues that the PGCE “provides an important challenge and valuable opportunity for teacher educators to identify what is essential” (Verbreek, 2014:48). Meaning, “rather than comparing graduates with different types of [ITE], the significant specific contributions and challenges of each qualification model should be recognised” (Verbreek, 2014:48). In other words, the PGCE grants an opportunity to secure data to influence the impact of all ITE programmes.

To explore the PGCE curriculum in more depth, focus is placed on the modules which comprised the PGCE in 2014 (see Appendix I).

6.4.3. Mathematics didactics focused more on subject administration and general education theory

Mathematics didactics was tasked to “[i]ntroduce [students] to subject policy, curriculum development, learning and teaching strategies, and assessment in a specific subject area” (Programme Guide 2014). The aim of this module is presented in Table 6.3 on the next page. To begin realising its aim, mathematics didactics allowed students to identify SMK (potentially CCK only) gaps during the first two weeks. Students did not (or potentially were not able to) identify gaps in their SMK (CCK and SCK) during the first two weeks.

No one had a problem with the content in maths so we didn't do any content with maths (NQT3 interview).

They told us that we are experts (NQT1 interview).

Table 6.3: Mathematics didactics (MDSG 2014; Programme Guide 2014; TE3 interview)

PURPOSE	OUTCOMES
Introduce students to subject policy and curriculum development.	Mathematics didactics do not focus on SMK. Focus is on advanced studies of theories (Behaviourism and Constructivism; Learning with understanding; Piaget's types of knowledge; Classroom culture, and teacher's and learners' roles and expectations; & Co-operative learning) before the first scheduled TP period.
Introduce students to learning-teaching strategies and assessment relevant in mathematics.	Concurrent with the TP periods focus is on: subject organisation; assessments; & lesson plans.

To prove competence in mathematics didactics, students were required to design different forms of assessments relevant for learners in FET mathematics. These assessments needed to be conducted during TP after planned lessons were delivered. This required students to merge their existing SMK with the newly acquired PCK to assess learners after a lesson was presented (MDSG 2014; Programme Guide 2014; TE3 interview). To prepare students to complete assessments and deliver lessons the following broad approach was followed:

So what we would do is we would focus on the theory of pedagogy. How do we teach mathematics? What is mathematics anxiety? We let them familiarise themselves with that – how do we deal with learners with mathematics anxiety. Different teaching strategies of teaching mathematics. Not all teaching strategies can be applied to mathematics. We look at the theoretical aspects of pedagogy: theories of learning, theories of constructivism, Piaget, Vygotsky. So that they could understand how do learners learn and do they actually learn. Is it about teaching or is it about learning (TE3 interview).

In addition to the above, TE3 stated that the bulk of mathematics didactics content focused on subject administration because this is an aspect he felt least prepared for as a NQT.

I was taught how to teach things but when you get into a school, it is not the same thing. There are all these admin things that you have to do... So I wasn't prepared [and now I make sure] that they do know what is required of them... There is no specialised mathematical knowledge introduced only needed to be known by mathematics teachers... I mainly focus on subject administration... (TE3 interview).

Because of this, there was the potential for duplication of content during the 2014 PGCE of which TE3 was aware:

I am aware that others focus on it [subject administration]. But I make sure that they know it (TE3 interview)

To clarify what was meant by subject administration, the following was stated:

We would look at what is required to be taught according to the policy document and then look at how do we align it. So that when students leave here they are familiar with the policy document. So that they don't come there, at their school and say okay, I have just started teaching but I don't know what to teach (TE3 interview).

Understanding that when you open the year plan it is grade 10 then after that a new thing will start grade 11 all the way. That is something that I didn't know. I only knew it when I came to PGCE and that was math didactics (NQT5 interview).

The focus on administration also highlighted mathematics' specific media needs:

I mean a movie with mathematics you can't you have to go do it practically. So playing a movie is not a practical media for mathematics (NQT4 interview).

In addition, due to mainly focusing on subject administration, this module is perceived to equip NQTs to teach both mathematics and mathematical literacy (TE3 interview). Although TE3 assumed that the focus on subject administration better equips NQTs for the classroom context, this reduced the status of mathematics didactics, from NQTs perspective, as developing them as professionals relating to teaching mathematics. For example:

[A]t the end of the year I had a distinction in mathematics. So I was in the class, even standing and saying I have a distinction for mathematics. They replied saying: This is not maths, this is just arranging the file, all the lesson plans like, that is where we got the marks (NQT2 interview).

Didactics was pretty much routine with a lot of paperwork. I did not really get the point (NQT5 interview).

Although mathematics didactics was delivered as part of equipping NQTs for the classroom context, limited focus on SMK caused NQTs to experience term 1 in 2015 as challenging. For example:

It was challenging and there was much to learn and there is a lot of work because I have to focus on familiarising myself with content (NQT1 interview).

Reflecting on the above, didactics (curriculum studies) serves as the core of the PGCE by focusing on (1) selecting, (2) transferring and (3) assessing specific content (Carl, 2008:31). Although mathematics didactics can be seen as the core because it focuses on the above three aspects, it potentially overemphasises general education theories and the administration side of teaching. By doing so, it focuses less then potentially possible on selecting, transferring and assessing content to develop a student's SCK to meet the demands experienced in a classroom context. For example:

As a maths learner I felt that there was something more that needs to be taught in order for me to understand somehow... mathematics it is not just about the theory but that there is also another part that is tied to everyday life (NQT1 interview).

6.4.4. Introduction to research mainly focused on completing a research proposal

The intended purpose of this module was as follows: "This subject is designed to teach students the basic skills of engaging and writing research... Students will also be taught the link between research and the practice of teaching" (IRSG 2014). The curriculum as indicated by the study guide and supporting data sources are presented in Table 6.4 below.

Table 6.4: Introduction to research (IRSG 2014; Programme Guide 2014; TE5 interview)

PURPOSE	OUTCOMES
This subject is designed to teach students the basic skills of engaging and writing research.	Understand the traditions within which educational research is located; Understand the research process; Understand other people's research by engaging in a critical reading of research within a particular field of interest; Report on research orally (as part of the LDC module).
Students will also be taught the link between research and the practice of teaching.	Develop a research problem based on teachers' and learners' everyday classroom experiences, and contemporary issues in education .

This module's aim was to develop academic literacy and practical research skills in students:

The skills that the course aims to inculcate in the students... include, among others:
(i) Identifying the research problem, (ii) Conducting research, (iii) Reporting the research results/findings, (iv) Referencing, and (v) Writing the research proposal (IRSG 2014).

Although the above intentions were stated, TE5 mentioned that she mainly focused on the process followed to complete a research proposal. This was done as she felt students needed to be able to complete a research proposal when they pursued further studies after the PGCE. In addition, this decision was made to focus specifically on a research proposal because of her experiences in attending “a lot of research classes in different areas” (TE5 interview). The focus on a research proposal caused students to perceive this module as irrelevant to their needs as they had already completed modules with this focus while completing a diploma. In addition, students were required to complete assessments linked to completing a research proposal as group work. This caused students to perceive this module as irrelevant to their needs. For example:

It was group work but I did it on my own but she said she is going to penalise me because I am not doing it in a group. Look here, I tried group work... But his part was watered down... So I don't have time for that so. The proposal as a group work I don't know why (NQT4 interview).

Carl (2008:32) found that modules such as ‘introduction to research’ aim to enhance students’ reflexive practices and to stay up-to-date with subject and pedagogical knowledge and trends (Carl, 2008:32). ‘Introduction to research’ in the PGCE context mainly focused on the process involved in completing a research proposal in preparation for further academic studies. This potentially restricted the potential of equipping students with the desired reflexive skills and ability to keep up-to-date with mathematic teaching trends and research findings.

6.4.5. Perspectives on education focused on inclusive education and psychology

Perspectives on Education consisted of three separate modules (Component A: Inclusive Education; Component B: Psychology of Education; Component C: Philosophical Perspectives in Education) with the following overall purpose:

Education studies serves as the umbrella of all the learning areas. All students need an in-depth knowledge of educational principles to become a competent teacher. This course will enable you to understand the theoretical rationale underpinning efficient classroom practices and to enhance your teaching. Through this you can achieve four pillars of successful education – learning to know, learning to do, learning to be and learning to live together (PESG 2014).

The purpose and outcomes of these modules, as indicated in its study guide and supporting data sources, are presented in Table 6.5 below.

Table 6.5: Perspectives on education (PESG 2014; Programme Guide 2014; TE4 interview)

PURPOSE	OUTCOMES
Component A: Inclusive Education The broad aim of inclusive education is to provide a context and theoretical background for understanding the different origins and sorts of problems of learning which occur in South Africa (and elsewhere).	Understand factors and dynamics affecting particular problems of learning; Developed skills required to execute their roles as teachers effectively and efficiently; & Able to integrate this knowledge in their selected Didactics.
Component B: Psychology of Education First, the aim is to understand learning and development processes that occur to learners in the FET phase. In addition, to understand that while some of these changes may be relatively small and short-lived, others are profound and enduring. Second, the module aims to develop an approach to theorizing the process of learning and change both in relation to specific educational challenges generated in the South African context, and in relation to the broader questions of psychological change. In this regard, the module explicitly draws the link between issues and debates often discussed in inclusive education/special education and psychology.	Compare and contrast theoretical explanations about learning, considering ranges of individual variation; Analyse how differences in approaches to learning interact with development; Identify differences in approaches to learning and performance, including different learning styles, multiple intelligence's and performance modes; Identify factors that influence motivation and engagement and how to help learners become self-motivated; Analyse the cognitive processes associated with various kinds of learning and how these processes can be stimulated; & Analyse the learning theories and teaching approaches in terms of the South African context.
Component C: Philosophical Perspectives in Education The module aims at engendering a critical understanding of contemporary issues in South African education from various perspectives.	Enable students to develop a philosophical understanding of educational issues within the context of modern society; Enable students to develop the capacity to engage critically with various educational issues and to become critical teachers and citizens; & Enable students to develop practices of education that are democratic, just and empowering.

To summarise the purpose and outcomes presented, students were introduced to the following during programme orientation conducted before contact sessions started:

Provide [students] with conceptual framework underpinning educational processes. These include theoretical, historical and comparative perspectives (Programme Guide 2014).

The relevant study guide stated the following in support of the above summary to clarify the overall objective of this module:

Engendering critical and creative citizens – the aim of education in South Africa (PESG 2014).

The broad approach taken to deliver this module was to focus on education challenges as a whole using inclusive education as the main theme:

But we really have to be thinking differently about the status of education and where we are going. It is not just about us. Our contribution. What are we thinking

about the learners that we will be teaching. Because it is like really... it is not just about a teacher standing in front of the learners. It is about the whole nation (TE4 interview).

The curriculum delivered during component A and B (see Table 6.5) was greatly influenced by TE4's understanding of "inclusive education and psychology of education".

[I]t is informed by a lot of things that I read and believe in from psychology (TE4 interview).

Component C (see Table 6.5) was not presented by TE4 as it was the responsibility of another teacher educator who only formed part of the PGCE at the end of 2014. This specific teacher educator declined an interview as he felt that his part in the PGCE was too small to add value to this research. Concerning the impact of this module as a whole, most NQTs revealed that this module influenced their understanding behind the importance of education and the real challenges being experienced in the system. For example:

Our future lies in education. The one thing I realised which is you realise the impact of education on the country as a whole. You realise how dire the situation is in this country. I don't know how they are going to sort out this problem that we have with education here. But they need people that can guide them. People that can implement. It is one thing to talk. But to implement? (NQT4 interview).

Reflecting on the above, it is argued that perspectives on education served as the core module to develop students KC[L] (Ball et al, 2008:393) by requiring students to link existing SMK with the content focusing on inclusive education, psychology of education and philosophical perspectives in education (Carl, 2008:35). KC[L] was therefore potentially developed in "a general (often abstract) form first before being deployed in specific circumstances at a later date" (Philpot, 2006:300) by focusing mainly on inclusive education and psychology.

6.4.6. Language development and communication focused more on English in the business world

The curriculum as indicated by the study guide and supporting data sources are presented in Table 6.6 below.

Table 6.6: Language development and communication (LDCSG 2014; Programme Guide 2014; TE1/TP coordinator interviews)

PURPOSE	OUTCOMES
The purpose of this subject is to provide the students with the ability to convey his or her subject knowledge effectively in English.	Developed and improve oral and written skills in English, the most common language of learning and teaching; Be able to demonstrate knowledge of style, tone and register, as well as the rules and conventions of the English language in inter alia, the writing of business letters, memo's, reports, the curriculum vitae, as well as the correspondence of meetings; & Be able to use concise language and reduce the length of texts.
To provide the students with the ability to handle any communication situation in the teaching environment successfully.	Understand effective communication in diverse situations; Have an insight into the nature of interpersonal communication and how it can be utilised in the teaching situation in particular to reach certain goals; Be aware of the important role of feedback and barriers in communication in general, and in the teaching situation in particular; Be able to write and present academic assignments using the conventions of citations and referencing correctly, and also to compile the bibliography correctly; & Be able to use his or her voice effectively in a variety of oral communication situations.

The content included during contact sessions to achieve the purpose and outcomes as stated in the Table was based on TE1's discretion, supported by verifying the selected content with other experts:

To ensure content is appropriate: It is based on our judgement but at the same time I will cross check with my HoD or other language expert. Is it suitable? Is it the right level? That kind of thing (TE1/TP coordinator interview).

A key resource required by students to meet the outcomes of this module was two dictionaries:

Students are advised to buy a good bilingual dictionary [and an] English dictionary
– Please ask for advice before buying (LDCSG 2014).

Language development and communication specifically focused on developing students' competence in using oral and written English as a medium of instruction:

The purpose of this subject is to provide the student with the ability to convey his or her subject knowledge effectively in English, and to handle any communication situation in the teaching environment successfully... This subject is designed to strengthen your development of the English language and communication skills in preparation for your teaching career (LDCSG 2014).

Concerning this module's impact on influencing PCK, it introduced students to the generic process of communication (sender-message-receiver-feedback) and the concept of inter-cultural communication:

And communication skills, how do you communicate with [learner]. How can a small thing mean totally different things. The communication module. And I found that useful, you know the chain of communication from you as the sender and receiver and all of that. It was an eye opener for me, it kind of made me go wow. You need to do that. And one other thing. You must be careful of what you say to [learners]. You must be careful of what you say. You must be careful what you make them believe because that is what they will remember you for (NQT5 interview).

Carl (2008:31) found that language medium-based modules such as language development and communication ensured that the process of communication was understood to transfer subject knowledge (Carl, 2008:31). This module, in the PGCE context, focused more on using English to communicate in general (for example, business letters and curriculum vitae). This was potentially at the cost of specific and extended focus on using English in the most effective manner to communicate their existing SMK to diverse learners. TE3 noted that 2014 was her first year as a teacher educator and used the study guide for this module as received from the previous teacher educator. TE3 stated that changes will be made to the study guide to focus more on using language and communication for teaching purposes. In addition, the MRTEQ states that ITE should include engagements developing/verifying a student's competence and confidence "to converse competently in a second official language" (DHET, 2015:11). This was not done during this module. Therefore, the 2014 PGCE graduates are potentially in need of further training and development in using "a second official language" to communicate SMK to diverse learners.

6.4.7. Professional studies served as the backbone of the PGCE by focusing on professional teaching practice

The module served as the backbone of the PGCE (TE2/programme coordinator) as it introduced "learners to learning facilitation and educational media, as well as teaching practice" (Programme Guide 2014). Table 6.7 below presents an overview of the modules purpose and outcomes.

Table 6.7: Professional studies (PSSG 2014; Programme Guide 2014; TE2/programme coordinator interview)

PURPOSE	OUTCOMES
Introduce students to learning facilitation.	Provide continuous, summative and formative assessment; Develop a broad understanding of the background to national curricula, National Curriculum Statements; Analyse and use selected curriculum theories; Engage in assessment and evaluation; Engage in the management of the learning environment.
Introduce students to educational media.	Select and develop teaching and learning material/media; Use selected teaching, learning and media use.
Introduce students to teaching practice.	Create and provide various teaching and learning opportunities; Complete teaching practice; Apply principles applicable to lesson planning, preparation, implementation and assessment; Develop a teaching philosophy & teaching portfolio.

Professional Studies' overall purpose was summarised by TE2 as follow:

I tend to say we have Professional Studies, my subject, which forms the backbone. That is general education practice... Curriculum theory...Teaching practice...teaching media...teaching methods. Those things all together form Professional Teaching Studies and there we work through the general theory of the curriculum process. From the philosophies all the way down to assessments and management (TE2/programme coordinator interview).

The overall outcome was summarised as follow to students in the relevant study guide:

[D]evelop competencies in the use of a variety of learning facilitation methodologies, as well as appropriate education and training media in the contest of theoretical constructs and learning environments (PSSG 2014).

Carl (2008:32) found that teaching practice related modules such as professional studies, focused on developing a student's ability to plan and implement lessons by using the most appropriate method and media. The core purpose of professional studies was therefore to develop all students' KCT by mainly focusing on generic processes to select the most suitable media and methods as applicable in diverse contexts in terms of selected didactics (Ball et al, 2008:393). KCT was therefore potentially developed in "a general (often abstract) form first before being deployed in specific circumstances at a later date" (Philpot, 2006:300). This was because it was developed during the compulsory modules professional studies, which included all didactics (electives) and which required students to link existing SMK with newly introduced KCT by means of guided self-study.

6.4.8. Education management focused on policy, management and learning facilitation (professional teaching practices)

This module focused on three aspects related to the field of education management within the perimeters of becoming a classroom teacher:

Provide learners with conceptual and practical knowledge of educating policy, management skills and conceptual frameworks for learning facilitation (Programme Guide 2014).

Carl (2008:32) found that education management related modules highlight relevant legislation, professional organisations/role-players, educational management, governance, leadership, diversity, inclusivity, learning and learner support, human rights, democratic classroom practices and sensitivity concerning a democratic society. It seems that educational management in the PGCE context developed PCK (KCT and KC[L]) by providing students with a broad framework of the context that is the South African education system. These aspects were only briefly introduced in the limited time granted to the PGCE, as revealed by the relevant teacher educator, in response to an invitation to be interviewed (which was declined as the teacher educator perceives his role in the PGCE as too limited to add value in this case-study). Aspects of PCK related to the concept education management were therefore also potentially developed in “a general (often abstract) form first before being deployed in specific circumstances at a later date” (Philpot, 2006:300).

6.4.9. Life skills-ICT skills could be delivered as a compulsory didactic C (CAT) module to develop TPACK

This module focused on developing a student’s skills in using computer software:

Develop learners working ICT skills, including Windows, word processing, spreadsheets, presentations and database use (Programme Guide 2014).

The PGCE scheduled content and engagements to developed students’ competence in using ICT. Three periods were scheduled on a Monday (see Appendix I) for ICT skills, which also included a focus on Computer Application Technology (CAT) and Information Technology (IT), which are didactics (see Appendix I). TE2/programme coordinator stated that most of the students meet the requirements to receive credits for ICT skills and are therefore not required to attend these contact sessions. MRTEQ stipulates that ITE should develop students’ competence in using “ICTs for innovative

teaching and enhanced learning” (DHET, 2015:11). Reflecting on the above, the PGCE as an experience could be enhanced by making it compulsory for all students to complete ICT skills delivered as part of the process of qualifying as a CAT teacher. This could enhance the employment prospects of teachers and allow them to begin to understand how to use ICT to enhance lessons, by being engaged in the process of delivering lessons focusing on developing CAT SMK to learners. In short, CAT could serve as a compulsory didactic C to promote understanding of ICT in education. By doing so, PCK related to CAT could be used as a basis to use ICT related PCK in didactic A and B (influencing the development of TPACK).

6.4.10. Health and safety in education could be delivered as a compulsory didactic D (life-orientation) module to enhance links to education

Health and safety in education aimed to equip students with specific health and safety skills deemed necessary to cope in diverse classroom contexts:

Develop learners basic first aid skills and introduce learners to health and safety legislation (First Aid; Health & Safety Legislation; HIV/AIDS education) (Programme Guide 2014).

This module was delivered by means of short courses focusing on the above aspects in a generic manner not directly linked to education (the classroom context):

The short courses must be interesting and clear... In the short courses, the information must be based on teaching not in other fields (NQTsD13 written response on course evaluation questionnaire).

An external facilitator facilitated and assessed a First Aid course to equip students with the necessary knowledge and skills to handle medical emergencies (TE2/programme coordinator interview). This training was finalised before the first TP period. In 2014, First Aid training involved a one-day theory-focused workshop without a practical component, which left some NQTs feeling ill prepared to deal with such emergencies. For example:

You know those courses their purpose is to help the teacher in the class if something happened in one of your learners you should be able to apply and those course you are paying. It was almost R300... or was it R600? But there was nothing practical happening for them (NQT2 interview).

This module did not feature on the 2014 PGCE timetable, indicating that it was delivered as a stand-alone component by means of external workshops. This module also required students (even those with bursaries) to pay for, as an example, First Aid training. Understanding that some students experienced this module as not being directly linked to the classroom context, a recommendation is to potentially deliver this module as part of the didactic life orientation module. Additional life orientation contact sessions were scheduled in 2014 to accommodate a specific group of sport diploma graduates (see Appendix I). These periods could potentially be made available to all students to deliver content and engagements focusing on “First Aid; Health & Safety Legislation; HIV/AIDS education” as this forms part of the life orientation school curriculum. Students could be given the opportunity to complete, as an example, only half of the contact sessions scheduled for life orientation and thereby meet the requirement for the module health and safety in education. If students so choose, they could attend, as an example, the remaining contact sessions to gain life orientation as an additional didactic. By doing so, students could potentially gain greater insight into the diverse modules comprising a specific grade and how their didactic A and B is (can be) linked to life orientation and vice versa.

6.4.11. TP curriculum offers a summary of the PGCE curriculum

TP began by students observing the teaching profession. Observations needed to be formally reported under the following topics as headings: year/term/module planning, lesson planning, assessment, learning material, subject meetings, and technology. The remaining 4 weeks of the first TP and the 4 weeks dedicated to the second TP period required students to plan and conduct 15 lessons per didactic (therefore 30 lessons) per TP period.

In the **Teaching Practice Portfolio** you will include the 2 lessons evaluated by the subject lecturer plus the 5 lessons evaluated by the subject mentor (=total of 7 lessons).

Please note:

In the **Subject Didactics portfolio**, you will include the remaining 8 lessons: 3 with reflections. And 5 without reflections (MDSG 2014).

Students were guided during the planning and delivery of lessons by means of the following three HEI templates:

The lesson plan template (see Appendix K) required students to state the lesson outcomes for the specific lesson, the teaching method/s to be used, media/resources

selected/developed, acknowledging learners existing knowledge of the topic/content to be introduced, original questions to be asked to learners (which could not be copied from a textbook or other sources), and the time allocated for specific activities to be completed by the teacher and the learner as per the details included in the aspects mentioned above (Mathematics Didactics Portfolio; Professional Studies Portfolio).

The assessment plan template (see Appendix L) required students to clarify the learning to be assessed. This was followed by a section requiring students to present an analysis of “potential assessment mechanisms” to clarify the thinking process followed in selecting a specific form of assessment. Students were also required to present “[a] brief summary on how feedback after each assessment activity was [to be] handled”. The above needed to be supported with attachments of the “assessment itself”, the “memorandum... (answers with mark allocation, assessment criteria or rubrics)”, “[a] copy of at least one learner’s answer”, and “[r]eflection of the assessment activity” (Mathematics Didactics Portfolio; Professional Studies Portfolio).

The reflection template (see Appendix M) required students to present their thoughts on “aspect(s)” during a lesson related activity (delivery and/or assessment) in terms of being “successful” and “unsuccessful”. Students were further required to present their thoughts on how the unsuccessful aspects identified could be improved during future lessons. A further requirement was to communicate how the intended outcomes of a specific activity (lesson or assessment) was “achieved or not”. The template closed by an open-ended category to allow students to communicate “[f]urther remarks” relating the completed activity (Mathematics Didactics Portfolio; Professional Studies Portfolio).

As a whole, TP served as an opportunity to develop practical knowledge after engagements, focusing on developing disciplinary, pedagogical, fundamental and situational knowledge during contact sessions (DHET, 2015:10-11). Therefore, the TP curriculum as explored above is summarised to serve as an overview of the PGCE curriculum. The 2014 PGCE FET mathematics programme curriculum consisted of engagements focusing on: year/term/module planning; lesson planning (teaching methods and acknowledging learner’s existing knowledge); learning material and technology (selecting/developing media/resources); assessment (selecting assessment mechanisms, developing original assessments and memorandums/rubrics, providing feedback to learners); reflection to improve practice; and the purpose of subject meetings. The fourth theme to organise data is presented in the section to follow.

6.5. Assessment process

The section above presented data on the content associated with the 2014 PGCE. This section presents data linked to assessment and the PGCE.

6.5.1. Continuous assessment (tests, assignments, HEI templates and presentations) used with limited re-assessment opportunities to maintain high standards

“There are no final exams” (Programme Guide 2014) in the PGCE using continuous assessment to secure evidence of development achieved. This means that assessment deadlines had the “same status as exam dates” (Programme Guide 2014). Students who missed an assessment were required to substantiate their reason with a medical certificate or equivalent. If the reason and provided evidence was valid, a second opportunity was granted to submit, present or write (FEAP 2014). Continuous assessment required students to write tests, conduct presentations, deliver planned lessons, submit assessments, and compile portfolios of evidence (PGCE Study Guides 2014; Programme Guide 2014). Examples of assessments comprising the 2014 PGCE are presented in Table 6.8 on the next page.

Assessment weighting towards the year mark for the related module was stipulated in the various study guides. This allowed “students to monitor their own progress as the year progresse[d]” (LDCSG 2014). Concerning assessment and TP, the principal or mentor teacher at the placement school were delegated the task of ensuring students attended during the TP period (TPP 2014). As part of the continuous assessment process, TP started with observation, followed by students delivering planned lessons and assessing learners (Nomlomo & Sosibo, 2016:200; Reeves & Robinson, 2014:237; Zeichner, 2010:90; Darling-Hammond & Baratz-Snowden, 2005:117; Walkington, 2005:57). In case of student absenteeism during TP, the following policy stipulation applied:

If, for whatever reason, the student misses FIVE days or more during the [TP] session, the student has to re-teach for the number of days missed. This ruling will be applied at the discretion of the [TP] Co-ordinator and should the reasons for missing fewer days be deemed unsatisfactory, the student could be required to re-teach. The minimum period of a re-teach is five days. Should the student perform unsatisfactorily during this period, the student’s provisional results will be changed to a fail (TPP 2014).

Table 6.8: Scheduled assessments (PGCE study guides)

FEB	ICT Skills: Computer competency exam (pass mark 50% to be exempted from ICT Skills).
MAR	PS: Development planning documents indicating levels of planning, demonstrating progression, integration and links of aims, objectives and outcomes; LCD: Test: Basics of communication theory; Barriers to communication; PE: Assessment; IR: Literature Review; Health and Safety: First Aid; MD: Examination paper evaluation.
MAY	PS: Lesson and media plan for one lesson; MD: Report on subject organization.
JUN	PS: Curriculum theory test; LCD: Oral presentation – oral communication in the classroom (the teacher as communicator); PE: Test.
AUG	PS: Curriculum Theory Literature Review; MD: Assessment Portfolio,
SEP	PS: Assessment Portfolio; PS: Electronic learning,
OCT	PS: Electronic learning; PS: Teaching Philosophy & Portfolio; LCD: Written assignment – Business correspondence; Academic writing; PE: Assessment; IR: Proposal; MD: Lesson plans/presentations.
NOV	LCD: Test: Intercultural communication in the classroom & diversity.

Reflecting on the discussion above, the key assumption held in the PGCE assessment process is that all assessments are developmental and linked to the learning occurring in the programme as a whole (TE2/programme coordinator interview).

6.5.2. Distinction (minimum of 75%) only achievable with initial submission (second submission acknowledged but original pass mark remained)

The PGCE required a minimum of 50 percent to pass, with restricted opportunities for re-evaluation as stated in the specific subject study guide. For example:

Students who fail to obtain a module mark of 50% or more after the test, assignment or portfolio assignment will be given ONE opportunity to be re-assessed at the end of the year. In this case, students can only be awarded a maximum module and subject mark of 50% (PESG 2014).

If students failed the re-assessment opportunity, they were required to re-do the entire module (Programme Guide 2014). Students who passed but requested to re-do an assignment in the hope of achieving a higher mark were unsuccessful because of the following rule applied in the PGCE assessment process:

A subject is passed with distinction if the candidate obtains a minimum of 75% in the final mark at the first attempt at the subject (Programme Guide 2014).

The above was translated as meaning that if a student passed with their first submission, the mark received is retained even if a student re-submits. For example:

[A]sked to look at others who achieved high mark, spoke to [TE2/programme coordinator], redid the assessment but mark stayed the same (NQT4 interview).

Reflecting on the above, students were potentially discouraged to improve their knowledge, skills and attitudes being measured in assessments because it was not formally recognised when re-submitting an assessment that they had passed. This could potentially affect the manner the student approaches assessment with learners once they enter a classroom as a NQT. It is argued that continuous assessment should be governed by the understanding that assessment is not a destination, but part of the journey that is the PGCE in learning how to teach (Hiebert et al., 2003:207). By restricting students to make second submissions to improve their mark (and thereby improve their knowledge, skills and/or attitudes), assessment is potentially not communicated as being part of a developmental journey, but rather that every assessment is a destination. Once the student arrived at the 'destination', that was the end. It is possible that the re-assessment of students who had already passed is not formally re-evaluated due to the potential pressure placed on teacher educators to submit marks within HEI deadlines for the ever-increasing number of students gaining access into the PGCE. The reality is that teacher educators might be 'forced' to secure a pass mark from students who failed an assessment or a test. This potentially restricts the time available to re-assess students who have passed but believe they can do better. This potentially highlights a challenge in the PGCE caused by some students who gain access in the PGCE not holding the desired SMK, academic literacy and maturity restricting the additional development potential of students who do hold such. Although the above argument is presented, marks achieved can be perceived as adequate.

Table 6.9: Marks achieved in the PGCE (Professional studies portfolio; Mathematics didactics portfolio)

MATHEMATICS DIDACTICS					
SAMPLE	30	30	30	10	(100)
NQT1	21	21	26.7	7.9	76.6
NQT3	21	21.9	23.1	7.5	73.5
NQT4	20.1	24	26.7	8.3	79.1
NQTsD3	18	[23.7]	28.5	7.9	78.1
NQTsD9	19.5	27.9	27.3	8.8	83.5
AVERAGE:	19.92	23.7	26.46	6.32	78.16

PROFESSIONAL STUDIES								
SAMPLE	15	10	20	20	15	10	10	(90)[100]
NQT2	9	5.1	10	11.6	7.8	-	7.6	(51.1)[56.78]
NQT4	8.4	5.2	13	10	9.3	-	7.6	(53.5)[59.44]
NQT5	9.9	6.2	[12.6]	10.2	[9.72]	-	7.6	(56.2)[62.47]
NQT6	10.5	5.2	12.2	11	9	-	8.6	(56.5)[62.78]
NATsD9	9.3	5.9	14.6	10.6	12.3	-	8	(60.7)[67.44]
NQTsD13	11.1	7.2	13.2	13.2	10.2	-	7.6	(62.5)[69.44]
AVERAGE	9.7	5.8	12.6	11.1	9.72	-	7.83	(56.8)[63.05]

Concerning Table 6.9, various students achieved a distinction (above 75 percent) for mathematics didactics. Professional studies seemed to be more challenging as none of the sampled students achieved a distinction. The reason why one column for professional studies has no marks is that this assessment, although included in the study guide, did not form part of the module's final mark. This is why the last column contains a mark out of 90 and 100. This table also serves as further evidence that a distinction was only achievable with the initial submission of an assessment.

6.5.3. 'Paper heavy' assessments could be revised and delivered by means of ICT resources (such as a tablet/laptop)

It was expected of students to ensure that their assessments were submitted and received by the relevant teacher educator in hard copy format (Programme Guide 2014).

No assignment is to be handed in via email (even if a lecturer gives permission) (Programme Guide 2014).

Students were further required to ensure that they had sufficient copies of HEI templates during TP. This included a lesson plan template (see Appendix K) for each observed lesson, copies of assessments developed and memorandums/rubrics, assessment plan template (see Appendix L) and a reflection template (see Appendix M) where applicable. Students were also expected to hold sufficient copies of the TP evaluation feedback sheet (see Table 6.10 on the next page) to record evaluations by either a mentor teacher or HEI representative.

The TP evaluation feedback sheet, along with the templates and supporting documents mentioned above, were to be filed in a portfolio to serve as evidence that the following criteria has been met to be awarded a pass for TP:

- (1) He/she has taught for the duration of the prescribed session at the school used for practice teaching;

- (2) He/she has satisfied the Faculty that he/she should be awarded a pass;
- (3) The Faculty is satisfied that the student's teaching portfolio meets all the set requirements (TPP 2014).

Table 6.10: TP evaluation feedback sheet

SUBJECT:		DATE:	
GRADE:		ASSESSOR:	
LESSON PLAN ATTACHED:		MEDIA ATTACHED	
ASSESSMENT FORM ATTACHED:		REFLECTION SHEET ATTACHED	
SUMMARY OF FEEDBACK (To be completed by assessor)			
Lesson strong points:			
Aspects that can be developed:			
Things to change if done again:			

Reflecting on the discussion above, it seems that the PGCE assessment requirements involved a 'paper heavy' exercise requiring access to printing paper, a printer, a photocopier, and a personal computer (preferably a laptop to ensure mobility). These all require access to additional funding and are a potentially large component of expense to the HEI (if students are provided with hard copies of all the HEI templates in the required numbers). In short, 'paper heavy' assessments could be revised and delivered by means of ICT resources (such as a tablet/laptop) and developed applications to replace the printed HEI templates.

6.6. Closing

This Chapter presented data to address the following sub-question: What can a student expect when pursuing the PGCE ITE route in terms of the selection process, modality, curriculum and assessment? The short answer to this question is presented in the Table on the next page. The thinking behind the presentation of this Table was guided by Table 4.2 presented in Chapter 4. In brief, Table 4.2 serves as the summary of the literature review presented to clarify clear goals (clear structure) as the first criteria/step at the top of the conceptual framework built in Chapter 4 (see Figure 4.9). For this reason, a similar approach was taken to summarise the related data in a Table format. Concerning Table 6.10, the four points from Table 4.2 were refined to reflect the PGCE specific context, namely, PGCE selection process, PGCE modality, PGCE curriculum, and continuous assessment. The clarification under each point was done by reflecting on or restating the related emerging category used to organise the discussion presented. This Table is to be reflected upon in Chapter 9 to contribute towards the

short answer for the overall the research question: How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher?

Table 6.11: What the PGCE offer students

PGCE selection process
PGCE (teaching) was chosen by those in need of a second career option;
PGCE spaces increase annually due to DHET and HEI demands;
HEI diploma graduates meet PGCE entrance requirements;
Bursaries are available for most (not all) qualifying students.
PGCE modality
PGCE is maximum eight months in duration to deliver engagements equivalent to a four year B. Ed. PGCE modality is guided self-study anchored in the following assumptions: (1) students can link existing SMK with newly acquired PCK (able to communicate/present how SMK can be differentiated to suit diverse learners and contexts); (2) Students can conduct self-study; (3) Students are guided by one-on-one consultation sessions; (4) Orientation clarifies expectations attached to the PGCE modality of guided self-study.
TP in the PGCE guided self-study context assumed to be supported by three HEI templates (lesson plan; assessment plan; and reflection template);
TP logistics done by a TP coordinator and TP administrator placing students according to their preference and/or school/college availability. TP delivered as a standalone module requiring students to complete didactic linked assessments assumed to promote programme coherence.
PGCE curriculum
PGCE mission is to convert a graduate in a specific field of expertise into a teacher by only focusing on PCK. The PGCE does not focus on SMK (CCK and SCK). PGCE curriculum specifics is dependent on teacher educators' discretion, policy guidelines and student expectations.
Mathematics didactics focused more on subject administration and general education theory;
Introduction to research mainly focused on completing a research proposal;
Perspectives on education focused on inclusive education and psychology;
Language development and communication focused more on English in the business world;
Professional studies served as the backbone of the PGCE by focusing on professional teaching practices;
Education management focused on policy, management and learning facilitation (professional teaching practices);
Life-skills – ICT skills focused only on generic ICT skills for most students (and didactics for others)
Health and safety in education focused on First Aid, safety legislation and HIV/AIDS in a generic manner.
TP curriculum consisted out of engagements focusing on: year/term/module planning; lesson planning (teaching methods and acknowledging learner's existing knowledge); learning material and technology (selecting/developing media/resources); assessment (selecting assessment mechanisms, developing original assessments and memorandums/rubrics, providing feedback to learners); reflection to improve practice and; the purpose of subject meetings. This also serves as a summary of the overall PGCE curriculum.
Continuous assessment
Continuous assessment (tests, assignments, HEI templates and presentations) used with limited re-assessment opportunities;
Distinction (minimum of 75%) only achievable with initial submission (second submission acknowledged but original pass mark remained);
'Paper heavy' assessments require access to a printer, printing paper, a photocopier and a personal computer (preferably a laptop to ensure mobility).

In closing, this Chapter addressed the first research objective of this study, namely: To examine the PGCE ITE route to gain background information and to understand what

the programme entails in terms of selection process, modality, curriculum and assessment. The selection process as stipulated in national policy allows HEI's to increase the number of individuals qualifying as teachers by allowing diploma graduates access into the PGCE. The modality of the PGCE is highly dependent (and therefore the quality of the PGCE as an experience) on a student's ability and willingness to take initiative and actively participate in the PGCE from the beginning of the academic year. The curriculum of the PGCE is dependent on teacher educator discretion, further influenced by student inputs, national policy stipulations and HEI objectives. The PGCE is assessed by means of continuous assessment to allow students to prove their competence to be awarded the PGCE allowing them to enter a school or college as a qualified teacher (NQT). This Chapter offered insights into the PGCE as a process by focusing on inputs comprising the PGCE. To build on this understanding, specifics on the outcomes realised in the PGCE is explored in the next Chapter to realise the second research objective: To examine the policy stipulated teacher knowledge, skills and attitudes developed during the PGCE FET mathematics programme.

CHAPTER 7

POLICY STIPULATED TEACHER ROLES DEVELOPED IN THE PGCE

7.1. Introduction

The preceding Chapter presented an overview of the structure and goals of the PGCE FET mathematics programme. This Chapter answers the second sub-question (What policy stipulated teacher knowledge, skills and attitudes were actually developed during the PGCE?). This is to reveal insights of the specific outcomes realised as a result of the structure and goals of the PGCE, that guide experiences/engagements. Data sources offering insights include student portfolios, NQT interviews, TE interviews, PGCE study guides and the programme guide. The bulk of the analysed data was accessed from 'professional studies' and 'mathematics didactics' portfolio assessments and related reflection templates (see Appendix M) submitted to meet graduation requirements. The logic behind this Chapter is to build on the preceding Chapter's insights, by highlighting how the PGCE developed NQTs to fulfil the seven roles specified in national policy as refined in Chapter 2 (see Table 2.9). For example, the preceding Chapter presented insights on the assessment process followed in the PGCE, while this Chapter explores the development realised because of specific assessments that form part of the overall assessment process. To guide the discussions to follow, the overall conceptual framework (see Figure 4.9 in Chapter 4) is reflected upon. Specifically, the discussions presented under step/criteria two to four in Chapter 4 (see section 4.4 – 4.6) are reflected upon to identify related categories by using the seven policy stipulated teacher roles (policy expectations (see Table 2.9 in Chapter 2)) as themes. The insights gained during this process are summarised in a Table format to present descriptions of the seven policy stipulated roles developed because of PGCE experiences. The first of the seven roles are discussed below.

7.2. Understanding the role 'specialist in a phase, subject discipline or practice' verified in the PGCE

The DHET (2015:58-59) expects HEIs to produce NQTs who are specialists in a phase, subject discipline or practice such as FET mathematics. This is assumed to be evident when a NQT understands education and its foundations (specialist in a phase) as well as specific specialised subject matter (specialist in a subject discipline or practice) (DHET, 2015:10-11, 58-59 & 62). Engagements linked to developing the above during the PGCE FET mathematics programme are explored below. This is done by presenting four emerging categories to describe this role in the PGCE context.

7.2.1. Specialist in a subject discipline or practice is able to conduct self-study to overcome emerging CCK gaps

All NQTs perceived themselves as being a specialist in mathematics as a subject (CCK) because they completed a diploma focusing on mathematics. Some perceived themselves as holding more CCK than needed by a teacher. This was because of the perception that completing grade 12 mathematics is enough to cope with the CCK demands placed on a NQT in the classroom context. Some NQTs stated that they experienced gaps in their CCK from time to time, which emerges during the process of planning and teaching a mathematics lesson.

Maths is not like a theory subject whereby you know it and you will know it forever.
Maths you must remind yourself all the time (NQT3 interview).

This indicates an awareness by at least some NQTs that CCK is never completely “already in-place” (Ellis, 2007:450-2). Self-study is recommended to overcome such gaps as introduced during the PGCE. For example:

[T]he things you did in Grade 12, Grade 10 and Grade 11. So you always have to rephrase and go back on how to. But as you are somebody who did you immediately see that you will be just okay. That is how it is supposed to happen (NQT2 interview).

Reflecting on the above, being a specialist in a subject discipline or practice in the PGCE context includes the ability to conduct self-study to overcome emerging CCK gaps during lesson planning and/or delivery.

7.2.2. Specialist in a subject discipline or practice is able to develop simplified examples in addition to examples found in textbooks

The PGCE did not focus specifically on verifying mathematical knowledge only needed by a mathematics teacher (SCK) (TE3 interview). The PGCE indirectly developed NQTs SCK with the need during TP to develop simplified examples of content as demanded by learners. For example:

I had to come up with simplest examples ever (NQT3 reflection MD TP2).

Some NQTs struggled to identify and/or develop simplified examples of content during the second TP period, indicating a potential need to offer more focus on this. For example:

Look at more ways of simplifying your explanations (NQT1 mentor evaluation MD TP2).

Based on the above, the PGCE might have focused more on the need to develop original examples instead of using existing examples in textbooks when planning and presenting lessons.

Why not use the examples in the textbook? (NQT1 HEI representative evaluation MD TP2).

Therefore, a specialist in a subject discipline or practice in the PGCE context includes the ability to hold a range of simplified examples of content beyond that included in the prescribed textbook. The inclusion of extra notes during TP potentially occurred because of a common misconception that the ability to use a textbook is in place or developed during TP (Christiansen, 2012:183-184; Shield & Dole, 2013:183).

7.2.3. Specialist in a phase is able to link prescribed curriculum to real life scenarios to maintain learners interest

A specialist in a phase was understood by NQTs to be someone who is able to maintain learners' interest by clarifying difficult topics in the curriculum and contextualising its real-life value. For example:

I always relate mathematics into real life by showing them how mathematics is applied in diseases modelling (epidemiology), how mathematics is applied in population modelling (demography) and how mathematics is applied in ecosystem modelling (NQTsD13 approach PS assessment 7).

Most NQTs developed their understanding of what a specialist in a phase is after reflecting on their experiences as a learner while completing PGCE assessments. For example:

They [past teachers] presented their subjects like mathematics and physical science in a way that caught my interest, clarified difficult topics and led me through

complex areas, and put knowledge into context so that its relevance was apparent (NQT2 approach PS assignment 7).

Therefore, a specialist in a phase in the PGCE context includes being able to link prescribed curriculum content to real life scenarios to maintain the interest of learners.

7.2.4. Specialist in a phase is able to realise specific change in learners as guided by curriculum documents, curriculum theories and past (and present) experiences

For analysis purposes, the policy expectation of understanding education and its foundations (DHET, 2015:10-11) is translated as holding understanding of curriculum theory. The test below formed part of professional studies to assess understanding of curriculum theory introduced during the PGCE.

Table 7.1: Professional studies assessment 3 (test) (Professional Studies Portfolio)

Curriculum theory test 19/06/2014
<u>Question 1:</u> Critically discuss the statement that “curriculum is not merely the delivery of teaching and learning in the classroom”.
<u>Question 2:</u> During the twentieth century a number of curriculum paradigms arose and dominated curriculum delivery. Discuss in detail any [Two scratched out with a pen] ONE of the broad curriculum theories associated with the following ideologies: (a) The Liberalism (b) The Behaviourism (c) The Constructivism.
<u>Question 3:</u> Briefly discuss the nature of learning and a learning domain that dominates learning in your field. Also discuss the elements of a taxonomy commonly used in assessment linked to that domain.
<u>Question 4:</u> Answer any ONE of the following questions:
(a) Critically discuss the statement that “mediation and dialogue is a vital element of the teaching and learning process”.
(b) Critically discuss the statement that “learning is a biological process and its success is therefore dependent on the proper functioning of a learner’s biological system”.
(c) Critically discuss the argument that adults and adolescent youth are different and, as a result, so is curriculum delivery.

This test served to clarify one’s position as a specialist in relation to curriculum theories. Most submissions revealed an understanding of hidden messages (hidden curriculum) potentially communicated when transferring content. For example:

[W]hen learning takes place in the classroom the educator needs to be aware of not just the overt curriculum that is the set objectives, outcomes. He/she needs to take into consideration the hidden messages we as educators send the learners through our comments, gestures and content covered in the class (NQTsD9 approach PS assessment 3).

In addition, most submissions emphasised that the transfer of content needs to lead to a specific and intended change in a learner’s knowledge, skill and/or attitude. The expected change is guided by a teacher’s curriculum ideology. Within this context, the key change is not what is learned, but how learners learn. As examples:

Liberalism ... they don't care much about how much the learners learn, they care about how they learn (NQT2 approach PS assessment 3)

In Constructivism it is not about what to teach, but how to teach... For example, when teaching learners how to multiply a 3-digit number with a 2-digit number, it is not about what numbers should be multiplied but it is about how those numbers should be multiplied (NQTsD13 approach PS assessment 3).

In support of the curriculum ideology held, all NQTs perceived that fields related to the subject or discipline of mathematics are dominated by the cognitive domain. Achieving desired change in learners was also perceived as verified by reflecting on Bloom's taxonomy levels when planning lessons and related assessments. For example:

Bloom's taxonomy levels beautifully describes how the cognitive domain can be applied to teaching and learning (NQT4 approach PS assessment 3).

Although guided by the curriculum ideologies and cognitive domains introduced and discussed, all NQTs follow the prescribed curriculum to establish the prescribed desired change.

As in this curriculum we guided by Curriculum and Assessment Policy Statement I have to make sure whatever I am teaching them is something that will help them also required by the document (NQT2 approach PS assignment 7).

I will rely heavily on the CAPS document as this is not only a guide for teachers, but also it is policy or if it is safe to say it is the law (NQT6 approach PS assignment 7).

Concerning Question 4 (see Table 7.1), in terms of understanding education and its foundations, Option C was selected by all (Professional Studies Portfolio). NQTs who were not employed on a full-time basis in 2014 reflected on their own experiences as learners to enhance their discussions. NQTs who were employed reflected on their teaching/lecturing experiences. The main focus of discussion was on the difference between the maturity levels of adult and adolescent learners, which influences a learner's behaviour and motivation to complete tasks. By mainly focusing on past experiences/exposure to the teaching profession, students potentially relied more on their experiences than engaging with theory, focusing on teaching as a profession to address this question. This supports research findings arguing that experiences/exposure to the teaching profession are perceived by some as having greater influence on a student than the formal preparation delivered during the PGCE

(Akyeampong et al., 2011:71; Ashby et al., 2008:14; Sinclair, 2008:92; Hammerness et al., 2005:366; Feiman-Nemser, 2001:1016). Alternatively, the instruction “Critically discuss” might imply in the PGCE context that a student needs to reflect on their experiences to address such related questions. Either way, the above is presented as evidence that NQTs are able to reflect upon their experiences and engagements as learners to present their understanding of education and its foundations. In addition, the process of completing TP also influenced NQTs understanding of being a specialist in a phase. For example:

My approach to teaching would be in the form of my past observations. What I observed when I was on primary and secondary school and what stood out. And most of all what I observed during teaching practice and what stood out. I am looking at the do's and the don'ts. My teaching would be based on all of these observations (NQT6 approach PS assessment 7).

Reflecting on the discussion presented above, the PGCE context description of a specialist in a phase includes being able to realise specific change in learners as guided by curriculum documents, curriculum theory and past experiences. The second related theme is discussed below.

7.3. Understanding the ‘learning mediator’ role verified in the PGCE

The DHET (2015:58-59) expects HEIs to produce NQTs who know how to teach their subject in English and at least one other official language. This is assumed to be evident when a NQT holds general pedagogical knowledge and specialised pedagogical knowledge. The above is assumed to be held when a NQT is able to select, sequence and pace content according to both the subject and diverse learners needs (DHET, 2015:10-11; 58-59 & 62). Engagements linked to developing the above during the PGCE FET mathematics programme are explored below. Two emerging categories are presented with the aim of securing a context-specific description of this role.

7.3.1. Learning mediators are able to compile a subject portfolio file indicating how they select, sequence and pace their delivery of curriculum content

The completion of a cascade of planning documents forming part of a subject portfolio file was assessed before the first TP period as follow:

Table 7.2: Professional studies assignment 1 (planning documents) (Professional Studies Portfolio)

Due Date: 27 March 2014
Assessment question: Develop a cascade of planning documents, as specified below, for one subject in your field of expertise. The subject could be a school grade or a subject on a NATED or NC(V) programme.
<p>Guidelines: Select a subject curriculum and attach it as attachment 1 to the back of the submission; Develop a year plan, if your choice is a year, or a semester plan, if your choice is a semesterised subject. There is no specific format to follow but year plans tend to be longer than one page and tends to include the following:</p> <p>(a) Dates, including start dates, end dates, date groups, assessment date, important dates and influencing dates; (b) Topics to be covered; (c) Outcomes and/or objectives linked to topics;</p> <p>Develop a detailed plan for an academic week of the subject. (There is no perfect format, but this plan tends to provide detail that indicates dates, intention and assessment); Three consecutive lesson plans for one topic included in the week plan (For this exercise use the [HEI] format); Develop an assessment plan for the topic (For this exercise use the [HEI] format); For each of the plans presented include a narrative on the process completed, influencing factors and decisions; Overall quality of the portfolio.</p>

Specifically, the above assessment introduced students to planning related documents filed in a subject portfolio to select, sequence and pace the delivery of curriculum content in preparation for TP (Professional Studies Portfolio): “This assignment allowed me to put together a portfolio and planning the year planner enabled me to see how the functioning and preparing for a new year is important” (NQTsD9 reflection PS assignment 1). Practical exposure to selecting, sequencing and pacing the delivery of curriculum content was scheduled to occur during TP, after completing the first term of contact sessions. The first TP period of five weeks was to be conducted within the guidelines presented on the next page (see Table 7.3) for teaching mathematics.

Specifically, mathematics didactics required students to observe teachers and compile a report organised as follows: Year/term/module planning; Lesson planning; Assessment; Learning materials; Subject meetings; and Technology (MDSG 2014). As part of the preparation to meet the requirements of this assessment, professional studies introduced a cascade of planning documents relating to teaching (see Table 7.2). The submission for both assessments (Table 7.2 and 7.3) is explored below.

All NQTs were exposed to a process of compiling a year/term/module plan by linking topics and assessments to specific dates and highlighting holidays and self-study periods for learners to prepare for examinations (Professional Studies Portfolio). Observations revealed that individual teachers do not complete their own year/term/module plan as done for professional studies. Some received it from the school/college after departmental or curriculum and assessment committee meetings. Others received it in the prescribed textbook or teacher’s guide along with other planning related documents (Mathematic Didactics Portfolios).

Table 7.3: Mathematics didactics part B TP1 assessment guideline (MDSG 2014)

<p align="center">PART B (CONCURRENT WITH THE TEACHING PRACTICE PERIODS) The programme consists of the following three components:</p>
<p>SUBJECT ORGANISATION: This component requires a [student] to write a report describing the following: Note: Compile an Addendum for the examples you supply. Clearly indicate what each example refers to. The above-mentioned report forms part of the continuous assessment mark and is used to calculate the final mark.</p>
<p>Year/term/module planning: How is this done (describe in detail)? How are the outcomes decided upon? How is the content decided upon? How do they allocate time? Does planning for assessment take place here? Who does it? How is it recorded (e.g. on a year plan)? How do they keep record of their progress? (Supply examples of planning documents, after getting permission from your mentor).</p>
<p>Lesson planning: Do teachers/lecturers plan their lessons individually/in groups? What process/procedure do they use when they plan a lesson (e.g. start with content that needs to be covered/start with outcomes that need to be achieved/don't really prepare etc)? Do they write down their planning, e.g. on a lesson plan form? (Supply examples of planning documents, after getting permission from your mentor).</p>
<p>Assessment: What types of assessment opportunities are provided for students, and how often do these occur? Who are responsible for these? How are the results reported? What feedback is given to learners after assessment? Is assessment deliberately designed to address stated outcomes? (Supply examples of recording and reporting material, if possible, after obtaining permission from your mentor).</p>
<p>Learning material: What learning material is used (e.g. textbooks (and what text book), notes compiled by the teacher/lecturer, worksheets, combinations of these, etc). (Supply examples of learning material other than textbooks, after obtaining permission from your mentor).</p>
<p>Subject meetings: You need to attend all subject meetings in the school/college and report on the following: How often do these take place? Who chairs them? What is discussed during meetings (e.g. planning, problems of various natures, sharing of teaching ideas, training of staff, etc)?</p>
<p>Technology: What technology is used to facilitate mathematical learning (e.g. scientific calculators, graphic calculators, and computers)? Describe how and how often these are used; including what software programmes are used.</p>
<p>LESSON PLANS: As part of Teaching Practice, you are required to design a lesson plan for and teach a minimum of 10 lessons per major subject (Mathematics in this case). These lesson plans form part of the continuous assessment mark and are used to calculate the final mark. Please note: In the Teaching Practice portfolio you will include the 2 lessons evaluated by the subject lecturer plus the 5 lessons evaluated by the subject mentor (= total of 7 lessons) Please note: In the Subject Didactics portfolio you will include the remaining 8 lessons: 3 with reflections. And 5 without reflections.</p>

Teachers also stated that the relevant CAPS document contained all the required information on time allocation and assessments for a year/term/module plan. (Mathematics Didactics Portfolio). Following the above document, week plans were compiled by stating daily activities over a five-day period. Specific topics were allocated a set time, concluding with an assessment (either formal or informal) to verify the learning that occurred. All compiled week plans can be perceived as being a 5-day lesson plan. NQTs who were employed in 2014 used the “weekly programme”, as included in the prescribed textbook, as their weekly plan. In addition, observations revealed that weekly plans were also discussed and finalised during meetings either once a week or once every second week. Thus, the CAPS (curriculum) document provided the year plan and textbooks and/or subject meetings provided teachers with weekly plans (and year/term/semester plans).

The textbook for learners as well as the teacher's guide to give clear guidance to the teacher on how is expected to achieve at the later stage and all are very paramount to an extent that they help both the teacher to be on the right pace with learners and CAPS be followed (NQTsD3 approach MD TP1).

The week plan was followed by "three consecutive lesson plans for one topic included in the week plan" (Professional Studies Portfolio). This seemed to have caused confusion. Most rewrote the first three days as planned in the week plan as the three consecutive lesson plans. The only difference was the template (see Appendix K) used to re-write the lessons from the week plan. Observations revealed that the lesson plans of teachers ranged from lesson plan templates kept in a file to A4 Activity books completed on a daily basis in the form of a journal/diary. Observations caused most to conclude, along with their mentor teachers, that the HEI lesson plan template (see Appendix K) was tedious and unnecessary (Heerala & Bayaga, 2011:101-103).

Teachers don't use the standard document provided for lesson plans but write their lessons in their own personal format. Everyday lesson plans is not as formal as the prescribed document (NQT4 approach MD TP1).

Observations revealed that individual teachers do not decide on outcomes and content. Teachers in schools followed the CAPS documents guidelines provided by the Department of Basic Education subject specialist and advisor. Because of this, teachers relied on the prescribed textbook along with the relevant CAPS document when designing lessons. Lecturers in TVET Colleges rely on the prescribed textbook (Mathematics Didactics Portfolios).

The Assessment plan was submitted on the provided HEI template (see Appendix L). Three of the six templates were submitted blank. No student completed it in full. This was potentially because they did not understand the template or alternatively, ignored it as its relevance was unclear. There is also no mention of an assessment plan as a separate aspect to be observed in the guidelines, presented in Table 7.3. Observations relating to assessment planning revealed that assessment was done in accordance with the guidelines stipulated in the relevant curriculum documents. For example:

Since they follow CAPS and cover the content according to CAPS and also assessment addresses the stated outcomes on CAPS (NQT3 approach MD TP1).

Observations relating to assessments also revealed that teachers use formal and informal assessments. Informal assessments are conducted to establish readiness for

formal assessment. Formal assessment is done to calculate a learner's year mark, to verify learner readiness for the final examination and to make sure that the prescribed curriculum content has been transferred. Observations revealed that individual teachers/lecturers are responsible for setting daily informal assessments in preparation for formal assessments. Formal assessments are either set by one or a group of teachers/lecturers, or it is provided by the relevant Department of Education. In cases where a large body of learners are doing the same subject, teachers use common assessments. Assessment feedback focused on clarifying why a response was incorrect by working through the assessment's memorandum with learners. The moderation processes when formal assessments are conducted were also introduced. For example:

These questions paper has a pre-moderation process also then the post moderation where the [learners'] papers are also moderated (NQTsD9 approach MD TP1).

Observations revealed that individual teachers used mark sheets with learner names and spaces to record their formal assessment marks. Once all marks are recorded, a copy of the list is kept in the subject portfolio file and another is forwarded to the Programme Manager in a TVET College or the HoD in a School. The marks are then captured on the school or TVET college system to generate progress reports (Mathematics Didactics Portfolios). Although the above observations were stated by students, mark sheets were potentially only discussed without providing examples or discussing the process of completing it. For example:

I wish the [teacher educators or mentor teachers] gave us an idea or gave us an example or a sample of how a class mark sheet should look like and what is expected of us to do. Because now when I come to the school... It is not complicated. It was just that it was my first time seeing it and you have to do it while under pressure. It was kind of difficult... also when it comes to controlling the book (NQT1 interview)

Observations relating to learning material (standard technology) revealed that for the most part, teachers/lecturers only used the prescribed textbook with limited or no extra notes when teaching mathematics. Some teachers/lecturers were observed using worksheets or provided learners with a summary to clarify specific content in support of the prescribed textbook.

[I]t is not common for teachers to supply extra hand-outs as most of the required work is in the textbooks (NQT4 approach MD TP1).

Learners are then given summarised notes or worksheets, these are dependent on the educator's choice (NQTsD9 approach MD TP1).

Observations relating to advanced technology revealed that teachers/lecturers use scientific calculators, cell phones or tablets to access the internet, and personal computers or laptops linked to a smartboard when facilitating mathematics. The most common was scientific calculators and then personal computers. The third most used was students' cell phones, even though school policy does not allow cell phones. These teachers allowed cell phones because access to the internet was limited in the host school. Others observed teachers/lecturers make use of laptops linked to a smartboard, further supported by learners having access to tablets to transfer content. It was observed that even in well-resourced environments, the scientific calculator remained the key technology to complete mathematical tasks. Although a scientific calculator was observed as the most common and therefore essential technology to become mathematically competent, some NQTs completed TP in environments where all learners did not have access to it.

Only scientific calculators are used... nothing else was being introduced to learners. Some of them they do not even have the calculator (NQT3 approach MD TP1).

In environments where computers were available, the programmes used to facilitate mathematics as observed were "Ask Archie" (NQTsD9 approach MD TP1) and "geogebra" (NQT1 approach MD TP1). Access to such software was only available on specific days as the computer room needed to be booked. Some students observed that although a school/college has a computer room or lab, it is mainly used for CAT or IT learners and does not contain software to aid the teaching of mathematics. Concerning fellow teachers as a resource to assist in the role of mediating learning, observations revealed that the following topics are discussed during subject meetings, namely: progress reports, content issues, challenges with learners, assessment dates and moderation, portfolios, subject files and training needs of teachers/lecturers. Minutes of these meetings are filed in the subject portfolio file for record keeping purposes.

Based on the above, NQTs were guided to understand that a learning mediator is able to compile a subject portfolio file indicating how they select, sequence and pace the

delivery of curriculum content. This process started by introducing the relevant school curriculum documents during didactics (TE2/programme coordinator; TE3 interview) and planning related documents in professional studies (TE2/programme coordinator interview). Because of teacher educator workloads, they are not always able to observe and evaluate the NQTs during TP to verify their ability to select, sequence and pace curriculum content. To observe and evaluate the learning mediator role, TE3 included an informal assessment involving the presentation of a lessons introduction in addition to submitting the TP linked assessment after completing TP (see Table 7.3). Mathematics didactics also included a formal assessment in which groups of five had to select, sequence and pace a randomly assigned topic guided by a rubric. One of the rubric criteria was titled “Mathematics Content”. The remaining six criteria were “Visual techniques”, “Audio techniques”, “Organisation”, “Mechanics” and “Eye contact”. The topic had to be presented as a PowerPoint presentation to their peers to show how they sequence and pace selected content. Teacher educators were also given access to a report that served as evidence that TP assessment requirements were met (TE3 interview). Unfortunately, the evidence produced by the assessments and reports mentioned above are not perceived as providing sufficient information to verify that NQTs can select, sequence and pace curriculum content:

I see the [TP] report, but that doesn't really tell me... I don't always know what I am actually sending out (TE3 interview).

What product they come back with I am not sure (TE5 interview).

Some NQTs also raised the relevance of TP linked assessments as a concern. Some specifically mentioned that they perceived TP linked assessments as duplicating paperwork (ticking boxes) instead of developing them as learning mediators. The relevance of the HEI planning templates was also raised as a concern by some NQTs in terms of developing them as learning mediators:

Because here [host school/college] we are given a lesson plan which goes this way... Now at [HEI] filling department or whoever those people are, are going to give you something totally different right. The templates are different... They want you to use the [HEI] one, but when you are presenting it to your [mentor teacher] here they want their own one. It does not make sense (NQT5 interview).

Reflecting on the above, the PGCE engaged NQTs with experiences that focused on learning in and from practice to develop their practical knowledge and equip them to fulfil the role as learning mediator (DHET, 2015:10-11). The key challenge experienced

is the inability of TP linked assessments and reports to provide adequate data, to ensure that teacher educators are able to verify desired development (Islam, 2012:24; Ortlieb, 2008:477; Philpot, 2006:298; Goldstein, 2005:9). Nonetheless, it is concluded that NQTs are aware that the learning mediator role involves compiling a subject portfolio file to indicate how they select, sequence and pace the delivery of curriculum content.

7.3.2. Learning mediators are enthusiastic, flexible and approachable in terms of selecting the best method to satisfy both subject and learner needs

Professional studies and didactics introduced NQTs to methods available to mediate learning. Professional studies verified the transfer of such understanding by means of the assessment presented below.

Table 7.4: Professional studies assignment 2 (methods) and student submissions summary

WRITTEN GUIDELINES							
22 May 2014 <u>Assessment criteria:</u> Available methods: How many methods were used? The more used the better. How relevant were the methods? If the lists contained methods that were relevant it was better than an extensive list of methods that was unlikely to be available. Factors that need to be considered when selecting methods: How many methods were used? The more used the better. How relevant and applicable were the factors? Weighting process: What was the extent of the criteria – two point scale, five point scale, etc							
STUDENT SUBMISSIONS SUMMARISED							
METHODS	SAMPLE						Frequency
	NQT4	NQT2	NQTsD13	NQT5	NQT6	NQTsD9	
Practical demonstration/simulation	√		√		√	√	4
Coaching	√						1
Small groups/syndicates/co-operative learning	√		√	√			3
Brain storming	√	√				√	3
Tutorials	√						1
Teaching presentation and explanation (lecture/direct instruction)	√	√	√	√	√	√	6
Question and answer (inquiry)		√	√	√	√		4
Work in groups		√	√				2
Practical work		√	√				2
Problem solving		√	√				2
Investigation		√	√		√		3
Class/group discussion			√		√	√	3
Role play					√	√	2
Assignments					√	√	2
TOTAL METHODS PER STUDENT	6	7	8	3	7	6	

Assessment submissions included between three and eight suitable methods for the selected didactic. The highest ranked and most popular was teaching presentation and explanation (lecture/direct instruction). Submissions also revealed that four aspects

were considered before a method was chosen. First, “[T]he method... chosen... depend on topic/lesson given” (NQTsD9 reflection PS assignment 2). Second, “[t]eachers must always use different teaching styles simply because they need to cater for hearing, learning, touching and off course the eye one. Now as a teacher you must try by all means to cater for all the different learning styles” (NQT5 interview). Third, “[i]t is important that one does not assume that [learners] know concepts..., but rather assume they don’t know and think of them thoroughly when planning” (NQT1 reflection MD TP2). Lastly, the practical implications of the chosen method to transfer the identified content to the specific learners needs to be considered. For example:

Here is the question that I ask myself all the time. How can I make my students understand? How can I make sure that they remember what I have just exposed them too? (NQT4 approach PS assessment 7).

The understanding presented in this assessment was further developed by allowing individuals to experiment with the variety of introduced methods to identify what works best for them. For example:

[T]he options and that there isn’t just one way. It didn’t only give me one option. You can do it in different ways. I think that part. That part was very clear especially because I didn’t know anything (NQT1 interview).

In support of the above, TE3 encouraged all to experiment in the classroom and explore different methods by maintaining a high level of approachability and flexibility:

[Y]ou should never be scared that you are going to be dismissed for... doing something in a certain way. But rather you should ask: Help me or show me, if I did this wrong, show me where I went wrong. And that is the same as what they should apply in the classroom as well...[NQTs] should have the same mentality or approach or they should have that same approachability for their learners. Learners should be able to come to them and say: I don’t understand where I went wrong, please help me. [NQTs] should then be able to show their learners where they went wrong (TE3 interview).

Most NQTs revealed that they anchored their approach as a learning mediator by being approachable and flexible. This understanding allowed most NQTs to enter a classroom as not only a teacher, but also a student developing themselves alongside the learners. For example:

I encourage my learners to ask questions, and I am straightforward about not having all of the answers. When I become “stuck” I seek the input of my colleagues, my books, and on the internet. On the following lesson, I share not only the answer I have found, but also the process I went through to discover it. I challenge my learners to understand that I am open to their thoughts, eager to hear their opinions, and thrilled to learn with and through them (NQTsD13 approach PS assignment 7).

In addition to the above, most NQTs also identified enthusiasm for the subject as a vital ingredient to enhance the impact of a selected method. In support of enthusiasm, all NQTs perceived it essential to include learners as active participants and contributors during a lesson as a method. As examples:

Learners need to be given the platform where they can contribute to the knowledge they have, as no learner is an empty vessel (As [lecturer for Educational Management] points out to us on a regular basis) (NQTsD9 approach PS assignment 7).

[E]very learner possesses unique capabilities that can be shared with others if given the appropriate support. I challenge my learners to share opinions with and to mentor one another (NQTsD13 approach PS assignment 7).

With the developed understanding of the need to be enthusiastic, approachable and flexible, all NQTs used teaching presentation and explanation (lecture/direct instruction) during TP. This method was perceived as being the best method and easiest to use to facilitate mathematics. Although perceived as the easiest to use, evaluations during TP revealed challenges in using this technique. Examples of aspects to improve when using this method include “Go around the class to reach all learners (NQT3 mentor evaluation MD TP1); “Voice projection can be developed” (NQT3 mentor evaluation MD TP2); and “Invite learners to chalkboard to complete given formulas” (NQTsD3 HEI representative evaluation MD assessment 3). The module language development and communication included content and assessments relating to the aspects identified by evaluators to improve as mentioned above. For example:

[T]here is a big oral presentation section that I go through with the students. So I use it as if they are going to use the skills that they acquire in the classroom in the school. So I take them all the way through presentation skills, articulation, pronunciation, projection, how you position yourself, proxemics in the classroom,

who you are interacting with. With the front row only? Are you reaching [learners] in the back? Et cetera (TE1/TP coordinator interview).

Reflecting on the above, practical tips were provided for mediating learning. At the very least, NQTs were introduced to the need to be enthusiastic, flexible and approachable when using a method or methods to best satisfy both subject and learner needs.

7.4. Understanding the role of ‘interpreter and designer of learning programmes and materials’ verified in the PGCE

The DHET (2015:58-59) expects HEIs to produce NQTs who are able to identify and/or design suitable written and visual resources to transfer content to diverse learners. This is assumed to be evident by holding knowledge of the school curriculum and the ability to unpack it by identifying/designing the most suitable written and visual resource(s) to transfer specified content to diverse learners (DHET, 2015: 10-11; 58-59 & 62). Engagements linked to the above are explored to present a PGCE context specific description of this role.

7.4.1. Interpreter of learning programmes and materials is able to select and use the most suitable accessible media to satisfy both subject and learner needs

Professional studies and didactics introduced NQTs to media available to interpret curriculum content. Assessment submissions listed between five and ten media perceived to be relevant in the chosen didactic (Note that not all chose mathematics (didactic A) to complete this assessment (see Table 7.5 on the next page) as they selected their didactic B). The most popular media was chalk board/white board. Two students ranked it as the most important media, one as second most important and two as fourth and fifth most important. The second most popular selected media included photo copies/handouts, PowerPoint presentations and textbooks/books. The most frequent media ranked as top three included flip charts, demonstration movies and smart board.

The rationale for selecting whiteboard/chalkboard as the most popular media was due to the nature of mathematics as a discipline and its value when using teaching presentation and explanation (the most popular method). For example:

Mathematics... requires a lot of demonstrations and calculation on the white board or chalkboard. Mathematics... requires lots of teacher learner interaction (NQT4 approach PS assignment 2).

Table 7.5: Professional studies assignment 2 (media) and student submissions summary

WRITTEN GUIDELINES							
<p>22 May 2014</p> <p><u>Assessment criteria:</u></p> <p>Available media: How many methods or types of media were used? The more used the better. How relevant were the types of media? If the lists contained methods that were relevant it was better than an extensive list of media that was unlikely to be available.</p> <p>Factors to be considered when selecting media: How many types of media were used? The more used the better. How relevant and applicable were the factors.</p> <p>Weighting process: What was the extent of the criteria – two point scale, five point scale, etc.</p>							
STUDENT SUBMISSIONS SUMMARISED							
MEDIA	SAMPLE						Frequency
	NQT4	NQT2	NQTsD13	NQT5	NQT6	NQTsD9	
Chalk board/White board	√	√	√	√	√	√	6
Bulletin board/Posters	√				√		2
Flipchart/Flash cards	√				√	√	3
Photo copies/handouts	√	√	√		√		4
PowerPoint presentation	√	√			√	√	4
Textbooks/Books	√	√	√	√			4
Computer/Internet	√		√			√	3
Video clips/Demonstration movies/Television	√				√	√	3
Multimedia/Visual audio media	√			√			2
Interactive/Video camera	√					√	2
Data projector		√	√	√			3
Exam question papers			√				1
Graphs/Newspapers			√		√		2
Smart board				√		√	2
Kinaesthetic				√			1
Mimio classroom media kit				√			1
TOTAL MEDIA PER STUDENT	10	5	7	7	7	7	

Although whiteboard/chalkboard was identified as the most popular media, various TP evaluations and reflections revealed development needs when making use of it. For example:

The flow of the problem solved on the board was not in order, as it was not easy for the learners to copy the problem solved on the board (NQT1 reflection MD TP2).

Development in the PGCE with regards to using a whiteboard/chalkboard to enhance a lesson's impact involved that "you write from the left to the right" (NQT5 interview) when presenting content. Tips and comments on using the whiteboard/chalkboard in the best way were provided during TP observations. These include: "You need to face the learners when you talk to them"; "Write keywords with definitions on the board" (NQT3 HEI representative evaluation MD TP2); utilise all available space on the whiteboard (NQT1 mentor evaluation TP1); plan board writing (NQT3 HEI representative evaluation MD TP2); and practice chalkboard use, especially correct fonts (NQT3 HEI representative evaluation TP1). The only other form of media mentioned during TP observations was handouts/worksheets. Although introduced to

an array of media (see Table 7.5), some NQTs had limited exposure to a few because of the environment of some host schools/colleges:

[T]he resources that they deal with in schools are also a problem. It is a very sad story where there is no libraries, no laboratories, no nothing in some schools (TE4 interview).

The PGCE therefore developed NQTs ability to identify the most suitable media to enhance a lesson, which was more often than not inaccessible. For example:

I would have liked it if learners were able to build circuits to measure the value during the lesson... there are no physical representation of the concept... no physical replica of the product learners tend to find difficulty imagining these concepts (NQTsD9 reflection MD TP2).

The HEI allowed NQTs to use HEI media and resources to complete TP linked assessments. For example:

On our [TP], let's say maybe you are supposed to do a practical at school. Now if your school is not well-resourced to have, to do practical, you have to go to campus and borrow all their apparatus to perform your practical. So you would never make an excuse saying I didn't do my practical because my school didn't have the needed apparatus (NQT3 interview)

Although done with good intentions, the practice of borrowing HEI media during TP potentially restricts NQTs in developing the ability to make use of the media and resources they would commonly find in under-resourced schools. In 2015, some NQTs struggled to complete the required curriculum content because they did not have access to media and resources they thought they might need. For example:

I think this school that I am at is not resourceful. So now I must think carefully to find a way that the school is resourceful. So now the thing is I must do all the things but at the same time I am expected to be finished with my syllabus although I don't have all the physical resources to finish on time (NQT3 interview).

It is potentially better for NQTs to adapt to available media and resources in the school/college when completing TP. Some NQTs are recommending what their media and resource needs are to the school/college management, when it is found to be lacking. Some are also exploring available media which are underused and/or available in limited quantities. For example:

One of the things that I am using now which I never used before which I found was very useful is a flip-chart... I looked and there was only two flip-charts on the campus. Only two! Can you imagine that! It is supposed to be a teacher's aide. So I got an old flip-chart and I use it because it is excellent... So I am using more media in the class (NQT4 interview).

Reflecting on the above, being an interpreter of learning programmes in the PGCE context is possessing the ability to select and use the most suitable accessible media to satisfy both subject and learner needs.

7.4.2. Designer of learning programmes is able to write a training manual and a study guide

Some NQTs believed the PGCE assessments and engagements developed their ability to compile a training manual to meet SAQA credits. For example:

Most of the assignments were teaching you things like for example: these are the SAQA credits, you must design a course based on that. So I feel at the moment that I would be able to confidently sit, analyse it and be able to write a training manual (NQT4 interview).

Engagements focusing on developing training manuals were perceived by some NQTs as equipping them to design study guides for learners. This was done with the aim of interpreting the curriculum and related expectations to learners, and to better equip themselves for the year ahead. For example:

I am busy writing a study guide. The reasoning why I am doing this is just to enhance my, how can I say it. It is a lot of content man. I am doing it because I want to organise my mind better. So what I want to do now. Do a lesson plan for each one to just enhance my knowledge of the book. So that is why I am writing it (NQT4 interview).

Reflecting on the above, the role of learning programmes designer in the PGCE context involves the ability to write a training manual and design a study guide (supported by lesson plans) for prescribed curriculum.

The fourth theme is explored below.

7.5. Understanding the role of 'leader, administrator and manager' verified in the PGCE

The DHET (2015:58-59) expects HEIs to produce NQTs who are able to create environments conducive for learning and teaching. This is assumed evident when NQTs hold understanding of the various learning situations, contexts and education environments. It is further assumed evident by being able to make appropriate decisions, manage classrooms, complete classroom administration duties and participating in school decision making structures in a democratic fashion (DHET, 2015: 10-11; 58-59 & 62). Engagements linked to developing the above during the PGCE FET mathematics programme is explored below.

7.5.1. The role leader is able to participate during meetings and to influence school/college management to purchase additional media

Observations conducted during the first TP revealed that NQTs were introduced to subject meetings in terms of who chairs it and the decisions taken (MDSG 2014). Some NQTs used the media knowledge gained in the PGCE to request school/college management to request what media they needed (Professional Studies Portfolio). Reflecting on the above, the role leader in the PGCE context includes attending and contributing during subject meetings and requesting school/college management to purchase additional media to enhance the quality of education delivered in the school/college.

7.5.2. The administrator role is being literate in Word, Excel, PowerPoint and Access to complete PGCE assessments

The PGCE verified NQTs computer literacy in the following ICT basics: Windows, word processing [Word], spreadsheets [Excel], presentations [PowerPoint] and database use [Access] (Programme Guide 2014). NQTs also mentioned that most of the PGCE assessments developed their computer literacy by requiring them to submit hard copies of either a Word, Excel or PowerPoint document. The ability to apply basic ICT knowledge and skills to classroom administration is assumed to be in place. Alternatively, it is assumed to be developed as NQTs gain experience. Reflecting on the above, the role of administrator in the PGCE context involves NQTs being computer literate in terms of Word, Excel, PowerPoint and Access to complete PGCE assessments.

7.5.3. The manager role includes being able to create and manage safe environments conducive to learning by doing lesson planning and setting class rules

The PGCE developed the understanding that “a good lesson is a balance between a well explained lesson and a well-managed classroom” (NQT4 reflection TP2). A well-explained lesson was revealed as being able to state “the importance of every activity” to learners (NQT5 approach PS assignment 7). A well-managed classroom was revealed to be dependent on “setting fair and consistent rules” (NQT5 approach PS assignment 7). As a whole, a good lesson was revealed to be dependent on a teacher’s ability to plan a lesson that captures and retains learners’ interest from the beginning (NQT1 reflection MD assessment 3). A safe environment is encouraged by being aware of First Aid procedures and how to avoid risks, as developed during the externally facilitated First Aid training (Programme Guide 2014) Therefore, the manager role involves the ability to plan a good lesson and communicate set class rules within the aim of creating and managing a safe classroom environment conducive to learning and teaching.

7.5.4. The manager role includes maintaining classroom discipline by moving around, providing examples and asking questions to retain learners’ interest

The PGCE introduced NQTs to theories on the practice of maintaining classroom discipline. For example:

I had someone come in and do a presentation on dealing with behavioural problems at schools (TE3 interview).

Although introduced to related theories, most evaluators noted that NQTs struggled with classroom discipline during TP. Challenges occurred because of nerves and feeling unfocused when responding to learner questions, causing some to become undisciplined. For example:

When a learner asks a question, take time to understand the question or misconception and then address the issue. Don’t rush to answer. If you’re not sure about the question, ask the learner to rephrase or you could ask the learner whether your explanation makes sense (NQT1 mentor evaluation TP1).

Others experienced discipline challenges when letting a learner complete a task on the whiteboard/chalkboard without actively including all learners in the activity. For example:

Let the class follow as the [learner] does the answer on the board – otherwise its futile (NQT6 approach PS assessment 7).

Others who were evaluated positively in terms of classroom discipline revealed that they walked around, involved learners, asked questions and provided examples of what is expected. For example:

As the teacher I walked around and those who did not understand how some of the answers came about and explained. When done with individuals, I explained one example to make it clear for everyone to understand (NQT1 approach MD TP2).

Reflecting on the above, the manager role in the PGCE context includes the ability to retain learners' interest by moving around, providing examples and asking questions to maintain classroom discipline. It is noted that the ability to retain diverse learners' interest was underdeveloped during the PGCE as most NQTs mentioned that the key challenge they experienced was ill-disciplined learners.

The fifth related theme is discussed below.

7.6. Understanding the role of 'scholar, researcher and lifelong learner' verified in the PGCE

The DHET (2015:58-59) expects HEIs to produce NQTs who are competent in research and reflective skills to improve their teaching practices. Research skills are assumed evident by holding highly developed literacy, numeracy and IT skills to achieve ongoing personal, academic, occupational and professional growth. Reflective skills are assumed evident by understanding how to learn from practice and in practice to continuously improve teaching practices to best suit specific content and diverse learner needs (DHET, 2015: 10-11; 58-59 & 62). Engagements linked to the above are explored with the aim of presenting a PGCE context specific description of this role.

7.6.1. Limited verification of highly developed literacy, numeracy and ICT skills because it is assumed to be developed during the recognised diploma

Because NQTs completed a diploma (or degree) from a recognised HEI, it is assumed that they hold the desired level of literacy, numeracy and ICT skills. ICT skills were verified in the beginning of the year and most NQTs passed the related examination (TE2/programme coordinator interview). The few that did not pass were required to

attend contact sessions to develop their ICT skills. In the PGCE FET mathematics programme context, it is assumed that the NQTs hold the desired level of numeracy because they completed a diploma with a mathematics focus. Although assumed to hold the desired level of literacy, it emerged that some NQTs struggled with referencing during the PGCE. For example:

Referencing is something you will find out that they have no idea what you are talking about. You have plagiarised they don't understand (TE4 interview).

The assessments weren't very original (NQT6 reflection PS assessment 4).

Engagements focusing on referencing as part of the module introduction to research were scheduled for October (IRSG 2014). This was potentially scheduled late in the year as students were assumed to have already developed the desired level of understanding and skill relating to referencing. In addition to referencing, some NQTs revealed that they struggled to meet all PGCE assessment requirements because of their literacy level. For example:

Language and spelling was one of the things that contributed in me performing lower (NQT2 reflection PS assessment 3)

Reflecting on the above, the role as researcher is potentially underdeveloped in some NQTs during the PGCE because it is assumed that all diploma graduates hold the desired level of literacy, numeracy and ICT skills needed to conduct research.

7.6.2. Personal, academic, occupational and professional growth influenced by the PGCE modality of guided self-study and continuous assessment

The modality of guided self-study and continuous assessment, used to deliver the PGCE, developed NQTs ability to participate in personal, academic, occupational and professional growth.

Thank you for a good year I have not just grown on a personal level but also with regards to my Job delivery (NQTsD9 reflection PS assessment 7).

There could be a perceived advantage to being employed as a teacher/lecturer while doing the PGCE. This is because daily opportunities are available to apply theories in a classroom context to improve their teaching practice. For example:

I enjoyed the fact that when I was lecturing and studying I could come back the next day and try that thing... It was almost like it gave me all these tools and threw it in the class and I would see what worked... in the class (NQT4 interview).

The above does not argue that all who pursue the PGCE should be employed on a full-time basis to gain benefit from the qualification. Rather, it argues that the PGCE should offer opportunities for all to apply theories in a classroom or similar context throughout the year (in addition to TP) to equip all NQTs with the ability to learn from and in practice. There are definitely benefits to completing the PGCE, especially for unqualified teachers who secured a position as a teacher/lecturer with a non-education related diploma or degree. For example:

[N]ow I got that teaching part you know, things about curriculum and lesson plans. I remember the first time I came here [place of employment] lesson plans was, I didn't do lesson plans and I would stand there in the class. I would, the first time I would get to a point where students will ask something and you don't know and they know when you don't know. And it works out when you plan your lesson. And you know it is funny you would think that the old lecturers would do that but nobody actually explained to you that. So yes, it was for me... now that has to be done properly (NQT4 interview).

The PGCE also developed NQTs ability to research and present on randomly assigned topics to influence their understanding of the teaching profession. Mathematics didactics, as an example, included an assessment focusing on the presentation of a randomly assigned topic to their peers. Examples of randomly assigned topics include "Learning with understanding (reference to Mathematics)", "Prerequisite knowledge for Mathematics", "Connections to real life", "Mathematics anxiety" and "Extra-tutoring" (Mathematics Didactics Portfolio). The above, it is argued, developed NQTs ability to learn from their peers (learning from practice) and to present their work to their peers (learning in practice). The PGCE also developed NQTs ability to learn from practice by completing a literature review on a selected "person, theory or philosophy" as introduced (see Table 7.6 on the next page).

The assessment on the next page required students to select and analyse a specific theoretical aspect introduced in the PGCE (Professional Studies Portfolio). Submissions revealed that at least eight "persons" were introduced as presented in the bottom part of Table 7.6. The reason for eight is because of NQT4 briefly mentioning six persons/theories/philosophies.

Table 7.6: Professional studies assignment 4 (literature review) (Professional Studies Portfolio)

18 September 2014

Select a person, theory or philosophy covered in professional studies (or specific didactics) that you think has significantly contributed toward the understanding or practice of teaching and learning. Analyse the person, theory or philosophy by focusing on the following:

- (a) The nature of the person, theory or philosophy;
- (b) Factors influencing the person, theory or philosophy;
- (c) The contribution the person, theory or philosophy has and potentially can continue to make to understanding teaching and learning.

(Guidelines: amongst others – never less than 8 pages and never more than 12 – Harvard referencing method – Should students not know what is expected the lecture is to be contacted BEFORE THE DUE DATE).

SAMPLE	SELECTED "PERSON, THEORY OR PHILOSOPHY"
NQT2	"Lev Semyonovich Vygotsky"
NQT4	"Piaget, Bloom, Bruner, Ausubel, Vygotsky and Bandura"
NQT5	"Burrhus Frederic Skinner"
NQT6	"Lev Vygotsky"
NQTsD9	"Jack Mezirow"
NQTsD13	"Jean Piaget"

As a whole, four persons/theories/philosophies dominated the discussions included in submissions. These were:

- (1) Vygotsky's research on the development level of learners and group work;

His idea that students should be working in groups on challenging tasks with assistance from someone who is more capable is widely embraced in education (NQT2 approach PS assignment 4).

- (2) Piaget's research on learners as active participants;

Some educators normally take children as empty vessels or people who do not know anything but Piaget made them believe that children are not empty vessels to be filled with knowledge (as traditional pedagogical theory has it), but active builders of knowledge, little scientists who are constantly creating and testing their own theories of the world (NQTsD13 approach PS assignment 4)

- (3) Skinner's research on environmental influences;

The actions we take are influenced by our environment, which means we behave according to our current physical states and situations/circumstances (NQT5 approach PS assignment 4).

- (4) Mezirow's research on adult education and breaking prejudice;

Mezirow's theory has not just added significantly to the study of adult education but it has also aided curriculum developers and training facilitators to draw up study

guides and workbooks to train up adults... [A]ll individuals' ability to change their mindsets and with this there can be change in their lives. The way we look at people and talk to people, especially with our own pre-conception as such a young democratic society, we as teachers must brake our own prejudice (NQTsD9 reflection PS assignment 4).

As a whole, the PGCE required students to complete various tasks with pre-set deadlines to realise personnel and professional growth. For example:

[T]here are a lot of assignments and everything that was submitted at a short period of time...[T]he reason why it is one year is that it gives the student to work under pressure so they can be able to manage time (NQT2 interview).

[I]t is eight subjects it is eight assignments and the deadlines are there...But it was really a learning curve. It was brilliant (NQT4 interview).

Reflecting on the above, the PGCE modality of guided self-study and continuous assessment as a whole influenced NQTs ability to participate in further personal, academic, occupational and professional growth.

7.6.3. Reflective skills to understand successful and unsuccessful aspects influenced by completing a reflection template

Appendix M presents the reflection template which formed part of the formal assessment of certain assignments and TP lessons. For example:

Use the reflective skills developed so far this year and reflect on each of the assignments for this subject. Use the attached reflection sheet for each assignment (Professional Studies Portfolio)

This template guided reflection by means of five questions/statements. The first focuses on which aspects were successful and why. As examples:

It is good to see others philosophy, many time these are things or concepts you know and believe yourself for even questioned and to know there was research done on it so good. Informing you of ways to look at things differently (NQTsD9 reflection PS assignment 7).

I was able to come up with all five assessments in mathematics and I was able to set all the different assignments. The reason for this is simply because, our didactic

lecturer already told us about five assessments for mathematics (NQTsD13 reflection PS assessment 5).

The second focuses on which aspects were unsuccessful and why. As examples:

To calculate the percentage in the given data. The learners didn't know how to calculate it... The background of calculating the percentage was the issue (NQTsD3 reflection MD assessment 3).

A year plan could not be designed according to the specified standards because where I teach does not use CAPS (NQT5 reflection PS assignment 1).

The third focused on presenting a solution to overcome aspects which emerged as being unsuccessful. As examples:

Always evaluating your lesson afterwards and asking questions "What could be done better" and "What do I need to discard" (NQT4 reflection MD assessment 3).

[W]ork more on my technical aspects like references etc. (NQT4 reflection PS assessment 4).

The fourth required reflection on whether intended outcomes were met or not. Most NQTs state that they assume outcomes were met where they had passed. In cases where the NQT perceived the outcomes had not been met, mention was made of either the timing of the assessment due date or experiencing personal challenges. As examples:

The only thing is during this time I had a great loss in my life, and due to this my work standard dropped (NQTsD9 reflection PS assessment 4).

Assignment was given at a wrong time, in my perspective (NQT6 reflection PS assessment 5).

The fifth allowed for additional comments to be made. This part of the template was left blank by most of the NQTs. In the few cases where a comment was stated, it involved a compliment. For example:

The task really impacted my learning and made the whole programme clear and interesting (NQT5 reflection PS assignment 7).

Based on the above, the PGCE influenced NQTs ability to identify successful and unsuccessful aspects relating to the process of learning to teach by including a reflection template as part of the formal assessment programme. The sixth related theme is discussed below.

7.7. Understanding the ‘assessor’ role verified in the PGCE

The DHET (2015:58-59) expects HEIs to produce NQTs who are able to evaluate learners’ progress. This is assumed to be evident by understanding how to assess in reliable and varied ways, how to design and manage suitable assessments, and how to interpret and use assessment results to provide feedback to learners and to improve future teaching practices (DHET, 2015: 10-11; 58-59 & 62). Engagements linked to developing the above during the PGCE FET mathematics programme are explored below. Three emerging categories are presented with the aim of presenting a context specific description of this role.

7.7.1. The ‘assessor’ role includes analysing reliability and validity of existing and designed assessments in terms of levels, outcomes, standards and suitability

The PGCE influenced NQTs ability to evaluate an assessment’s reliability and validity in terms of realising the intended purpose. For example, the assessment presented on the next page involved the analyses of DBE examination papers. This involved identifying the Taxonomy level(s), learning outcome(s) and assessment standard(s) comprising each question/problem.

Table 7.7: Mathematics didactics analysis grid template (Mathematics Didactics Portfolio; MDSG 2014)

Blooms Taxonomy Levels February/March 2011 Paper 1, Paper 2 and Paper 3 (MD 2014 Portfolios). Analyse Grade 12 exam papers, by extending and then completing the following grid:					
Question	Taxonomy level				Learning Outcome(s) and Assessment Standard(s) this question refer to
	1 (Knowledge)	2 (Routine procedures)	3 (Complex procedures)	4 (Solving problems)	
1.1					
...					
Total					

Following the above, the PGCE influenced NQTs ability to design valid and reliable assessments. For example:

[T]he students in a PGCE mathematics classroom were required to design a test that they will give to students while they are on their teaching practice. The test that a student has developed was to be handed in for evaluation and the lecturer had the assessment criteria to check if the test has been designed according to assessment criteria of designing a test and marks were given to each test (NQT5 approach PS assessment 5).

Specifically, NQTs were influenced to design at least four forms of assessment for mathematics before the second TP period:

Table 7.8: Mathematics didactics part B TP2 assessment guideline extract (Mathematics Didactics Portfolio)

**2ND TEACHING PRACTICE ASSESSMENT
Assessment Portfolio**

You are required to compile an assessment portfolio, consisting of the following: Four (4) different types of assessment tasks that YOU have designed/created: Project; Investigation; Assignment; Test. Include the memorandum /answers (with mark allocation, assessment criteria and/or rubric) for each of the assessments.

Submit a copy of a learners answer sheet/work for each of the assessment tasks after you have assessed it.

Provide a summary on how feedback was done with each assessment.

Reflect on each assessment task using the following headings:

- (a) What were the desired outcomes the learners had to demonstrate in the assessment task?
- (b) Which of the stated outcomes were met? Give reasons why you say this.
- (c) Which of the stated were not met? Give reasons why you say this.
- (d) How the assessment could be improved.

Each of the assessment tasks should be associated with a lesson you presented. Indicate a link between the assessment task and the applicable lesson plan in the lesson plan section. (e.g. Code it or number reference)

(READ SECTION 4 OF THE CAPS DOCUMENT MATHEMATICS)

The assessment above influenced the NQTs ability to establish the validity and reliability of designed assessments by answering the four reflective questions numbered (a) – (d). The answers served as formal reflections to indicate the development realised to assess learners in a reliable and valid manner. It also focused on influencing the NQTs ability to collect information from assessments to provide learners with constructive feedback. This was done by analysing assessments in terms of successful and unsuccessful aspects to guide constructive feedback, influence future teaching practices and to complete related PGCE assessments. Professional studies further influenced the NQTs ability as an assessor to analyse the reliability and validity of the form of assessment used. For example:

It is easy to become so absorbed in the profession of teaching that we lose sight of the precise purpose of a specific element of assessment. There is then the likelihood that we are not realizing that purpose, or that we overlook another form of assessment which might be more appropriate (NQT6 approach PS assessment 5).

The ability of NQTs to select the most suitable form of assessment that is reliable and valid, in terms of being most suitable for the intended purposes, was verified in professional studies as follow:

Table 7.9: Professional studies assessment 5: forms of assessment (Professional studies portfolio)

18 September 2014		
Identify the five forms of assessment that are the most appropriate for (one of) your subject(s). Discuss the nature and use of each form of assessment in detail by reviewing literature on it and reflecting on assessments that you have constructed during the course of the year.		
SAMPLE	SUBJECT	SELECTED ASSESSMENTS
NQT2	Physics	Investigation; Research Project; Class Test; Experiment/Practical Work; & Classwork
NQT4	Mathematics	Exercise from Textbook; Project; Investigation; Tutorial; & Test
NQT5	Mathematics	Collaborative Assessment; Written Test; Presentation/Oral; Portfolio; & Project/Research
NQT6	Mathematics	Tests; Classroom Exercise; Assignment; Project; & Investigation
NQTsD9	Electrical Engineering	Summative Assessment (Formal Standardised Test); Formative Assessment (Worksheets); Project/Practical Work (Subjective Assessment); Investigations Report (Subjective Assessment); Workplace Based Assessment (Logbook to Record Daily Activities)
NQTsD13	Mathematics	Investigation; Assignment; Project; Test; & Pop Quiz

Submissions included the four assessments designed and delivered as per the guidelines presented in Table 7.8 (presented on the preceding page). Based on this, it can be assumed that NQTs perceive project, investigation, assignment and test as the four most suitable forms of assessments for mathematics, as introduced during mathematics didactics. The fifth most appropriate assessment form as perceived by the NQTs is classwork, exercise from textbook, tutorial, presentation/oral or pop quiz. The discussions on the nature and use of the assessments all involved an understanding that it was dependent on the nature of the specific content comprising the lesson(s), the needs of learners and its ability to provide valid and reliable information to confirm desired competence achieved. For example:

[1] ...assessment should be fair... should consider the amount of time for investigation to be finished. [2] Assessment should be valid... assess what the teacher really want to measure. [3] Assessment should be reliable in a way that before I judge the performance of a learner I have to make sure that the task was clear to the learners. [4] ...assessment should be meaningful... [5] ... distinguish between learners who have learnt and those who didn't understand. [6] A balanced of the assessment is vital since some learners prefer to work on their own and others like to work with a group... [7] ...formative in a way that learners deserve to get a feedback on what they have done.[8] ...timely in a way that it encourages to the learners to always have some activities before they wrote the final exams. [9]

Manageable assessment is where the task of the learners is kept in a file with question papers also the memorandum (NQT2 approach PS assessment 5).

Reflecting on the above, being an assessor in the PGCE context includes the ability to analyse the validity and reliability of existing and designed assessments in terms of taxonomy levels, learning outcomes, assessment standards and suitability to verify the transfer of a specific skill or content.

7.7.2. The 'assessor' role includes interpreting assessment results to provide constructive feedback and influence future lesson planning and delivery

The PGCE influenced the ability of NQTs to interpret assessment results by introducing them to baseline assessment as a strategy to introduce a new topic. For example:

The first assessment was the baseline test to reflect the current knowledge of the learners about the topic. The result gave me an idea and reflection of what they know about the subject content (NQT5 narrative PS assignment 1).

Their ability to interpret assessment results was further influenced by being exposed to contextual factors, which influences assessment results. For example, learners copy from each other when doing homework or group work, which distorts the reliability and validity of assessments. To overcome this, NQTs design and schedule formal tests to verify competence and to identify individual learners experiencing challenges. The results are also essential to verify whether the teaching method and media used were successful (or not) to develop the desired competence in all the learners. In short, NQTs were influenced in the PGCE to understand assessment as being a cyclical process involving specific steps that are repeated throughout the year. For example:

It involves four step. [1] Generating and collecting evidence. [2] To evaluating this evidence and record the findings. [3] Use this information to understand and assist in the learner in his or her development. [4] All this is then used to improve the process of learning and teaching (NQT4 approach PS assessment 5).

The success of the steps taken is perceived by all as being dependent on securing information that allows a teacher to provide constructive feedback, and which assists learners and improves teaching practice where needed. Although the above understanding was developed, providing constructive feedback to all learners is experienced as easier said than done in a classroom context. NQTs experienced time

management aspects as challenging during TP to complete all planned content and assessments. For example:

Due to the amount of time in the period learners were not able to work in groups or have discussions (NQTsD9 reflection MD assessment 3).

TP evaluations also revealed time management challenges, which restricted the impact of a lesson in providing learners with feedback on their performance. For example:

Aspects that can be developed: Definitive ruling on the final answer – learners must be left with the final answer. The understanding of the example presented (NQT1 mentor evaluation MD TP2).

TP evaluations also revealed time management challenges in terms of providing learners with deadlines to complete assessments:

Give learners time limits on activities. Keep proper timing (NQT1 mentor evaluation MD TP1).

Give the students a time frame to complete assessment. Allows them to learn to work faster (NQT4 mentor evaluation MD TP1).

In the classroom context, some NQTs experience the perceived large number of learners in their classes as restricting their ability to provide constructive feedback to all learners. For example, “when it comes to controlling the books” (NQT1 interview), it is a challenge to offer all learners constructive feedback in a personalised written form. To reduce the workload and enhance the potential of providing all learners with constructive feedback, most NQTs make use of media to assist learners control their own books and informal assessments. For example:

Answers were written on the board for learners to compare and mark their work done at home (NQT1 approach MD assessment 3).

Reflecting on the above, the PGCE introduced NQTs to the need to interpret assessment results, to provide constructive feedback and influence future lesson planning and delivery.

7.8. Understanding the ‘community, citizenship and pastoral’ role verified in the PGCE

The DHET (2015:58-59) expects HEIs to produce NQTs who are able to conduct themselves as professionals during interactions with the school and surrounding community. This is assumed to be evident when NQTs understand professional ethics, hold knowledge of relationships between the self and others, understand the past of South Africa preceding our current constitutional democracy to promote democratic values, and understand the diverse challenges faced by learners and communities in South Africa and strategies proposed/used to overcome this (DHET, 2015: 10-11, 58-59 & 62). Engagements linked to developing the above during the PGCE FET mathematics programme are explored below. The aim is to develop a PGCE context specific description of this role.

7.8.1. This role was influenced by overcoming negative attitudes and misconceptions relating to teaching as a profession

The key challenge experienced by most teacher educators was changing student misconceptions and negative attitudes towards teaching as a profession.

[I]t was quite challenging to try and change their mind-sets about the teaching profession. Because it isn't really what they wanted to do (TE1/TP coordinator interview).

Although being a key challenge, the PGCE was perceived as being successful in overcoming misconceptions and negative attitudes towards teaching as a profession.

The majority of students seem to have a positive stance towards teaching. They do believe or think that teachers are not appreciated and valued (TE1/TP coordinator interview).

The process perceived to have achieved the change involved holding high expectations and maintaining high standards from the beginning of the year. This process was supported by introducing positive and negative aspects associated to teaching as a profession during contact sessions.

So [the PGCE] kind of gives one pros and cons of being a teacher... PGCE made me realise that teaching doesn't suck as people say it does (NQT5 interview).

Reflecting on the above, the PGCE influenced the community, citizenship and pastoral role. This was done by engaging with theory and entering debates. The focus of these were on the positive and negative aspects of teaching to overcome related negative attitudes and misconceptions.

7.8.2. This role was influenced by introducing theories and discussions focusing on inclusive education and creating a caring classroom environment

The module 'perspectives in education' introduced NQTs to theories and debates on inclusive education, the psychology of education and philosophical perspectives in education, with the overall aim of "[e]ngendering critical and creative citizens" (PESG 2014). Most NQTs experienced engagements during this module to have greatly influenced their understanding of a teacher's role in society. Most also perceive the expectations introduced, specifically relating to inclusive education, as unrealistic because of the limited resources and time at their disposal. For example:

[T]he perspectives class I had this conversation with the Doctor and she was saying that the news of the future is that they want inclusive education. They want a teacher or a lecturer to be able to deal with all these different aspect and we were talking about all these various aspects. For example disabled students... I just though with that do not expect too much from a teacher or lecturer in the class (NQT4 interview).

In support, some teacher educators hold the perception that NQTs are underprepared to fulfil the expectations placed on NQTs in terms of dealing with social ills influencing NQTs ability to create caring environments. For example:

[NQTs are] ill equipped for dealing with aggressive [learners], drugs at school and all the emotional stuff that go with that (TE1/TP coordinator interview).

NQTs who were employed in 2014 provided inputs during on this role during 'perspectives on education' to clarify their reasoning for perceiving inclusive education and creating caring environments as a challenge. For example:

A [learner] that has fainted in the class and then it was investigated. And the Mother was called in and the Mother cried and said I didn't feed my child for two days. She fainted because she didn't eat... I had an example of a [learner] with an epileptic fit in the class or students with problems. You cannot expect a lecturer or a teacher to also be a therapist... Although you have to be sensitive towards them... That is

why we have an officer [who] deals with all [learners who needs professional services] (NQT4 interview).

Although perceiving these expectations as being unrealistic, 'perspectives in education' attempted to influence NQTs ability to think differently about education to assist all learners to develop to their full potential. The aim of education as proposed during 'perspectives in education' is to assist society as a whole by developing one learner at a time.

[W]e really have to be thinking differently about the status of education and where we are going. It is not just about us... our contribution, what are we thinking about... the learners that we will be teaching. Because it is like really... it is not just about a teacher standing in front of the learners. It is about the whole nation (TE4 interview).

Because of the module 'perspectives in education', most NQTs developed the understanding that although the expectations placed on teachers can be seen as being unrealistic, education is a key strategy to assist society overcome the diverse challenges being experienced. For example:

But you can see that we really need good teachers in this country. Our future lies in education. The one thing I realised which is, you realise the impact of education on the country as a whole. You realise how dire the situation is in this country and I do not know how they are going to sort out this problem that we have with education here. But they need people. They need people that can guide them. People that can implement. It is one thing to talk. But to implement (NQT4 interview).

Other modules comprising the PGCE also focused on assisting NQTs to understand that although expectations can be perceived as being unrealistic, it is the responsibility of each teacher to do their best and by doing so, become part of the overall solution. For example:

But then you also need to point out to them that it is up to the teacher to make a difference. So what are you doing as a teacher... to enhance your [learners] experience in the classroom? That rests with you (TE1/TP coordinator interview).

Most NQTs perceive their daily activities as affecting the future potential of all the learners in their care. Most NQTs perceive the key expectation placed on teachers as

the ability to create a caring environment in which learners are able to develop to their full potential.

I must be that person who is providing an environment that is safe, supports risk-taking, and invites a sharing of ideas (NQT5 approach PS assignment 7).

[W]e deal on a daily basis with the future, we either “make them or we break them”. (NQT6 approach PS assignment 7).

Most NQTs perceive that a caring environment promoting inclusive education exists when a teacher acts as a guide, stimulating learner curiosity and anchored within the concept of mutual respect. In short, “all learners should have an education catering for their strengths and needs” (NQTSD9 approach PS assignment 7).

Reflecting on the above, this role was influenced by the introduction of theories and discussions influencing the delivery of inclusive education and creating caring classroom environments.

7.8.3. Professional ethics and behaviour involves awareness of required actions and conduct to retain learner and community trust

Most NQTs perceive professional ethics and behaviour, due to the PGCE, as being able to engage with diverse individuals in a respectful manner to achieve desired outcomes. For example:

[H]ow to conduct yourself, how to not use certain terms with students, how to not label a student: hey smarty, hey sweetness, you don't do that. PGCE taught me not to do that and it makes total sense... how to not always rush and forget that you have slow learners... So I became too aware of the classroom environment... So my first term was all about wow I am aware of this now and I know what to do (NQT5 interview).

Professional ethics and behaviour are further perceived, due to the PGCE, as being able to complete and implement planning related activities to achieve desired outcomes. This understanding was developed during the process of completing the PGCE. For example:

[Y]ou are more consciously aware of things that you are doing. Time management, classroom management, introduction, lesson planning... lesson management, those are important things (NQT4 interview).

The PGCE further developed NQTs professional ethics and behaviour by influencing their understanding of ensuring learners are engaged and assessed in a manner that is relevant to the realities experienced in the community (and country at large). For example:

Every task the [learners] are involved in should be constructive and meaningful (NQTsD9 approach PS assessment 7).

[T]o make sure that they are able to work with larger world around them I give them a project where they are expected to go to libraries and certain companies and find some information (NQTsD13 approach PS assignment 7).

The PGCE also introduced NQTs to theories and discussions emphasising the reasons why a teacher/lecturer and learner should never enter into a romantic relationship, to retain the trust of learners and the community. For example:

You are the parent or guardian of the [learner]. That is why a lecturer cannot have a relationship with a student. And you can see why because they really hang on your every word...It is not just an authority figure... Not a brother. It is a father something figure. It is almost like whatever you say to the student they take it to heart... That comes out and you know that this is your job and this is how. Why you need to behave in a certain way (NQT4 interview).

Reflecting on the above, professional ethics and behaviour in the PGCE context involves an awareness of required actions and conduct to retain learner and community trust to enhance the realisation of achieving intended outcomes.

7.9. Closing

This Chapter analysed data to address the following sub-question: What policy stipulated teacher knowledge, skills and attitudes were actually developed during the PGCE? The short answer is presented as Table 7.10 on the next page. The thinking behind the presentation of this Table was guided by the Table 2.9: Revised list of policy expectations placed on NQTs as presented in Chapter 2. Table 7.10 is not presented to replace Table 2.9. Its purpose is to provide a summary of engagements which influenced the development of the seven policy stipulated roles. This Table is to be

reflected upon during the discussions presented in Chapter 9 to answer the overall research question: How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher?

Table 7.10: PGCE context specific policy stipulated teacher role descriptions

ROLE	Description
Specialist in a phase, subject discipline or practice	<u>Specialist in a phase:</u> Link prescribed curriculum to real life scenarios to maintain learners' interest; Realise specific change in learners as guided by curriculum theories and past experiences; <u>Specialist in a subject discipline or practice is being able to:</u> Conduct self-study to overcome emerging CCK gaps during lesson planning and/or delivery; Develop simplified examples in addition to examples found in textbooks.
Learning mediator	Learning mediators are able to compile a subject portfolio file indicating how they select, sequence and pace their delivery of curriculum content; Learning mediators are enthusiastic, flexible and approachable in terms of method selected to best satisfy both subject and learner needs.
Interpreter and designer of learning programmes and materials	Interpreter of learning programmes and materials is being able to select and use the most suitable accessible media to satisfy both subject and learner needs; Designer of learning programmes is being able to write a training manual and a study guide.
Leader, administrator and manager	The role leader is being able to participate during subject meetings and recommend media needs to school/college management; The role administrator is being computer literate in Word, Excel, PowerPoint and Access; The role manager includes being able to create and manage environments conducive to learning by doing lesson planning and setting class rules; The role manager includes maintaining classroom discipline by moving around and asking questions to retain learners' interest.
Scholar, researcher and lifelong learner	Limited verification of highly developed literacy, numeracy and ICT skills because it is assumed to be developed during the recognised diploma; Personal, academic, occupational and professional growth influenced by the PGCE modality of guided self-study and continuous assessment; Reflective skills to understand successful and unsuccessful aspects influenced by completing a reflection template (see Appendix M).
Assessor	The role assessor includes analysing reliability and validity of existing and designed assessments in terms of levels, outcomes, standards and suitability; The role assessor includes interpreting assessment results to provide constructive feedback and influence future lesson planning and delivery.
Community, citizenship and pastoral role	This role was influenced by: (a) overcoming negative attitudes and misconceptions relating to teaching as a profession; and (b) introducing theories and discussions focusing on inclusive education and creating caring environments; Professional ethics and behaviour involves awareness of required actions and conduct to retain learner and community trust.

In closing, this Chapter addressed the second research objective of this study, namely: To examine the policy stipulated teacher knowledge, skills and attitudes developed during the PGCE FET mathematics programme. Table 7.10 presents the PGCE context specific descriptions of the seven policy stipulated roles as influenced because of PGCE experiences/engagements. This Table also allows for the identification of further training and developments needs of NQTs who completed the PGCE ITE route, to fulfil all seven policy stipulated teacher roles. Examples include further development and training for SCK, using prescribed textbooks in the most effective manner to develop CCK in learners, teaching in under-resourced environments using media that

is available in the school, conducting action research to improve teaching practices, maintaining classroom discipline, and practical guidelines or mentoring to fulfil the community, citizenship and pastoral role. Overall, the main message emerging from the analysed data is that the PGCE equips NQTs with knowledge, skills and attitudes to enter a classroom context as a teacher and develop their ability to fulfil the seven policy stipulated roles placed on teachers by means of self-study and asking for help where needed. A key challenge that was identified involved teacher educators perceiving the current assessments and documentations used during TP as not providing sufficient feedback to verify the quality of teacher being produced because of PGCE experiences/engagements. To build on the insights gained, the Chapter to follow presents data highlighting aspects which restricted the potential of the PGCE to develop policy stipulated teacher knowledge, skills and attitudes within the perimeters of the PGCE structure and goals.

CHAPTER 8

CONSTRAINTS IN THE PGCE FET MATHEMATICS PROGRAMME

8.1. Introduction

The preceding Chapter identified descriptions of context specific policy teacher roles that highlight the output and selective shortcomings of the PGCE. This built on insights into the structure and goals of the PGCE in Chapter 6. Chapter 8 is guided by the third sub-question: What are the constraints of the PGCE FET mathematics programme as identified by those who undertook and facilitated it? The logic behind this Chapter is to complete the circular process of the study's final conceptual framework (see Figure 4.9). The two preceding chapters were completed by reflecting on step/criteria one to four of this circular process. In this Chapter, the four refinements (selection of students, modality, curriculum and assessment) in step/criteria one (clear goals (clear structure)) are again used as themes. This time, they serve to organise the constraints emerging from data (NQT interviews; TE interviews; HEI Official Website; Faculty Handbook; Programme Guide; Student Portfolios Faculty Policies and; PGCE Study Guides) to bring the circular process illustrated in Figure 4.9 to a close. This Chapter is further guided by reflecting on the fifth step/criteria (supportive HEI environment) discussions (see section 4.7 in Chapter 4).

Programme coherence is a key concept that is reflected upon to identify the constraints negatively impacting the PGCE structure and goals. Desired programme coherence occurs when clear and intended links between components comprising the PGCE (structure and goals) are designed and pursued by all (Canrinus et al., 2015:11; Hammerness, 2006:1241; Darling-Hammond, 2006a:306). The constraints, as identified by teacher educators, NQTs and emerging from documents, are summarised in a Table format to bring this Chapter to a close. These constraints, impacting the PGCE structure and goals, and therefore highlighting changes/refinements needed, are presented below.

8.2. 'Selection of students' constraints impacting the PGCE structure and goals

The selection process of students was discussed in detail in Chapter 6 (see section 6.2). The main message from section 6.2 was that the PGCE is expanding annually because of an increase of diploma graduates pursuing the PGCE, as they need a second career option. To build on this message, two categories emerged that highlighted constraints in the PGCE structure and goals. These could be addressed by the specific HEI to enhance the quality achievable from the PGCE as an experience.

The first category involves recognition of prior learning during the registration process. The second is constraints caused by the increasing number of students being granted access to the PGCE without increasing the time allocated to accommodate the increase. These two categories are discussed below.

8.2.1. Limited to none advanced standing or credits for short courses and diploma modules

Recognised prior learning (RPL) at the HEI consists of the following options:

Table 8.1: Two options for RPL at the HEI (HEI Official Website 2014)

RPL Option	Overview
Gaining access	If you have considerable work experience, but you don't meet the entry requirements of your chosen course, you may want to apply for entry into a qualification. This is referred to as "access". The RPL application is evaluated against the entry requirements of the qualification. If access is granted, the qualification on the lower level is not awarded.
Advanced standing or credits	As an individual you might have gained knowledge in specific areas. When compared to outcomes against a [HEI] qualification, your knowledge might cover some subjects. You may apply for recognition of these subjects and this is called "advanced standing" or "credits". Once the assessment is done, the University might give recognition for specific subjects, but not for the entire qualification. You will be required to complete the outstanding subjects, before the qualification is awarded. There are guidelines governing the minimum number of subjects for which advanced standing can be granted and you are required to register as a student and complete the outstanding subjects in order to be awarded a qualification by [HEI]. This is in terms of the "residency clause", 50% of a programme has to be completed at the qualification awarding Institution. The residency clause requires RPL applicants to complete at least 50% of subjects as a student with [the HEI].

In the PGCE context, the FEAP 2014 stipulates that "[e]ach assessment of prior learning must be individual: no blanket criteria will be able to cover individual cases" (FEAP 2014). Teacher educators appointed for a module must conduct requested RPL by means of a written or oral assessment, demonstration and/or portfolio of evidence (FEAP 2014). Students must submit RPL requests during or before registration (FEAP 2014). If a student did not request RPL during registration, the HEI was not obliged to do so once contact sessions started.

Building on the above, the PGCE scheduled one RPL assessment for all students. This was a "Computer Competency Exam (pass mark 50% to be exempted from ICT Skills)" scheduled for late February. This test verified competence in word processing, spreadsheets, presentations and databases (Programme Guide 2014).

Most students "get credit for IT skills" (TE2/programme coordinator interview).

No other RPL assessment was scheduled or granted in the PGCE. For example, although most NQTs requested to be exempted from introduction to research, this was not granted.

So we even argued to say the one we did, research, the one up to a report and submit the results, we were not supposed to do research again in the PGCE (NQT2 interview).

Miskien moet ek noem dat die introduction to research nogals my geld gemors het en hulle vir almal gewyter om exempt te word [Translation: Maybe I should mention that introduction to research was a waste of my money and they refused to exempt us from doing it] (NQT6 interview).

A reason for not being given an exemption was stated as follows:

But they said that you would only be given that chance if you did Masters or Honours in another course. Because us we did the research from the introduction to the results. But they didn't agree (NQT2 interview).

In addition to the above, the PGCE context also does not consider short courses as adequate to grant credits. For example:

I did some training when I was working in the corporate environment so I think I am a natural speaker. And obviously the courses I did there was not recognised there. I've got a whole list of courses which are just irrelevant in this environment (NQT4 interview).

Reflecting on the above, it seems that in the PGCE, the first HEI RPL option (gaining access) is granted by allowing diploma graduates access into the PGCE. The second option (advanced standing or credits) is limited to proving competence in ICT by passing an examination. Limited further use of RPL was applied in the PGCE FET mathematics programme context. This occurred even though some NQTs stated that they requested exemption from specific modules. In addition to not being exempted, some NQTs perceived the modules for which exemption was requested as being a waste of their time and money. Such modules should be revised or allow individuals an opportunity to complete an assessment to prove competence. Alternatively, the content and delivery of these modules should be monitored to ensure the focus is on knowledge, skills and attitudes that are not held, to avoid the perception that it is a waste of time and money. The second 'selection of students' category is presented below.

8.2.2. The increase in spaces without increasing time dedicated to the PGCE potentially restrict clear and intended links between all components

Most teacher educators mentioned a key threat in the PGCE as the ever-increasing number of students being granted access. This is because teacher educators are expected to deliver the same academic support for more students in the same period as done in the past with fewer students. For example:

When I started out in 2011, I started with 7 students. In 2014 there were approximately 31 students in... Mathematics... But to have 31 students evaluated on a personal level, to see how well are you coping as a teacher... you can't do that in 2 hours or at least let's say 40 weeks (TE3 interview).

To build on the above, PGCE students were organised into three groupings. The first being their didactics A choice (mathematics), the second their didactics B choice (science/economics/engineering/etcetera) and the third involving a large group for all other PGCE modules (see Appendix I & J). The didactics A (mathematics) group consisted of at least 26 students (as per the class list of PGCE FET mathematics students provided by the participating HEI). These students were then organised into smaller groups for the various didactics B choices. Some of these groups, such as engineering, consisted of four students (NQT4 interview). For the remaining modules comprising the PGCE (see Appendix I & J) all PGCE students, "about a hundred and something" (NQT5 interview), were grouped together. This potentially highlights the opportunity to organise one-on-one engagements with students during didactic B (the smallest grouping). Teacher educators appointed for didactic B could serve as the HEI representative to evaluate students during TP, to promote programme coherence. This could assist in overcoming the challenge experienced by teacher educators responsible for didactic A (the second smallest grouping of students) and compulsory modules (the largest grouping of students) not being able to observe all (or any) PGCE students during TP.

[T]hey go out on teaching practice and me as the [mathematics didactics] lecturer: I can't go and evaluate them because I don't have the luxury of saying: I am available during the day... I am based at another campus (TE3 interview).
I have observed PGCE students at some stage, I don't do it as much as I would like to because I have a very heavy schedule in the GET (TE4 interview).

Within the context of the large number of students accessing the PGCE, some NQTs (reflecting on the PGCE as an experience while being a student) highlighted the need

to ensure that all who gain access hold the required level of SMK, academic literacy and maturity. If individuals are granted access without holding the above, some NQTs propose that they should be accommodated in a separate grouping or introductory PGCE programme. For example:

Part time and full time needs to be taught separate (NQTs D9 written response on course evaluation questionnaire).

In addition, teacher educators responsible for the compulsory modules indicated that it was almost impossible to effectively teach and assess over 100 students to verify the transfer of required knowledge, skills and attitudes. The main challenge is limited one-on-one engagement with all students due to the perceived limited time as allocated on the PGCE timetable (see Appendix I) and consultation sessions for each module. There is a general level of agreement that the time allocated for the PGCE as a whole (for both TP and contact sessions) should be increased to enhance the impact achievable.

[T]ake six months... to be at school... Unlike us who come for one month again and then that is it. From there, come next year, you are in class for the whole year. Are you going to cope? (NQT2 interview).

Understanding that the PGCE has produced teachers in schools and lecturers in colleges for over 20 years (TE2/programme coordinator interview), it is proposed that PGCE students should complete TP in a school/college in which PGCE graduates are employed. By doing so, students can be mentored by a teacher who has followed a similar ITE route and overcame challenges which NQTs are most likely to experience. In addition, PGCE students could be used to assist with the processes used by the HEI to assist first-year students who are underprepared for mathematics, as needed in a university context. Such an initiative is already in place at the HEI in which the PGCE students could be incorporated:

[HEI] has a long history of successfully supporting students who are underprepared for higher education studies... particularly for the... mathematics... fields. Our work in this area has been innovative, reported in a number of conferences and in academic publications... (QEPIS:P1).

In addition, by using PGCE students in support structures as stated above, it can potentially overcome some of the challenges experienced in its various support structures. For example:

There are also difficulties with retaining good tutors and writing centre facilitators; this is possible because tutor payment is too low, and that there is a lack of support or recognition from academic staff (QEPIS:P1).

To clarify, by using PGCE students in academic support structures at the HEI, it potentially gains access to an 'army' of tutors who are training to be teachers. The suitability of PGCE students to work in support structures is supported by the fact that some PGCE students are offered employment during TP:

I have had a problem over the years with students wanting to go work in September. Because the [TP host] school really wants them (TE2/programme coordinator interview).

Reflecting on the above, the increase in spaces is perceived as a success because NQTs are being offered employment as a teacher or lecturer (see Table 8.2). TP is perceived as a success because some students are offered employment during TP before graduation. This potentially creates a false sense of success and coherence between all components comprising the PGCE. Employment is potentially gained because there is a shortage of qualified teachers and not because of the quality and coherence of the PGCE. As a whole, it is argued that the increase in spaces without increasing time dedicated to the PGCE potentially restricts clear and intended links between all components. Examples of increasing time in the PGCE include using PGCE students as tutors in support structures for first year students, using PGCE graduates employed at host schools as mentors for PGCE students and using teacher educators appointed for didactic B as HEI representatives to evaluate students during TP, to promote programme coherence. The intention is not to simply increase allocated time, but to increase the engagements achievable and increase programme coherence within the existing allocated time of one-year full-time. The second theme is presented below.

8.3. 'Modality' constraints impacting the PGCE structure and goals

The PGCE modality broadly involved two components delivered over a period of eight months contact time by means of guided self-study, namely: contact sessions of the various modules (see Appendix I) and two TP sessions. The modality was discussed in detail in Chapter 6 (see section 6.3). To build on the insights presented within the context of identifying constraints impacting the modality, two categories emerged to organise the discussion to follow. The first category highlights specific modality focused HEI/faculty policy stipulations which were not followed by all involved in the PGCE. The

second explores aspects which indicate that the PGCE is perceived as being a part-time programme, which restricts access to support structures and the life of a student in general. Two discussions within the context of the above-mentioned categories are presented below.

8.3.1. Lack of oversight concerning the implementation of HEI policy stipulations potentially restrict clear and intended links between all components

Examples of Teaching Practice Policy (TPP 2014) stipulations not followed by all involved in the PGCE are presented and discussed below:

The TPP 2014 stipulates that the liaison teacher is responsible for “organising of student activities within the context of the school”. This includes the following task: “Make logistical arrangements at the school with regard to the students” (TPP 2014). Student reflections revealed that logistical arrangements were not always made in advance to accommodate students during TP. For example:

No media could be used these was booked out in advance (NQTsD9 lesson reflection MD Assignment 2).

The TPP 2014 stipulates that the liaison teacher is responsible for the “guidance of students in their development as teachers”. This includes the following task: “Initiate a goal directed guidance plan of action with the class teacher to ensure that the student develops in a meaningful way during the period in the classroom” (TPP 2014). Reflection templates forming part of TP assessment revealed that goal-directed guidance was not always provided as some entered classrooms in which the teacher had already covered the topic/content to be presented by the student. For example:

They seem to already know the work that was given or taught in class. This made me a bit confused on whether to continue to on something else or teach what they already know. So I kept on jumping what was on the lesson plan (NQT1 lesson reflection MD Assignment 2).

Concerning absence during TP, the TPP 2014 stipulated the following: (1) “Students are required to submit written documentation to mentor explaining absence. At the end of the [TP] session, such documents have to be forwarded to the relevant co-ordinator of [TP] at the university”; (2) “The principal/mentor and student leader have to be informed timeously if a student cannot attend school on a particular day” (TPP 2014).

Although the above is stipulated, one NQT was absent for five days without anyone noticing or taking corrective action:

Ek het nog van daardie tyd 'n week ook afgevat wat niemand eers agter gekom het nie [Translation: I missed a whole week during this time which no one noticed]" (NQT6 interview).

Concerning the above quote, the TPP 2014 also stipulates that "[i]f, for whatever reason, the student misses FIVE days or more during the [TP] session, the student has to re-teach for the number of days missed". NQT6 stated that he was awarded a pass even though he missed a week of TP. The reason stated was that he was able to submit the required paperwork for the formal TP assessment (NQT6 interview). In addition to the above, certain stipulations in the Faculty of Education Assessment Policy (FEAP 2014) were not followed by all involved in the PGCE. Examples of this are presented below:

The FEAP 2014 stipulates that "all assessments will be indicated on an assessment calendar per programme in the programme guide". The FEAP 2014 further stipulated:

An assessment plan/programme/calendar for each programme must be compiled and made available to students at the beginning of the year. This assessment plan should include all major assessment tasks (e.g. tests and assignment) of all subjects for the year, and should coincide with assessment tasks in the subject guides of the individual subjects (FEAP 2014).

No "assessment plan/programme/calendar" was present in the Programme Guide 2014. Further evidence emerged to indicate that such a document did not exist for 2014:

Die take wat gedoen was het due dates gehad wat opmekaar was. Ek dink nie juis hulle het 'n assessment program nie" [Translation: The assignments that were done due dates were all on top of each other. I don't think they actually had an assessment programme] (NQT6 interview).

Additional evidence that no "assessment plan/programme/calendar" was present for 2014 is presented:

I had a discussion with another colleague who told me that one of the didactics they have 13 assignments. That shocked me: 13 assignments. With me they have 2... So I was thinking maybe there is something that I am not doing if people can

give up to 13, over 10 assessment tasks in one year I really have to re-look at what I am doing (TE4 interview).

To clarify, if an “assessment plan/programme/calendar” was present for 2014, TE4 would have been shocked to discover colleagues gave up to 13 assessments while reading the “assessment plan/programme/calendar”. To reveal the basic content that could have featured in such a document based on study guide data, Table 8.2 is presented.

Table 8.2: Assessment programme for 2014 formulated from study guide data (PGCE FET Study Guides 2014)

ASSESSMENT PROGRAMME										
MODULES/ SUBJECTS	FEB	MAR	APR R&TP	MAY TP	JUN R	JUL R&TP	AUG	SEP R	OCT	NOV
PROFESSIONAL STUDIES	***	27 th	***	15 th	19 th	***	21 st	18 th & 25 th	2 nd – 9 th	***
LANGUAGE AND COMMUNICATION	***	27 th	***	***	19 th – 27 th	***	***	***	2 nd	6 th
PERSPECTIVES ON EDUCATION	***	26 th	***	***	18 th	***	***	***	22 nd	***
INTRODUCTION TO RESEARCH	***	26 th	***	***	***	***	***	***	8 th – 15 th	***
LIFE-SKILLS – ICT SKILLS	End	***	***	***	***	***	***	***	***	***
HEALTH AND SAFETY EDUCATION IN	***	End	***	***	***	***	***	***	***	***
EDUCATIONAL MANAGEMENT	***	***	***	***	***	***	***	***	***	***
MATHEMATICS DIDACTICS	***	25 th	***	20 th	***	***	19 th – 26 th	***	End	***
DIDACTIC B	***	***	***	***	***	***	***	***	***	***

Concerning this Table, recess periods occurred during April, June-July and September, which is indicated by **R**. TP occurred during April-May and July, which is indicated by **TP**. The four grey rows represent the four modules for which limited data was secured. To clarify the remaining rows, the due dates for assessments as stated in the study guides are presented. March, June and October had a minimum of three to six assessments due. February, April, May, August, September and November each had two assessments due. This indicates that due dates for assessments were potentially not as evenly spread as possible. It is argued that the presence of an assessment plan/programme/calendar” in the beginning of 2014 (such as Table 8.2) could have highlighted this uneven spread and corrective steps could have been taken. To explore the adherence to HEI policy stipulations relating to assessment weightings, Table 8.3 is presented and discussed.

Table 8.3: Assessment weightings for 2014 (PGCE Study Guides 2014)

ASSESSMENT BREAKDOWN									
MODULES/ SUBJECTS	FEB	MAR	MAY TP	JUN R	AUG	SEP R	OCT	NOV	TOTAL
PROFESSIONAL STUDIES	***	15%	10%	20%	20%	15% 10%	10%	***	100%
LANGUAGE AND COMMUNICATION	***	30%	***	30%	***	***	20%	20%	100%
PERSPECTIVES ON EDUCATION	***	33%	***	33%	***	***	33%	***	100%
INTRODUCTION TO RESEARCH	***	25%	***	***	***	***	75%	***	100%
MATHEMATICS DIDACTICS	***	30%	30%	***	30%	***	10%	***	100%

Concerning this Table, introduction to research scheduled one assessment that contributed 75 percent of the subject's year mark, even though the FEAP 2014 stipulated a maximum of 50 percent weighting per assessment:

[N]o single assessment should be more than 50% of the final assessment result...

No assessment task should carry a weight of more than 50% of the total mark of the subject/module (FEAP 2014).

In addition, introduction to research scheduled two assessments and perspectives on education scheduled three. All 2014 PGCE modules were year courses. Therefore, all modules should have scheduled a minimum of four assessments contributing towards the year mark in terms of the FEAP 2014.

The minimum number of assessments is dependent on the duration and the credit value of the course, subject or module... Four assessments per course offered over one year, or maximum number 32 credits, up to 0,26 HEMIS Credits (FEAP 2014).

The FEAP 2014 further stipulates that teacher educators "should not deviate from assessment plan". Concerning this stipulation, an assessment was due from the 25th of September (till 9 October) focusing on "Electronic learning" and weighted at 10 percent of the total mark for professional studies (PSSG 2014). This assessment was not present in all the sampled professional studies portfolios. Only one portfolio contained this assessment, which served as the sixth assessment ("Electronic Learning") for professional studies (NQTs D9 Professional Studies Portfolio). This indicates that not all assessments that were stated and given a weight in a subject guide formed part of the specific module's year-mark. The reason for not being present in other portfolios was because of the following:

Submit a portfolio that provides a reflection of the First Five assessments of this subject (Professional Studies Portfolio).

Reflecting on the discussions presented above, programme quality was potentially negatively affected because of some teacher educators ignoring HEI policy stipulations relating to assessment. A key aspect is the absence of an assessment plan/programme/calendar, which potentially caused students to be overloaded some months and given too little work during others. The absence of an assessment plan/programme/calendar could also have restricted the potential of the diverse modules running complimentary assessments with related modules. It also potentially restricted teacher educators from gaining an understanding of what is being done in the other modules to link all modules' engagements (content, assessments, et cetera). Certain TP related policy stipulations were also not adhered to. This indicates that the HEI is experiencing challenges in realising programme coherence between the school-based component and the HEI-based component comprising the PGCE. The above potentially occurred because of a lack of oversight by the HEI to verify policy implementation. Alternatively, the examples presented above indicate that HEI policies relating to the PGCE need to be amended. The second 'modality' focused category is presented below.

8.3.2. Part-time aspects potentially restrict clear and intended links between all components including support structures

PGCE students are considered part-time students because of attending (see Appendix I) the campus in the afternoon/evening (TE5 interview). This allowed full-time appointed unqualified teachers/lecturers in schools/colleges to complete the PGCE in the one-year full-time period (instead of two-years part-time).

[T]he way the subjects was structured it was actually funny. The part-time people [for year one] they came before the full-time people. The course was somehow structured so I thought what is the point? I might as well stay then for the extra. So I did the whole lot [while being employed] (NQT4 interview).

The PGCE is further perceived as being a part-time programme as most teacher educators in the PGCE are "paid extra to work in the PGCE" (TE2/programme coordinator interview) and potentially perceive it as a part-time responsibility. For example:

[T]hey take from staff within the Faculty. I am one of those... who also helps with the PGCE. Even though my employment primarily is in the BEd (TE4 interview).

The part-time nature of the PGCE also restricted frequent formal engagements between all part-time appointed teacher educators to promote the realisation of clear and intended links between modules (Darling-Hammond, 2006a:306):

[T]here have been a few meetings with the part-time people but not much because half of the people you don't know and you don't see actually (TE3 interview).

And I know they have a lot of didactics. You know mostly about pedagogy. The question of how to teach et cetera. I am not very sure what they do in there (TE4 interview).

The part-time nature of the PGCE potentially also restricted the realisation of engagements between teacher educators and mentor teachers to share TP ideas and expectations and thus promote programme coherence (Darling-Hammond, 2006a:306). This could have caused some NQTs to complete TP without teaching the required number of lessons. For example:

For that month I only taught two classes and it just... it was very limited (NQT1 interview).

It also potentially restricted opportunities during TP to conduct designed assessments as these might have been completed without considering the school/college context and year/assessment plan in which TP is to be done. For example:

I could not do my assessments as asked because my mentor told me that they are behind with CAPS document, also their June performance was very low they need to do intervention tasks with their learner. I cannot do project and investigation because that will waste time they do not have (NQT3 approach MD TP2).

Limited engagements between teacher educators and mentor teachers also potentially caused unnecessary duplication of planning related paperwork (Behrstock-Sheratt et al., 2014:10).

Because here [at the host school/college] we are given a lesson plan which goes this way... Now at [HEI] filing department or whoever those people are, are going to give you something totally different right. The templates are different... They

want you to use the [HEI] one, but when you are presenting it to your [mentor] here they want their own one. It doesn't make sense (NQT5 interview).

The part-time nature of the PGCE also restricted the promotion of programme coherence between TP and the diverse modules comprising the PGCE. This was because the appointed teacher educators were not always available to evaluate PGCE students. This required the HEI to appoint additional part-time evaluators not directly linked to the PGCE (Darling-Hammond, 2006a:310).

Normally they appoint people from the outside, retired teachers, principals and you know the lecturing staff. So they go out and actually evaluate the students... With the PGCE I have no idea who they are (TE3 interview).

The part-time nature of the PGCE also restricted access to some academic and non-academic support structures available at the HEI. To clarify, the PGCE applied the academic model to guide the support it offered although the HEI as a whole used the social model.

The social model of student assistance that you have for undergraduate students we tend to not use and apply here. So we apply the academic model. That person is a graduate and a certain level of skills, academic skills and writing skills and so forth. That you would expect from a graduate (TE2/programme coordinator interview).

In addition, it was the responsibility of the student to familiarise themselves with the available support structures offered by the HEI across all its campuses. This was because of the perception that PGCE students are experienced students who should know about the availability of support structures and how to make use of them:

[W]e have students here who come from the main campuses... where they have almost everything. I know some of them are still involved in those things that they were doing (TE4 interview).

Examples of available support structures include: Campus Health Clinics; Student Counselling Unit; Student Development Initiatives; Student Media; Department of Student Affairs (Social events; performing arts; religious interaction; first year socialising programme; et cetera); and Competitive and Recreational Sporting Codes (Faculty Handbook 2014; HEI Official Website 2014). Limited or no access and/or use

of the above examples were realised by PGCE students. The main reason is that support structures closed at 16:00.

The only thing I know is the Faculty Office closes at 16:00, there is nothing... the Cafeteria as well, it is closed (NQT5 interview).

Structures open after 16:00 were not accessible as PGCE students attended contact sessions (see Appendix I). Because of this, most teacher educators perceive PGCE students as being part-time students, which the HEI is potentially not yet fully equipped to accommodate.

PGCE students are regarded... they are considered part-time students. And I must say that part-time students don't really have good access to resources... and even mingling with other students. They are isolated (TE5 interview).

Here there is nothing, this campus is dead... I am sure you wonder how students here survive (TE4 interview).

Concerning the statement "this campus is dead" (TE4 interview), student media mainly informed students of non-academic facilities, structures and activities through internet platforms (Twitter; Facebook; Live streaming of [HEI] events). Additional media used included the HEI radio station ([HEI] FM) and signage screens (HEI Official Website). Unfortunately, [HEI] FM only broadcasted to the two main campuses of the HEI, which do not offer the PGCE. Neither were their signage screens available on the campus offering the PGCE. In support, all NQTs stated that as PGCE students, all they did was attend contact sessions.

But I don't know about students who are new at [HEI], whether they do anything besides coming to a PGCE lecture that ends at 20:45 at night (TE4 interview).

Nothing, just coming for classes and that was it (NQT4 interview).

In addition, most NQTs said that they did not need or have time to participate in extra-murals or make use of support structures. The general perception is that because they completed a diploma, they had already made use of those structures and are no longer in need of additional support and extra murals.

I only needed [support] on my Diploma, on my PGCE... No. I didn't need any support. I was fine. During the Diploma I needed all the support (NQT3 interview).

Support perceived as needed by most NQTs, which did not exist in 2014, relates to transport services between campuses and residences at night. For example:

And when you do the PGCE you usually do it at night so transport was not provided it is not... Maybe if they could have a school bus. We can pay. It can go from campuses to our homes. Or even the residences...That would have been helpful (NQT1 interview).

The HEI revealed an awareness of the above support gap as the following advertisement was placed in a national newspaper in 2016:

The [HEI] together with PURCOSA, invites Bus operators, fully qualified and equipped, with busses seating 60-65 passengers who are interested in rendering Bus Transport Services to the Campuses of [HEI]. Closing Date: 5 October 2016 at 12h00 (National newspaper advert 2016).

Although most NQTs stated no need for support structures and extra murals, some revealed that they experienced challenges which affected their academic performance. For example:

The only thing is during this time I had a great loss in my life, and due to this my work standard dropped (NQTsD9 reflection PS assessment 4).

Although most students did not need additional support, some teacher educators noted that they struggled to “channelise” students’ social and learning problems because of the ever-expanding PGCE (TE2/programme coordinator interview).

It was easier when we were smaller but it became difficult now that we are bigger (TE2/programme coordinator interview).

The HEI acknowledges that it is a challenge at the HEI to “channelise” students experiencing social and/or learning problems. This is caused by a lack of coherence between support structures and academic programmes such as the PGCE:

The various student learning and support divisions lack access to student records and this hampers early interventions and pro-active approaches to student support. The divisions also experience a lack of feedback from academic staff, so it is difficult to know whether an intervention was valued or not (QEPIS:P1).

Understanding that students are expected to take advantage of available support structures, one would assume that there are clear communication channels available to voice their concerns and challenges affecting their academic performance. Unfortunately, student complaints relating to aspects influencing their academic performance might have fallen on 'deaf ears'. For example:

Van die lecturers was baie “unprofessional” in die sense van, sommige tye klas tye end an die manier van hoe hulle klas gee. En daar was egter klagtes oor hulle. Maar niks het verander [Translation: Some of the lecturers were extremely “unprofessional” in the sense that, some class times and then the manner in which they gave class. And there were complaints forwarded. But nothing changed] (NQT6 interview).

The examples identified above of “channelising” student complaints and/or social and learning challenges potentially contributed to some students dropping out of the PGCE early in 2014:

There is a lot of work involved and very often after the first [TP] we have an exodus of about 10 percent (TE2/programme coordinator interview).

Examples of good practice in “channelising” student complaints and/or social and learning challenges in the PGCE are potentially restricted because of annual teacher educator responsibility changes. For example, TE3 was the programme coordinator, TP coordinator and facilitator for professional studies and mathematics didactics in 2013 (TE3 interview). In 2014, TE2 was the programme coordinator and facilitated professional studies (TE2/programme coordinator interview). TE1 was the TP coordinator in 2014 (TE1 interview). In 2015, TE2 was no longer the programme coordinator and TE1 was no longer the TP coordinator (TE2/programme coordinator e-mail correspondence). The above indicates that the PGCE potentially differs from one year to the next in its coordination and delivery. For example, although TE2/programme coordinator held the perception that PGCE students do not need academic or non-academic support, the programme coordinator appointed for 2015 potentially held a different view:

The new course coordinator sat in that chair a while ago and asked me a couple of days ago about orientation. I run a two-hour orientation programme and which she is now going to be doing. And she said ‘but what about the library, what about writing skills?’ (TE2/programme coordinator interview).

Reflecting on the above, part-time aspects such as the timetable (see Appendix I), part-time appointed teacher educators and TP evaluators, limited meetings with all involved, support structures closing at 16:00, the ever-increasing number of students to support after 16:00, and annual teacher educator and/or responsibility changes, all restricted clear and intended links between all components including support structures. The main concern identified is the HEI's potential incapacity to adequately support "part-time programmes" such as the PGCE at the specific campus. The third theme is presented below.

8.4. 'Curriculum' constraints impacting the PGCE structure and goals

Data on the curriculum of the PGCE FET mathematics programme in 2014 was presented in Chapter 6 (see section 6.4). The main message from this Chapter is that the PGCE curriculum is dependent on teacher educators' discretion, policy guidelines and student expectations. To build on the insights presented in section 6.4 of Chapter 6, two categories are highlighted within the context of constraints and the PGCE curriculum. The first involves exploring verbal and written communication clarifying the PGCE curriculum to guide related decision-making. The second category notes the need to develop curriculum that is TVET college context specific. The two discussions relating to the above theme are presented below.

8.4.1. Lack of standardised PGCE curriculum related verbal and written communication potentially restrict clear and intended links between all modules

A lack of standardisation concerning PGCE modality communication occurred in 2014. As evidence, Table 8.4 on the next page serves as a merger of the following four data sources: HEI Official Website 2014 (and 2015); Faculty Handbook 2014; Programme Guide 2014; & TE2/programme coordinator. This Table presents the standardised communication possible at the HEI relating to the PGCE to promote programme coherence (clear and intended links between all components). The lack of standardisation identified, making it necessary to compile Table 8.4, is presented below:

- (1) The HEI Official Website 2014 (and 2015) did not include all the electives/subject didactics and excluded certain compulsory subjects as stated;
- (2) The HEI Official Website 2014 (and 2015) and the Faculty Handbook 2014 presented electives/subject didactics without the grouping as done in Table 8.4.

The Programme Guide 2014 was the only source grouping electives/subject didactics as presented;

- (3) The split of the electives/subject didactics A and B (select one) did not feature on any of the written data sources. TE2/programme coordinator revealed that students were restricted to select mathematics or business studies as their didactic A: “Just from a timetable perspective... my didactics into an A and a B. Maths and business is my two A's” (TE2/programme coordinator interview).
- (4) The Programme Guide 2014 stated “Introduction to Research” (as well as the Faculty Handbook and certain sections of the HEI Official Website 2014 and 2015) while the HEI Official Website 2014 mentioned “Research Methodology” when presenting the PGCE fees attached to the various modules.
- (5) The Programme Guide 2014 stated “Perspectives **on** Education” when presenting the subject outcomes although the HEI Official Website 2014 (and 2015) and the Faculty Handbook 2014 stated “Perspectives **of** Education”.

Table 8.4: HEI’s PGCE structure (HEI Official Website 2014; Faculty Handbook 2014; Programme Guide 2014; TE2 interview)

FOURTH YEAR	
Compulsory subject(s):	
<i>Educational Management</i>	<i>Perspective on Education</i>
<i>Research Methodology</i>	<i>Professional Studies & Teaching Practice</i>
<i>Life skills (ICT Skills)</i>	<i>Language Development and Communication</i>
<i>Health & Safety in Education (First Aid; Health & Safety Legislation; HIV/AIDS Education)</i>	
Electives/Subject Didactics A (select one):	
<i>Mathematics</i>	<i>Business Studies</i>
Electives/Subject Didactics B (select one):	
School Subjects Business, Commerce & Management	
<i>Accounting</i>	<i>Computer Applications Technology</i>
<i>Economics</i>	<i>Mercantile Law</i>
School Subjects: Mathematics, Science & Technology	
<i>Life Sciences</i>	<i>Physical Sciences</i>
School Subjects: Specialist Areas	
<i>Consumer Studies</i>	<i>Life Orientation</i>
<i>Tourism</i>	***
School Subjects: General	
<i>Design</i>	<i>Visual Art</i>
<i>Dramatic Arts</i>	<i>Xhosa</i>
<i>Afrikaans</i>	<i>English</i>
<i>Geography</i>	<i>History</i>
<i>Religion Studies</i>	***
Technical and Vocational Education and Training College Subjects	
<i>Technology: Mechanical</i>	<i>Technology: Electrical</i>
<i>Technology: Technical Drawings</i>	<i>Technology: Civil</i>
<i>Somatology</i>	<i>Marketing</i>
<i>Personnel Management</i>	<i>Public Relations</i>

In addition, there was no standardised philosophy provided in a written format to guide decision-making when selecting and delivering content to realise clear and intended links between modules.

You see the thing was that there wasn't an outright philosophy given. There was not a 'this is our philosophy', not according to my knowledge (TE3 interview).

This is a concern as teacher educators held differing philosophies of the PGCE, potentially restricting the realisation of clear and intended links between the modules. For example:

There are different philosophies, different convictions about a PGCE [at the HEI]...
I teach in the PGCE but I don't believe in it. The PGCE as it is... is an anomaly...
I think new ways have to be envisioned about how to deal with PGCE (TE5 interview).

Concerning communication about the recognition of academic achievement and the PGCE, the Faculty Handbook 2014 mentions "criteria for medallist and awards" for B.Ed. students. No mention is made of an award or criteria for PGCE students. Additionally, the Faculty Handbook 2014 mentions the "maximum permissible period of study" for B.Ed., B. Ed. honours, M. Ed. and D. Ed. No mention of such is stated for the PGCE. The omissions above might be due to an administrative oversight. Unfortunately, such omissions, along with non-standardised communication potentially contributed to the perception held by some NQTs that the PGCE is being undermined. As examples:

I don't know is it because of [HEI], but somewhere the PGCE is undermined. So it is undermined in terms of a one year course. So the question we had then was why is it being offered if people know that for you to be a teacher you must take a four year in that particular... so I even felt so small because okay, this is a joke. At the end of the day are we going to be told that you can't be a teacher because you did one year? (NQT2 interview).

Maybe somebody thinks you know it is a year these guys don't deserve it (NQT4 interview).

The NQT perception that the PGCE is undermined at the HEI potentially began during an engagement with one of the teacher educators:

One of the Professors was giving us a lecture in the introduction to research but he did it but said he can't take his child to be taught by a PGCE teacher. Because it takes a four year to be a teacher. But you can't be a teacher just for one year (NQT2 interview).

The relevance of the above is that it caused some students to withdraw from discussions during certain contact sessions. For example:

And I thought and I looked at this guy and I was going to respond, and I thought... and this is now a Professor at [HEI]... and I thought I am not even going to bother talking to you (NQT4 interview).

By withdrawing, clear and intended links between the specific module and other modules and TP were restricted. The old saying comes to mind: a chain (programme) is only as strong (coherent) as its weakest link. In addition, some NQTs might have taken the above to heart and applied at a primary school because they potentially do not believe that they are FET mathematics teachers. To clarify, the positions secured by the interviewed NQTs are presented below:

Table 8.5: NQT employment data (NQT interviews)

Sample	Institution	Province	Subjects	Didactics	Experience
NQT1	High School	Limpopo	Grade 9 Mathematics Grade 10 Physics	Mathematics Economics	None
NQT2	Primary School	Western Cape	Grade 5 Social Sciences	Mathematics Physics	None
NQT3	High School	Eastern Cape	Grade 10 – 12 Physical Sciences	Mathematics Physics	None
NQT4	TVET College	Western Cape	NC(V) 2-4 Mathematics NC(V) 2-4 Math Literacy N1-N3 Mathematics	Mathematics Physics	+2 years
NQT5	TVET College	Western Cape	N1-N3 Mathematics N1-N3 Engineering Sciences N1-N3 Electrical Trade Theory N1-N3 Industrial Electronics	Mathematics Electrical Engineering	+2 years
NQT6	Primary School	Western Cape	Grade 4 Social Sciences Grade 6 Life Skills Grade 6 Natural Sciences and Technology Grade 7 Natural Sciences	Mathematics Economics	None

NQTs are either in a primary school (GET), high school (FET) or TVET college after completing the PGCE FET mathematics programme. The perception exists that there is a shortage of qualified mathematics teachers (Chetty, 2014:92; Spaull, 2012:12). From this it can be assumed that a qualified mathematics teacher is guaranteed employment as a mathematics teacher after graduation. Unfortunately, although the sample is small, the above indicates that being qualified as a mathematics teacher in FET does not guarantee employment in a high school or TVET college. It also does not guarantee employment as a mathematics teacher in a primary school (GET). The above could be an isolated incident. The above could also be because of a negative perception created about the value of the PGCE in the minds of some NQTs, 'forcing' them to accept a position in a primary school and not teach mathematics.

Reflecting on the above, a lack of standardised PGCE modality related verbal and written communication potentially contributed to the perception that the PGCE at the HEI is being undermined. Because this perception emerged, it is argued that the lack of standardised PGCE modality related verbal and written communication potentially restricted the realisation of clear and intended links between all modules. The argument is anchored in the assumption that if standardisation is lacking in written and oral communication, it will cause a lack of standardisation in guiding the realisation of clear and intended links between all modules (Hobson et al., 2006:265). The second 'curriculum' related category is presented below.

8.4.2. TVET college context specific PGCE FET mathematics programme is needed

The 2014 PGCE FET mathematics programme mainly focusing on CAPS was potentially not ideal for a TVET college lecturer.

I used most materials from my [TVET college] work portfolio as an example, however the marks I received lets me think we not doing things right at our campus (NQTsD9 reflection PS assignment 1).

A year plan could not be designed according to the specified standards because where I teach does not use CAPS (NQT5 reflection PS assignment 1).

There is a need to offer a TVET context specific PGCE. The HEI is potentially aware of this. It introduced a unit in its Faculty of Education in 2017 to train and develop TVET college lecturers (HEI Official Website 2017). The fourth theme is presented below.

8.5. 'Assessment' constraints impacting the PGCE structure and goals

The assessment process used in the PGCE was discussed in detail in Chapter 6 (see section 6.5). The main message from section 6.5 was that continuous assessment (tests, assignments, HEI templates and presentations), requiring hard-copy submissions with one opportunity to get a distinction (75% or above), was used. To build on this message, one category emerged within the context of constraint and assessment. This category involves the use of academic resources such as textbooks, journal articles and online platforms to complete PGCE assessments. The related discussion is presented below.

8.5.1. Limited use of prescribed materials, journal articles and 'Blackboard' potentially restrict clear and intended links between all components

Table 8.6 below presents the prescribed reading materials and resources for the five modules facilitated by the interviewed teacher educators.

Table 8.6: PGCE secured prescribed reading material (PGCE Study Guides) and resources (NQT3 interview)

SECURED PRESCRIBED READING MATERIAL	
1	Barker, L.L. & Barker, D.A. 1993. Communication (6 th Edition). Boston: Allyn and Bacon.
2	Bertram, C. & Christiansen, I. 2014. Understanding research: An introduction to reading researching. Hatfield, Pretoria: Van Schaik. ISBN: 978 0 627 031175
3	Curriculum Assessment Policy Statements (CAPS) [linked to selected "Didactics"]
4	Clearly, S. 2000. The Communication Handbook. kenwyn: Juta & Co, Ltd
5	Conley, L, et al. 2010. Becoming a Teacher. (Cape Town: Heinemann)
6	Goddard, W. & Melville, S. 2014. Research methodology: An Introduction. Landsdowne, Cape Town: Juta. ISBN: 978 0702 156 601
7	Gravett. 2005. Adult Learning. (Pretoria: Van Schaik)
8	Jacobs, Vakalasi & Gawe. 2011. Teaching-Learning Dynamics. (Sandown: Heinemann)
9	Le Roux, J. 2002. Effective educators are culturally competent communicators. Intercultural Education, Vol. 13 (10)
10	Nieman & Monyani. 2006. The Educator as Mediator of Learning. (Pretoria: Van Schaik)
IDENTIFIED PRESCRIBED RESOURCES	
A	Teaching Practice Templates
B	YouTube Videos

Two readings were prescribed for 'introduction to research' containing the word "introduction" in the specific titles (IRSG 2014). Three readings were prescribed for 'language development and communication'. Two of the readings focused on communication in general and one specifically focused on communication relating to educators (LDCSG 2014). Four readings were prescribed for 'professional studies'. Three of the four titles contained the word learning while the fourth focused on aspects involved in becoming a teacher (PSSG 2014). 'Mathematics didactics' and 'perspectives on education' made no mention of prescribed readings. It is noted that 'mathematics didactics' required students to download a copy of "CAPS (NCS)" for Mathematics (MDSG 2014). Concerning how many times the prescribed reading materials were used, only two of the nine (specifically 2 and 7) featured as references in the analysed assessments (Mathematics Didactics Portfolio; Professional Studies Portfolio). Additional notes and materials were assumed to have formed part of the PGCE:

[Teacher educators] make use of a variety of written resources, including lecture notes, copies of journal articles and prescribed books (Programme Guide 2014).

Although stated in the Programme Guide 2014, some teacher educators did not provide extra notes or copies of articles:

[M]ost of the time when people like [TE2/programme coordinator] teach, they will talk to you, they won't really give you notes (NQT5 interview).

Concerning access to additional materials to conduct self-study, the HEI houses a library claimed to contain various physical and electronic copies of materials such as books, textbooks, journals and newspapers (Faculty Handbook 2014; HEI Official Website 2014). Unfortunately, most NQTs experienced the library as housing an inadequate number of physical resources when the need arise. For example:

The library was at the beginning of the year when we are not writing or when we don't have a lot of assignments, then that is when the library is helpful because there is a lot of books there. But immediately when there is tests or assignments everybody goes to the library and they take books. The books would be there but there would not be enough (NQT2 interview).

Access to electronic materials were potentially restricted by the ICT infrastructure of the HEI. Most NQTs experienced the computer lab as inadequate, which potentially created a need for access to physical learning materials.

[T]hey don't care about the computer lab. I have to be honest with you. There was one time when students had to submit. They will only go there on the last day when it is due the next morning and there is no-one to assist... [T]here is only one lab with an old machine... and old everything (NQT5 interview).

The ICT infrastructure, in terms of access to printing facilities and Wi-Fi to make use of private laptops or tablets to access electronic resources, to alleviate the demand for physical resources, is perceived to be inadequate:

Many staff members complain about printing facilities and the lack of Wi-Fi access in classrooms... Requisitioning equipment (when one has the funds) is slow with long delays in procurement, caused by inefficiencies in the Finance Department (QEPIS:P1).

Challenges with the ICT infrastructure potentially restricted teacher educators' access to provide students with extra notes and copies of articles. In support, the HEI states that it experienced challenges with advanced technology for the last couple of years

due to too fast growth at the HEI, as revealed in the PGCE (and in other courses/programmes across the HEI) (QEPI5:P1).

Over the years, the IT system has been unstable, sometimes affecting... administrative tasks (QEPI5:P1).

To explore additional notes, articles and books accessed by students, Table 8.7 is presented below.

Table 8.7: Referenced authors and publication dates (Professional Studies Portfolio)

REFERENCED AUTHORS AND PUBLICATION DATES	
A	Abbott, S. (2013); Avenant, P. (1986)
B	Ball, I.D.G.M. (2010); Bandura, A. (1997); Bartelmay, K. (2001); Berk, L.E., & Winsler, A. (1995); Boeree, C.G. (2006); Brookfield, S. (1990) [2]; Bruner, J.S. (1983); Butt, G. (2010)
C	Carusetta, E. (2006); Chard, S. (1998); Chism, N.V.N. (1998) [2]; Cole, M. (1998); Coppolla, B. (2002); Coutts, L. (2006); Cranton, P., & King, K.P. (2003); Cullingford, C. (1995)
D	Department of Basic Education (2011 & 2012); Dirkx, J.M., & Cranton, P. (2006)
E	Elliot, S. (1994)
F	Frankena, W.K. (2014); Friesen, M., Schonwetter, D.J., Sokal, L., & Taylor, K.L. (2002)
G	Gawe, N., Jacobs, M., & Vakalisa, N.C.G. (2012); Grasha, A.F. (1996) [2]; Grundman, H. (2006); Goodyear, G.E., & Allchin, D. (1998)
J	Jacobs, M. (2011); Jacobs, M., Vakalisa, N.C.G., & Gawe, N. (2011); Joravsky, D. (1989); Jung, E. (2008)
K	Kamii, C. (2012); Kaplan, R.M., & Saccuzzo, D.P. (2009); Kenny, N. (2008); Kitchenham, A. (2008); Kozulin, A. (1996)
M	Marrison, G.S. (2010); McAlpine, M. (2002); Mcleod, S. (2012); Mcleod, S.A. (2007); McIerney, D., & McIerney, V. (1998); Mezirow, J. (1997); Muller, J.O. (2014) [2]
O	Ohio State University (2005); O'Neill, C., & Wright, A. (1993); Ormrod, J.E. (2012)
P	Papert, S. (1999); Piaget, J. (1982)
R	Roadhouse, S.J. (2001); Roth, W.L. (2007)
S	Schönwetter, D., Sokal, L., Friesen, M., & Taylor, L. (2002); Skinner, B.F. (1953); Somerset, S.D., & Herne, M. (2014); Stiggins, R., Arter, J., Chappuis, J., & Chappius, S. (2004)
T	Thissen, D., & Wainer, H. (2001)
V	Van der Veer, R., & Valsiner, J. (1991); Virginia Teaching Resource Centre (2004); Vygotsky, L.S. (1934 & 1978).
W	Wood, D.J., Bruner, J.S., & Ross, G. (1976); Woolfolk, A. (1998)

This Table reveals that only four sources were cited by more than one student. These are indicated with an additional [2] behind the date. These were: “Brookfield, S. (1990)”; “Chism, N.V.N. (1998)”; “Grasha, A.F. (1996)”; & “Muller, J.O. (2014)”. In addition, almost 50 percent were published before the year 2000. Close to a third were published before 2010. In addition, Table 8.8 on the next page presents the online resources cited. This Table presents thirty-eight website addresses cited by students. These websites focused on one of thirty-two keywords/topics. The most frequent website visited (indicated by [5]) was www.simplypsychology.org. Two other websites were visited by three students (indicated by [3]). Four websites were visited by two students (indicated by [2]). The most popular keyword/topic was “Teaching Philosophy”, followed by “Vygotsky” and then “Assessment Principles”. All the keywords/topics focused on PCK related aspects (Professional Studies Portfolios).

Table 8.8: PGCE referenced websites (Professional Studies Portfolio)

REFERENCED WEBSITES	
http://wps.ablongman.com ; www.simplypsychology.org [5]; http://wikipedia.org [3]; www.brookes.ac.uk ; www.qub.ac.uk [2]; https://teachpsych.org ; www.siu.edu ; www.tcnj.edu ; www.learning-theories.com ; www.biography.com ; www.uwo.ca [2]; www.fctl.ucf.edu ; http://edglossary.org ; www.qaa.ac.uk ; http://wbaonline.amc.org.au ; www.education.com ; www.justicenow.com ; http://jfmuller.faculty.nocri.edu ; www.goverpublishing.com ; http://everydaylife.globalpost.com ;	http://ehow.co.za ; http://education.stateuniversity.com ; http://www1.umn.edu [3]; http://webspace.ship.edu ; www.dukeschool.org ; www.theoryfundamentals.com ; www.velsoft.com ; www.aiu.edu ; http://orion.math.iastate.edu ; www.arms.org ; http://psych.colorado.edu ; http://psychology.about.com [2]; http://2020engineer.iss.utep.edu ; www.businessballs.com ; www.theoryfundamentals.com [2]; http://webspace.ship.edu ; www.businessdirectory.com ; www.education.gov.za
Key words/topics: Slavin; Vygotsky [5]; Scaffolding Theory; Assessment Principles; [3]; Learning Theories; Operant Conditioning [2]; Assessment Feedback [2]; Teaching Psychology; Sharon McGee; Kristen Lawson; Saul Mcleod; Teaching Philosophy [6]; Burhus Frederic Skinner [2]; Professional portfolios; Education Reform; Work Based Learning [2]; Workplace Based Assessment; Why Assessments Important; Assessment of practical work in Science; What is authentic Assessment; Personality Theories; Project Work; Teaching Learning Dynamics; Teaching Portfolio; Piaget; Constructivism; Blooms Taxonomy; Bruner; Ausebel; Bandura [2]; Tutorial; Project	
REFERENCED JOURNALS	
Journal of Transformative Education [2]; New Directions for Adult and Continuing Education; Journal of the College of Science Teaching; The International Journal for Academic Development; Journal for the Theory of Social [Sciences]; Archives of Neurology and Psychiatry; Notices of the American Mathematical Society	

Table 8.8 also presents the seven academic journals cited in assessments. Five focused on education in general and two were subject/didactic specific. Only one of the seven journals was cited by more than one student (indicated by [2]), namely: “Journal of Transformative Education” (Professional Studies Portfolios). Due to the low number of journals (seven) in comparison to websites (thirty-eight), it is assumed that students potentially made limited use of the online component of the HEI Library granting access to various databases and academic journals (HEI Official Website 2014 & 2015). Limited use of prescribed reading materials and journal articles to complete assessments potentially restricts programme quality and coherence. This is because it is assumed that a coherent programme includes various prescribed academic materials (books, journal articles, et cetera) which feature in most assessments, to promote a common thread of understanding transferred across the diverse modules (Strydom et al., 2012:43; Darling-Hammond, 2006a:306; Darling-Hammond, 2006b:276). To explore access to additional materials, the ICT platforms available at the HEI to promote out-of-class engagements between students and teacher educators are explored. To begin, the HEI encouraged communication between teacher educators and students, to enhance teaching and learning experiences, by using the programme “Blackboard” (QEPIS:P1). This programme was accessible from the HEI

official website (HEI Official Website 2014). The HEI revealed that although available, limited use was made of it to enhance teaching and learning at the HEI in general.

[E]ffective use of Blackboard for teaching and learning is done by a small minority of lectures. Most lecturers tend to use Blackboard as a content management tool. While extensive training is undertaken, staff need to implement this effectively (QEPIS:P1).

In addition to HEI staff training, the HEI also noted that students needed training in using “Blackboard”, which further restricted the use of it (QEPIS:P1). Concerning the PGCE context, various students were frustrated by the lack of use of “Blackboard”. This frustration was potentially caused because of past experiences where “Blackboard” was used while completing the NDMT at the HEI. For example:

What is the use of Blackboard: no grades are on there, no notices and notes were on there (NQT6 written response on course evaluation questionnaire).

The HEI potentially invested in “Blackboard” without adequately exploring the needs, preferences and ability of its students and staff. In support, TE1/TP coordinator used “EDMODO” (which is a free service available on the internet) to engage with students instead of “Blackboard”:

Then I also like to have an online component. I didn’t use it as much as a compulsory measure this year (2014). I would like to do so next year. I used EDMODO purely as a conversational tool firstly and secondly just to post study guides and reminders of tests. Or the scope of a test that is coming up. That kind of thing (TE1/TP coordinator interview).

As a whole, limited use of prescribed materials, journal articles and ‘Blackboard’ potentially restricts clear and intended links between all components. A key contributing aspect to the limited use of the above is challenges with the HEI’s ICT infrastructure.

8.6. Closing

This Chapter presented analysed data to address the third research objective: To identify the constraints in the PGCE FET mathematics programme as experienced by those directly involved in it. The main message emerging from this Chapter is that there are at least seven categories of constraints influencing the quality and coherence of

the PGCE programme/engagements as delivered in 2014 by the HEI. These are presented in a Table format below.

Table 8.9: Constraints in the PGCE FET mathematics programme

'Selection of students' constraints impacting the PGCE structure and goals
Limited to none advanced standing or credits for short courses and diploma modules;
The increase in spaces without increasing time dedicated to the PGCE potentially restrict clear and intended links between all components;
'Modality' constraints impacting the PGCE structure and goals
Lack of oversight concerning the implementation of HEI policy stipulations potentially restrict clear and intended links between all components;
Part-time aspects potentially restrict clear and intended links between all components including support structures;
'Curriculum' constraints impacting the PGCE structure and goals
Lack of standardised PGCE curriculum related verbal and written communication potentially restrict clear and intended links between all modules;
TVET college context specific PGCE FET mathematics programme is needed;
'Assessment' constraints impacting the PGCE structure and goals
Limited use of prescribed materials, journal articles and 'Blackboard' potentially restrict clear and intended links between all components.

Table 8.9 was presented with the aim of summarising the Chapter to reflect upon when addressing the study's overall research question: How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as an NQT classroom teacher? The Table highlights two constraints with the 'selection of students', indicating a potential need to revise the process and associated mechanisms available before a student is granted access into the PGCE. Two constraints with the 'modality' context indicate a need to either revise HEI policies or to refine the processes followed by the HEI to manage the delivery of a quality and coherent programme. The Table also presents two categories with the 'curriculum' context that indicate a need for a communication audit, to ensure all written (and verbal) communication relating to the PGCE is standardised. This would promote the delivery of a quality and coherent programme. This context also highlighted a need (which the HEI is addressing) to offer context specific qualifications (such as the PGCE) for the TVET college context in addition to the current PGCE mainly focusing on the state approved school curriculum. One category emerged with the 'assessment' context that highlighted a need to make better use of prescribed materials and online library resources during the completion of PGCE assessments. This Table, along with the two Tables concluding Chapter 6 and 7 (see Table 6.11: What the PGCE offers students and Table 7.10: PGCE context specific policy stipulated teacher role descriptions) serve as the core insights for reflection to contextualise the two complimentary

conceptual frameworks (see Figure 3.2: Mathematics teacher knowledge, skills and attitudes including context, technology (standard and advanced), policy expectations and PGCE modules and; Figure 4.9: Conceptual framework to learn how to teach) built during literature review to answer the overall research question. The Chapter to follow presents the final data analysis focused Chapter of this case study.

CHAPTER 9

EQUIPPING NQTS FOR THE CLASSROOM CONTEXT

9.1. Introduction

The preceding Chapter presented the constraints of the PGCE as identified by those directly involved in it. This Chapter synthesises the key findings as they relate to the main research question (How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher?). The logic behind this Chapter is to bring data analysis to a close by presenting a refined conceptual framework that focuses on developing teacher knowledge, skills and attitudes to equip a NQT for the classroom context (see Figure 9.3). Note that the main focus is to see what the HEI is doing right, as constraints were identified in the preceding Chapter. Data sources to answer the main research question include the Tables used to summarise the insights gained in Chapter 6, 7 and 8 (see Table 6.11: What the PGCE offer students, Table 7.10: PGCE context specific policy stipulated teacher role descriptions, and Table 8.9: Constraints in the PGCE FET mathematics programme). Two themes are used to organise and guide data analysis. These two themes relate to the overall synthesis of this study and to the main aim and research question that guides this study. The first theme is the PGCE process of learning to teach, supported by five categories linked to the five steps/criteria, as refined and illustrated in 'Figure 4.9: Conceptual framework to learn how to teach'. The second theme is PGCE teacher knowledge, skills and attitudes descriptions, supported by four categories linked to the knowledge, skills and attitudes categories, illustrated in 'Figure 3.2: Mathematics teacher knowledge, skills and attitudes including context, technology (standard and advanced), policy expectations and PGCE modules'. The first of the two themes are explored below.

9.2. The PGCE process of learning to teach

The process followed in the PGCE FET mathematics programme is summarised by the cyclical process illustrated in Figure 4.9 (It is presented again as Figure 9.1 on the next page for ease of reading). Note that the Figure is not presented as the format that the PGCE should follow. Rather, it is presented as a logical sequence of engagements which could occur during ITE, such as the PGCE. In short, the Figure serves as a data organising tool to tell the 'story' of the PGCE, using the format of a beginning, middle and end. The five related categories linked to the five refined steps/criteria illustrated are presented and discussed below Figure 9.1.

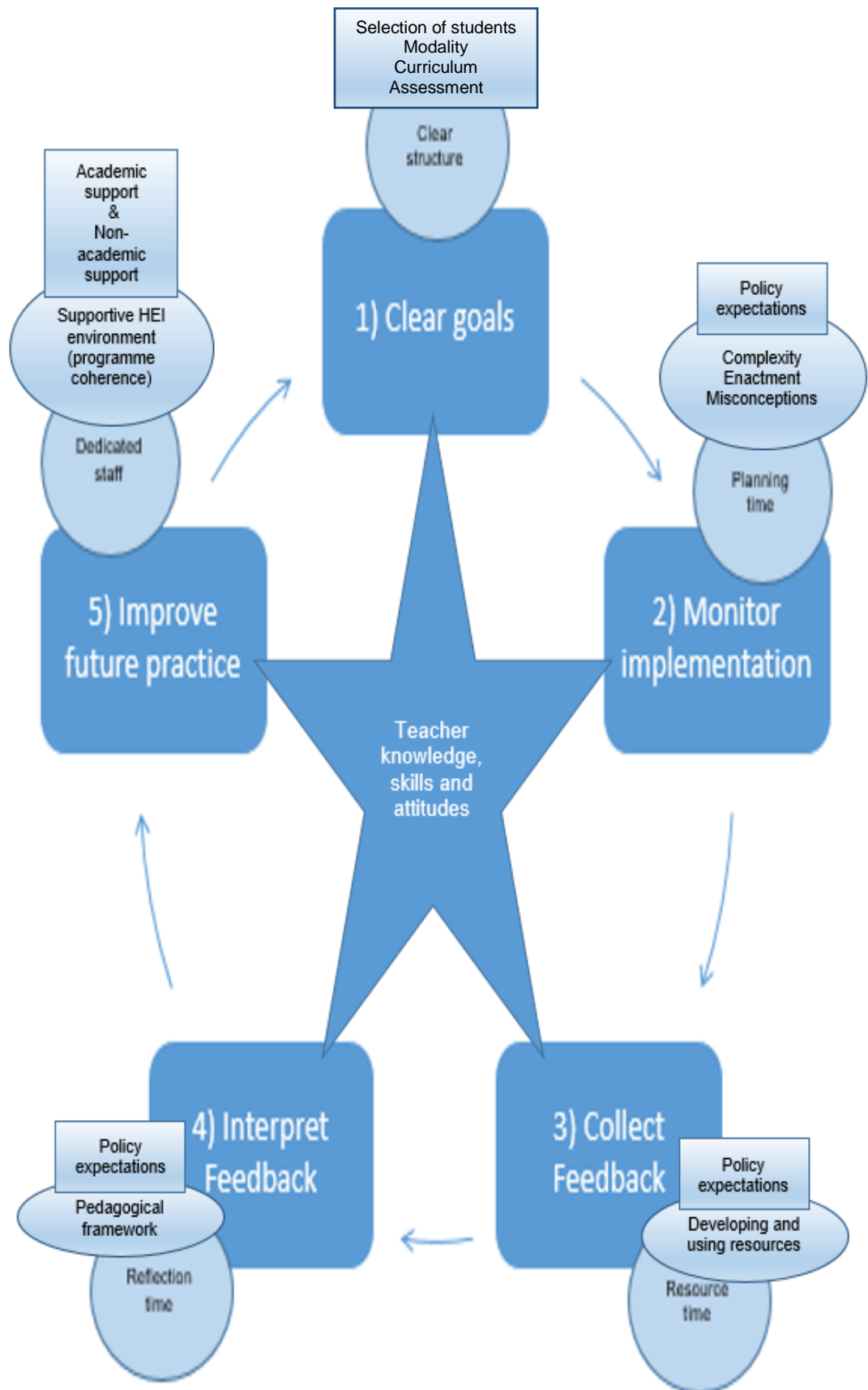


Figure 9.1: Conceptual framework to learn how to teach [repeated for ease of reading]

9.2.1. The PGCE FET mathematics programme structure and goals

The PGCE structure involved didactic A (mathematics or business studies), didactic B (a second school/college subject linked to the elected didactic A) and seven compulsory modules. The seven compulsory modules were (1) educational management, (2) perspectives on education, (3) introduction to research, (4) professional studies (and TP), (5) life skills (ICT skills), (6) language development and communication, and (7) health and safety in education (first aid, health and safety legislation, HIV/Aids education). TP was included as a component of professional studies but assessed as a separate 'short' module consisting of five weeks in term one and three weeks in term three. The remaining academic weeks involved contact sessions between February and early November.

Content (curriculum) used during contact sessions for PGCE modules was based on the related B. Ed. module's content. This practice is common in this HEI's PGCE as B. Ed. teacher educators are appointed on a "part-time basis" to facilitate the PGCE in the afternoon/evening. This practice assumes that teacher educators are able to translate B. Ed. context specific content (delivered over four years) into PGCE context specific contexts (delivered in a year). This is perceived possible by not developing SMK as done in the B. Ed. and only focusing on PCK. Six of the compulsory modules were year modules. Health and safety in education was offered in short workshop format and not included on the PGCE timetable (see Appendix I). Life skills (ICT skills) allowed for RPL by passing a test focusing on Microsoft Word, PowerPoint, Excel and Access in February. Because content sessions were scheduled in the afternoon/evening, employed teachers/lecturers could complete the PGCE in one-year.

9.2.2. The PGCE FET mathematics programme process related to equipping NQTs with planning related knowledge, skills and attitudes

The process followed in the programme is summarised by focusing on three aspects, namely: complexity, enactment, and misconceptions. Complexity refers to engagements to influence the ability to plan teaching related activities. Enactment refers to engagements to influence the ability to deliver planned teaching related activities. Misconceptions refers to engagements influencing the understanding of teaching as a professional practice, requiring a combination of specific knowledge, skills and attitudes.

Complexity-focused outcomes achieved in the PGCE are briefly explored. The first is the developed understanding that the purpose of planning a lesson is to realise a specific change in learners. This intended change is established by reflecting on curriculum theories and experiences with the profession. The process of planning for teaching involves compiling a subject portfolio file that indicates how a NQT selects, sequences and paces the delivery of curriculum content to realise intended change(s). The process of planning for teaching includes the setting of class rules and proper planning to enhance the probability of creating a safe environment that is conducive for learning and teaching.

Enactment-focused outcomes achieved in the PGCE are explored next. The first is the developed understanding that there is a need to remain enthusiastic, flexible and approachable to enhance a selected teaching strategy's (method and media) ability to realise intended change. The process of selecting a method and media was influenced by introducing theories that highlight the specific needs of learners and content. Development included highlighting the process of maintaining classroom discipline by moving around and asking questions to retain learners' interest.

Misconceptions-focused outcomes include the perceived success in overcoming the negative attitudes around teaching as a viable profession to enter and grow in. Understanding the expected professional conduct was developed by engaging with educational theories in general and highlighting the needs attached to inclusive education and creating caring environments. Professional conduct engagements also clarified the value of professional conduct, which could help a teacher maintain learner and community trust.

9.2.3. The PGCE FET mathematics programme process related to identifying, developing and using learning and teaching resources

Related data is analysed by focusing on the processes and theories introduced in the programme to influence NQTs ability to identify, develop and use learning and teaching resources. This includes resources to use during a planned lesson to transfer and assess the desired change. Linked outcomes include NQTs understanding the need to develop simplified examples in addition to examples found in textbooks and externally set assessments. The ability to use Microsoft Office to complete PGCE assessments also influenced NQTs ability to develop resources such as assessments, presentations, training manuals and study guides. The process of analysing the reliability and validity of designed assessments, in terms of levels, outcomes, standards and suitability, was

introduced and assessed. Analysing assessments during the PGCE influenced the ability of NQTs in identifying and/or designing suitable assessments to realise intended outcomes.

9.2.4. The PGCE FET mathematics programme process related to using reflection to develop and refine a philosophy of teaching

The pedagogical framework or philosophy introduced and refined during the PGCE was focused on by reflecting on two preceding categories. The PGCE modality of guided self-study and continuous assessment influenced reflection focused outcomes. Existing knowledge, skills and attitudes needed to be reflected upon during engagements introducing PCK. This process mainly involved linking existing SMK with newly-acquired PCK. PCK was further developed during TP to help NQTs think about what media they needed to enhance the potential of a planned lesson leading to the intended change. NQTs were given opportunities to learn how to influence school college/management to purchase this media by arguing about the need and benefits. Reflection was also developed by engaging with decisions and actions emanating from subject meetings. The need to interpret and reflect on learner assessment submissions was developed to identify constructive feedback to enhance the impact of lessons and assessments. Assessment results were also reflected upon to realise three outcomes. The first was to establish the planning and media aspects which contributed to the success and failure of the planned lesson and linked assessment. The second outcome was to influence future practices. The third was to identify development and resource needs for discussion during subject meetings.

9.2.5. HEI support structures in the PGCE FET mathematics programme context

Support structures to enhance the potential of achieving academic success are summarised by focusing on the HEI environment's role in assisting a diploma or degree graduate become an NQT. To begin, a lack of standardised PGCE modality related verbal and written communication potentially restricted clear and intended links between all modules. This is because a coherent programme is supported by clear communication that is available to all to guide decision-making and clarify clear and intended links between all modules. Exploring clear and intended links, HEI policy stipulations were explored. It was found that a lack of oversight concerning the implementation of HEI policy stipulations potentially restricts clear and intended links between all components. To clarify, certain HEI policy stipulations on assessment and TP were not followed by all. Clear and intended links between all components of the

PGCE was further restricted by the part-time nature of teacher educators' appointment in the PGCE. This caused limited engagements between all appointed teacher educators. This also caused limited engagement between teacher educators and mentor teachers to promote clear and intended links between contact sessions and TP. The ever-increasing student numbers in the PGCE, without increasing the number of contact sessions with students, also emerged as an aspect perceived as restricting the realisation of the most desired level of programme coherence. Realising clear and intended links are also constrained by the limited use of prescribed materials, journal articles and 'Blackboard' (online notes) across the diverse modules. Although the PGCE structure is based on the assumption that a diploma graduate holds adequate background knowledge to participate in the PGCE, limited opportunities are granted to gain exemption or credits for PGCE modules. In closing, the PGCE is subject to frequent re-curriculation as influenced by the DHET. This requires teacher educators to continuously present evidence and revise aspects found wanting, affecting the quality of the PGCE. Within this context, all teacher educators noted that the key challenge impacting the quality of the PGCE (the need for frequent re-curriculation) is the perceived limited time available to equip a NQT with all knowledge, skills and attitudes as perceived possible in the four year B. Ed.

9.2.6. Conclusion

Five categories were discussed under the theme 'the PGCE process of learning how to teach'. The final conceptual framework (see Figure 4.9 in Chapter 4) was used to organise the discussion. A key message that emerged is that the PGCE FET mathematics programme prepares a NQT for the classroom context by focusing on both theories and practices for the process of teaching and learning. Although successful, a key challenge impacting the delivery of the PGCE, as perceived by teacher educators, is that the allocated year for studies is insufficient. This perception is potentially based on the common practice of using B. Ed. content, designed to be delivered over a period of four years, in a quarter of the time for the PGCE. In short, the way teacher educators think of the PGCE (as a B. Ed. without sufficient allocated time) at the HEI is potentially a constraint impacting the development achievable in the PGCE. It is recommended that the PGCE be approached as a separate and unique qualification that is equivalent to a B. Ed. in terms of credits and formal recognition. The content and engagements need to be specifically designed for the PGCE context. The theme to follow focuses on the PGCE and the development realised, in terms of what the HEI expects a NQT to know, do and be, by means of the process as summarised above.

9.3. PGCE teacher knowledge, skills and attitudes descriptions

The aim of the section to follow is to present context specific descriptions of the teacher knowledge, skills and attitudes developed during the PGCE. This process begins by refining Figure 3.2 in Chapter 3 (the core of the studies final conceptual framework represented by the ‘star’ in the centre of Figure 9.1) with the insights gained from the case study.

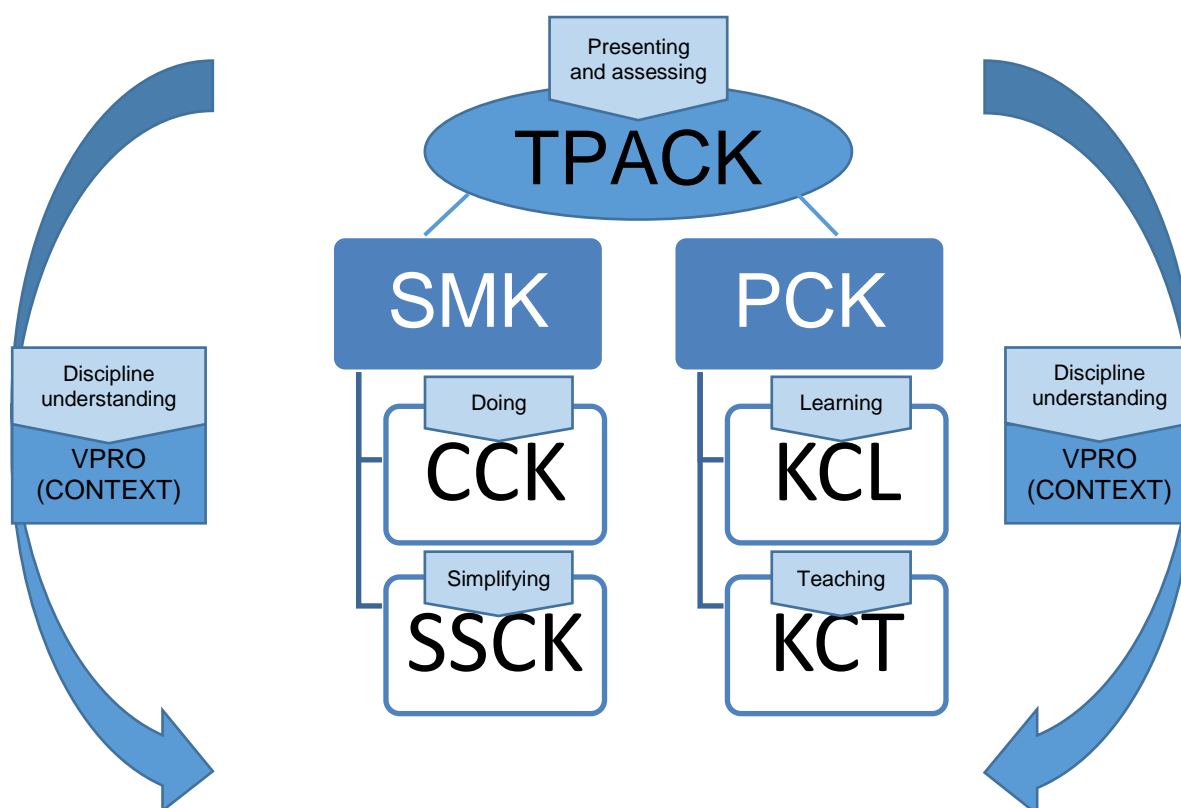


Figure 9.2: PGCE contextualised teacher knowledge, skills and attitudes model

Figure 9.2 illustrates the refined teacher knowledge, skills and attitudes categories emerging from the case study. TPACK (Mishra & Koehler, 2006: 1028-1029) as a category identified during literature review is maintained (see section 2.4 in Chapter 2). PCK and the sub-category KCT (Ball et al., 2008:394) is kept as clarified in section 2.2 in Chapter 2. KCL is refined by renaming it to Knowledge of Content and *Learning* (instead of Knowledge of Content and *Learners*) to allow for a PGCE contextualised description to be accommodated. SMK and the sub-category CCK (Ball et al., 2008:394) as clarified in section 2.2 in Chapter 2 is also maintained. SCK is refined to Specialised Simplified Content Knowledge (SSCK) to accommodate a PGCE contextualised description. VPRO (Barton, 2009:7) is kept as a category (see section 2.3.1 in Chapter 2) to present the attitudes needed to enhance the probability of successfully teaching mathematics in diverse contexts to diverse learners. PGCE context specific descriptions of the above are presented.

9.3.1. TPACK as developed in the PGCE

TPACK is a merged category for professional teacher knowledge and skills highlighting the wide body of knowledge and skills needed to present and assess mathematics. All PGCE engagements contributed towards the development of TPACK. The common practice of merging existing SMK with newly acquired PCK starts the process. Introducing students to media, methods, curriculum theory, teaching practice, education management, communication theory, inclusivity, psychology, education theories, research methodology, ICT, health and safety, and subject administration as a whole is TPACK. In summary, TPACK is the ability to select, sequence and pace the delivery of the prescribed curriculum by using the most suitable available technology (standard or advanced) to teach and assess learners in a specific context. It is the practical ability to present and assess prescribed curriculum content to diverse learners in actual classrooms using available resources.

9.3.2. PCK (KCL and KCT) as developed in the PGCE

PCK is the ability to use KCL and KCT to successfully plan and deliver lessons anchored in theory and practices focusing on learning and teaching mathematics.

KCL includes knowledge of learners to guide decision making when planning, delivering and assessing prescribed curriculum. Introducing students to models of intervention, barriers to learning, learners and learning, principles of human learning, multicultural education and challenges presented by diversity develops KCL. In summary, KCL is the ability to select, sequence and pace the transfer and assessment of the prescribed curriculum for both individual and groups of learners in a classroom context. It is developed by focusing on theories and practices focusing on learning mathematics.

KCT includes knowledge of teaching in diverse contexts to guide decision making when planning and delivering prescribed curriculum. Introducing students to background to teaching as a professional practice, national curricula, planning, media use, teaching practice (methods), assessment, managing the learning environment, teaching philosophies, teaching portfolios, electronic learning, the teacher as communicator, factors of effective teaching, South African education (past and present), modern society, and subject organisation develops KCT. In summary, KCT is the ability to select, sequence and pace the transfer of the prescribed curriculum by using and

reflecting on educational theories and professional teaching practices. It is developed by focusing on theories and practices focusing on teaching mathematics.

9.3.3. SMK (CCK and SSCK) as developed in the PGCE

SMK is the ability to use CCK and SSCK to successfully plan and deliver lessons anchored in theory and practices focusing on doing and simplifying mathematics.

CCK is the ability held by a teacher to complete (preferably pass with at least a distinction) formal and informal assessments as given to learners to assess school mathematics. CCK is developed during the process of completing Grade 12 or equivalent and a diploma or degree with a mathematics focus. CCK includes the ability to conduct self-study to overcome potential CCK gaps emerging during the process of planning or delivering a lesson. In summary, CCK is the ability to solve mathematical problems included in the prescribed curriculum. It is developed by focusing on theories and practices focusing on doing mathematics.

SSCK is the ability to analyse prescribed mathematical content to develop simplified real-life examples in addition to the examples presented in the prescribed textbook(s) and externally (department) set assessments. It involves an increase in depth of knowledge and skills relating to the prescribed school curriculum. Introducing students to teaching practices involving the development of simplified examples of content, interpreting and analysing assessments and linking prescribed content to practical examples applicable to learner's daily life or interests starts to develop SSCK. In short, SSCK involves theories and practices focusing on simplifying mathematics.

9.3.4. VPRO as developed in the PGCE

VPRO is an all-encompassing abbreviation representing a teacher's attitude towards mathematics as a discipline. V is for vision and focuses on why mathematics exist. P is for philosophy and focuses on how competency in mathematics occur. R is for role and focuses on the value mathematics offer society. O is for orientation and focuses on approaches to assist learners to become competent in mathematics. Introducing students to topics such as modern society and schooling, engendering critical and creative citizens, adulthood and citizenship, indigenous knowledge and education, research problems, behaviourism, constructivism, learning with understanding, Piagets types of knowledge, classroom culture, and teachers and learners' role and expectations influences their VPRO. In closing, VPRO influences a teacher's ability to

cope in diverse contexts by making decisions using their attitude relating to mathematics as a discipline. It is developed by focusing on theories and practices relating to a rich coherent conceptual map of mathematics to influence how NQTs understand it as a discipline. Developing VPRO is not a practice that happens independently. It is influenced by including aspects focusing on V during engagements focusing on CCK. P can be influenced during engagements focusing on KCT. R during engagements relating to SSCK and O alongside KCL engagements. In short, VPRO is developed and influenced alongside engagements developing professional teacher knowledge and skills by including a focus on context.

9.3.5. Conclusion

In summary, teacher knowledge, skills and attitudes within this case studies context includes the following: (1) presenting and assessing mathematics (TPACK); (2) learning mathematics (KCL); (3) teaching mathematics (KCT); (4) doing mathematics (CCK); (5) simplifying mathematics (SSCK); and (6) understanding mathematics as a discipline in context (VPRO). The insights presented above along with the insights presented under the preceding theme are to be reflected upon to present a short answer to the research question: How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher? This is realised by presenting a refined conceptual framework (see Figure 9.3) focusing on developing teacher knowledge, skills and attitudes during ITE.

9.4. Closing

Looking back, data indicates that the PGCE was successful in equipping a NQT with specific knowledge, skills and attitudes to cope in a classroom context. The approach taken to complete this Chapter involved two themes and related categories linked to the two complimentary conceptual frameworks (see Figure 4.9 and 3.2) built during literature review. This allowed for the process that was followed in the PGCE to be summarised under the first theme. The second theme allowed for the overall development of professional teacher knowledge, skills and attitude because of the PGCE to emerge. To bring the insights gained to a close, the following Figure is presented and discussed. This Figure presents the synthesised insights gained to conclude the case study.

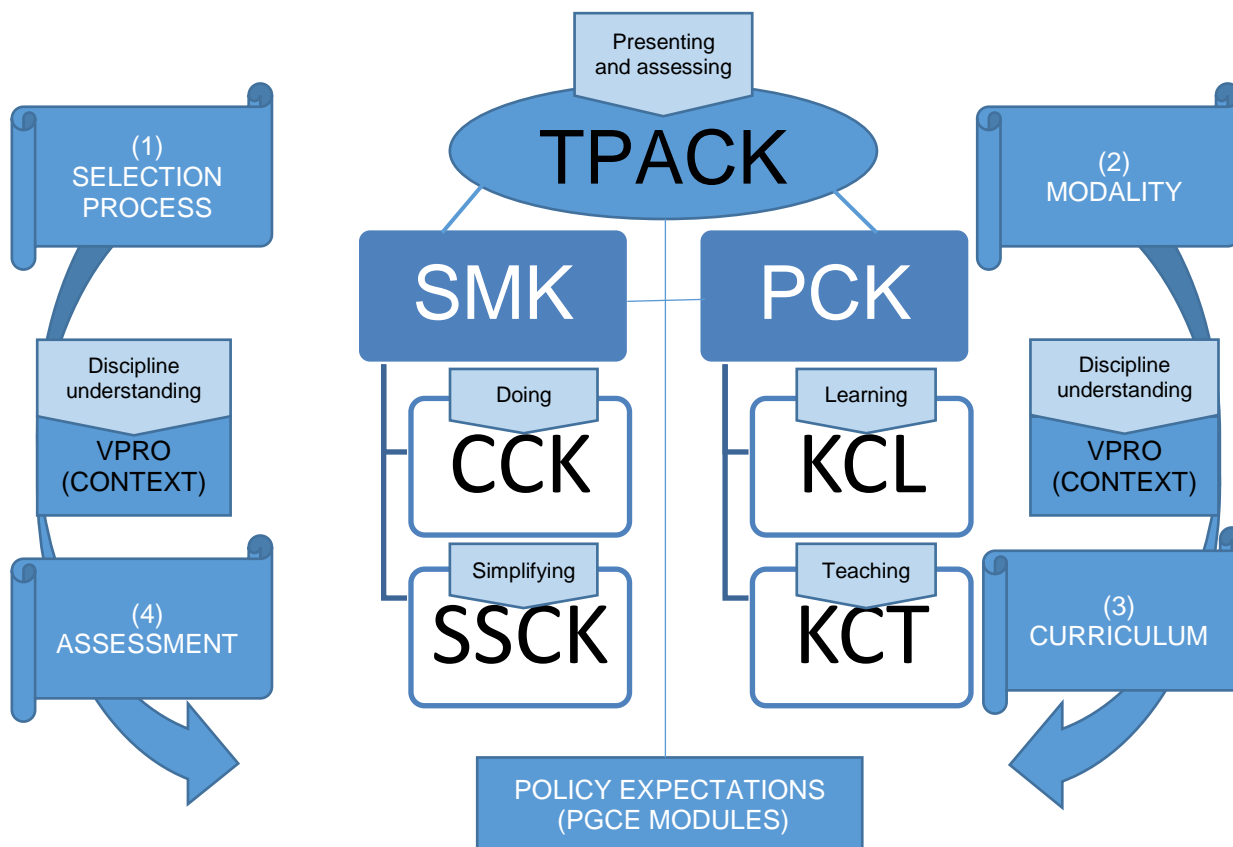


Figure 9.3: Developing professional teacher knowledge, skills and attitudes

Figure 9.3 is presented as the short answer to the research question: How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher? The logic in presenting the answer as a Figure is guided by the practice of summarising each of the preceding data analysis chapters in a Table format (see Table 6.11, 7.10 and 8.9). The discussion to follow aims to summarise the case study within the perimeters established by Figure 9.3 to guide the identification of key findings and recommendations to be presented in the Chapter to follow.

The PGCE FET mathematics programme as offered by the HEI is governed by national policy (MRTEQ) which relies heavily on institutions and teacher educators to deliver and design quality ITE programmes. This aspect of the case study is illustrated in the rectangle at the bottom of Figure 9.3 stating 'policy expectations (PGCE modules)'. This means that teacher educators are mandated by national policy to design and deliver PGCE modules to develop NQTs who are able to meet the expectations national policy places on them (see Table 2.9: Revised list of policy expectations placed on NQTs in Chapter 2).

The structure and goals of the PGCE FET mathematics programme was explored by focusing on four aspects illustrated in the four scrolls in Figure 9.3 summarising the process the HEI intended to follow(see Chapter 6), namely: the selection process of students; the modality promoted to equip NQTs to cope in a classroom context; the curriculum followed to ensure NQTs were introduced to theories and practices relating to the expectations placed on them by national policy and; the assessment process followed to verify that NQTs are able to meet the expectations placed on them by national policy. These four aspects also served as themes to present constraints in the PGCE as identified by those directly involved in it in terms of hindsight. Because the above was possible, these four aspects are presented to summarise the process of the PGCE in terms of developing teacher knowledge, skills and attitudes. Specifically, the selection process is responsible to ensure that SMK is in place. The modality is responsible to guide students to merge their existing SMK (and past exposure to the profession influencing their understanding of PCK) with newly acquired PCK to start influencing their TPACK to cope in diverse contexts. The PGCE curriculum is responsible for ensuring NQTs were exposed to specific theories and practices to influence their knowledge, skills and attitudes to allow them to meet the expectations placed on them as stipulated in national policy (MRTEQ). The assessment process followed is responsible for generating evidence to indicate the competencies achieved which allowed a student to be converted into a NQT by meeting the requirements to qualify for the PGCE and register as a professional teacher with SACE.

In addition to the above four criteria as illustrated in the four scrolls in Figure 9.3, teacher knowledge, skills and attitudes are illustrated in a model format. This is done by emphasising context (the two arrows on the left and right side of Figure 9.3) influencing the development of TPACK, SMK and PCK because of the PGCE. To narrow the concept of context, the model VPRO is illustrated to note that TPACK, SMK and PCK should be developed by including a focus on context by including theories or practices focusing on one or a combination of the aspects included in VPRO (see Table 2.1 and section 2.3.1 in Chapter 2). This understanding was gained during literature review. Data hinted that some VPRO related theories and practices formed part of the PGCE but more could potentially be done to enhance the PGCE as an experience.

The main focus of the PGCE FET mathematics programme was to develop PCK. TPACK focused engagements was limited as the PGCE as an experience potentially assumes that the basics associated with TPACK (specifically using advanced technology) and SMK are already in place. Data further revealed that limited theories and practices developing TPACK and SMK occurred in the PGCE. TPACK could

potentially be better developed in the PGCE by making it compulsory for all to complete computer applications technology (CAT) as a didactic C. This will also ensure that all PGCE students gain access to a personal computer and how to use such for teaching purposes by being engaged with theories and practices on teaching CAT. Such theories and practices could be reflected upon during didactic A and B and how advanced technology (CAT theory and practices) could be used to transfer related curriculum content (in support of standard technology introduced during didactics). SMK could potentially be given more time in terms of developing it by considering it as two complementary but separate knowledge categories, namely: CCK and SSCK. Those who gain access into the PGCE most likely hold adequate CCK, but not SSCK. This identifies the potential need to ensure that didactics focuses to a larger degree than what occurred in the 2014 PGCE on theories and practices equipping NQTs with the ability to simplify mathematical content included in the prescribed state curriculum. As a whole, the knowledge, skill and attitude categories are simplified in the light blue rectangles with arrow bottoms to summarise Figure 9.3 as a conceptual framework. This is presented within the aim of guiding the design and delivery of a PGCE able to equip a NQT to meet national policy expectations. Meaning that a PGCE should have clear and intended links between all modules to ensure that a NQT is able to: present and assess their didactics; do the subject matter linked to the didactics prescribed curriculum; simplify the subject matter linked to the didactics prescribed curriculum; plan and present lessons using theories and practices related to the concept of learning their didactics; plan and present lessons using theories and practices related to the concept of teaching their didactics; plan and present lessons using deeper discipline understanding to consider context in relation to VPRO to enhance the impact potential of lessons and assessments.

The discussion above is an attempt to make sense of the complex process that is learning to teach and teaching. The above also serves as a summary of the case study that is this thesis. The Chapter to follow brings the thesis to a close by focusing on findings and recommendations.

CHAPTER 10 CLOSING

10.1. Introduction

The preceding Chapter addressed the research question. This Chapter serves as the formal closing of the thesis. This is done by presenting findings, recommendations and the contribution of the study.

10.2. Findings linked to the study's research question and three sub-questions

The process to present case study findings involves three steps: (1) stating the relevant research question; (2) providing a short answer to the question (macro finding) and; (3) stating question specific findings. This process is presented below.

10.2.1. Findings linked to the research question

How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher?

By means of guided self-study, requiring students to take an active role to influence the quality and content of the PGCE.

Finding one (Six assumptions of student ability influencing PGCE quality):

PGCE delivery was anchored in the assumption that a diploma (or degree) graduate holds the following six abilities: (1) The ability to link existing SMK (CCK and SSCK) to newly-introduced PCK (KCT and KCL) to influence the development of TPACK; (2) The ability to work independently (conduct self-study) and hold the required level of literacy, numeracy and ICT skills; (3) The ability to approach teacher educators and prepare for constructive one-on-one consultation sessions (if time during contact sessions is insufficient); (4) The ability to access and analyse orientation-related documents (programme guide, faculty handbook, study guides, HEI policies et cetera) and approach teacher educators or HEI management to clarify unclear matters; (5) The ability to select a willing and capable host in which to complete TP within the first two weeks of the academic year; (6) The ability to identify SMK gaps by means of self-study, to influence content to be included during didactic contact sessions within the first two weeks of the academic year. If the above (including SMK (CCK and SSCK))

was not in place, a student was unable to take full advantage of the PGCE delivered by means of guided self-study focusing on developing PCK (KCT and KCL).

Finding two (All PGCE modules focused on developing PCK):

The overall aim of the contact sessions in the PGCE FET mathematics programme was to convert a graduate in a mathematics-related field into a teacher by only focusing on PCK (which included SSCK aspects). It is noted that all the teacher educators emphasised that the modality is based on the understanding that students are SMK experts and that they only focus on PCK. Compulsory modules were delivered with the assumption that SMK needs are sufficiently dealt with during didactics. Didactics A (mathematics or business studies) split the large number of students into two groups and represents the second largest contact session in terms of student numbers. Although didactic A involved fewer students, the size of these contact sessions was perceived as being too large to allow for frequent engagements and one-on-one contact with all students to verify their ability to teach mathematics. Didactic B (science, economics, engineering et cetera) split the didactic A groups into smaller groupings. Didactic B potentially consisted of frequent engagements and individual feedback because of the smaller grouping of students. As an example, the NQTs who completed science as their didactic B emphasised that the PGCE is successful in training science teachers.

10.2.2. Findings linked to sub-question one

What can a student expect when pursuing the PGCE ITE route in terms of the selection process, modality, curriculum and assessment?

The PGCE offers suitable diploma or degree graduates a concentrated B. Ed. fourth-year PCK-related qualification during afternoon/evening contact sessions using continuous assessment to verify development.

Finding three (Diploma graduates caused an increase in student numbers):

The HEI attracts diploma graduates from non-education specific faculties of the HEI who chose the PGCE, as they needed a second career option. This trend has allowed the PGCE to increase the number of students to the PGCE.

Finding four (Employed teachers completed the PGCE in one-year):

Contact sessions for the PGCE FET mathematics programme were scheduled in the afternoon/evening (see Appendix I) and supported by one-on one consultation sessions (which needed to be booked) with teacher educators. This allowed employed teachers/lecturers to complete the PGCE in a year, alongside full-time students.

Finding five (High expectations and continuous assessment promote quality):

The PGCE is assessed by means of continuous assessment (no final examination). High expectations are perceived as being maintained by offering limited opportunities for re-assessment and awarding a distinction only for a first submission.

10.2.3. Findings linked to sub-question two**What policy stipulated teacher knowledge, skills and attitudes were actually developed during the PGCE?**

General education theories, PCK (which includes aspects that can be considered to be SSCK) and positive and negative aspects associated with the teaching profession formed the basis of PGCE to equip NQTs to meet national policy expectations (see Table 2.6, 2.7 and 2.8 in Chapter 2).

Finding six (Attitudes influenced by focusing on positives and negatives):

The overall purpose of the PGCE was to overcome potentially negative attitudes held by students of teaching as a profession. This was perceived as realised by presenting content and topics focused on positive and negative aspects associated with teaching as a profession.

Finding seven (TP serves to prove oneself as a potential employee):

Most NQTs mentioned that they experienced TP as being too short to have had a real impact on their development as a teacher. Although TP included assessments linked to didactics and professional studies, it seems to have served more as an opportunity to prove oneself as a potential employee instead of solely focusing on learning to teach.

Finding eight (Classroom management underdeveloped during the PGCE):

Completing classroom management/administrative tasks caused most NQTs to experience the first term as challenging. Examples include completing class mark sheets (including getting marks from learners not submitting assessments and completing the form), controlling books (including dealing with learners who did not complete homework) and maintaining learner discipline during lessons. This was challenging because NQTs were potentially only told about classroom management/administrative tasks during contact sessions and TP, without being guided and shown how to complete them. The PGCE curriculum and modality potentially assumes that the process of being shown/guided on how to complete classroom management/administrative tasks occurs during induction or is developed with the assistance of a mentor.

Finding nine (Limited mentoring overcome by self-study):

Most NQTs did not experience a formal induction and were not appointed a formal mentor. NQTs were expected to teach independently from day one in the school/college, which was revealed to be a nerve-racking experience. Although the beginning of the first term was a nerve-racking experience, the PGCE modality of guided self-study seems to have equipped most NQTs to cope better in the classroom as they gained experience.

10.2.4. Findings linked to sub-question three

What are the constraints of the PGCE FET mathematics programme as identified by those who undertook and facilitated it?

The part-time aspects of the PGCE restricted the potential of one-on-one engagements with the ever-increasing number of students, as well as meetings between all involved in PGCE delivery.

Finding ten (Six key PGCE constraints):

The following six constraints potentially restricted the quality and level of programme coherence achievable: (1) The large number of students; (2) The lack of oversight concerning the implementation of HEI policy stipulations; (3) The limited formal engagement/meetings between teacher educators with the aim of communicating and

achieving a common goal; (4) The lack of standardised written and oral modality and curriculum-related communication; (5) The limited citing of prescribed materials and the lack of a common grouping of academic journals used as references to complete assessments; (6) The part-time nature of programme delivery (e.g. evening classes, part-time appointed teacher educators and TP evaluators).

Finding eleven (Limited exposure to advanced technology):

NQTs mentioned that limited or no use was made of additional advanced technology, such as an interactive smartboard or online communication tools such as 'Blackboard', during or in preparation for contact sessions.

Finding twelve (Support after graduation is almost non-existent):

Limited or no support is available to NQTs from the HEI or Alumni after graduation.

I haven't seen that any support is offered for Alumni, if I can put it that way, or a follow up programme to say: Okay, we have sent out these teachers. What support do we have for them? They are now qualified and just because they are qualified we are done with them. We send them out and they go out into this big world on their own and there is no support for them (TE3 interview).

To build on the above, suggestion to enhance the PGCE as an experience are presented.

10.3. Recommendations

The organisation of recommendations below is based on the refined conceptual framework (see Figure 9.3 in Chapter 9) emerging from the study. The approach taken is to use the four aspects (illustrated in the four scrolls located in the four corners of Figure 9.3) summarising the PGCE as a process to organise the presentation of recommendations, namely: selection process, modality, curriculum and assessment. The logic behind this decision is to use the refined conceptual framework (Figure 9.3) to prove its value as an analysis tool, allowing for the organising of recommendations emerging from data findings.

10.3.1. Recommendations relating to the PGCE selection process

Recommendation one (Verify SMK and develop introductory modules):

Teacher educators identified existing SMK and academic literacy as restricting some students from gaining full benefit from the PGCE. It is therefore advised to verify the level of SMK and academic literacy (including internet and e-mail knowledge and skills) held by students in the beginning of the year. If this is found lacking, students could complete additional modules focusing on SMK and/or academic literacy to overcome the gap. Within this context, there is potentially a need for a PGCE bridging (introductory) course, in cases where the gaps in existing SMK and/or academic literacy are too extensive to overcome by means of additional modules or workshops. By doing so, the limited time of eight months could be dedicated to critical engagement with educational theories, with all students adequately equipped to actively participate and take full advantage of the PGCE modality of guided self-study. Understanding that PGCE student numbers have increased annually, the most viable solution to reduce numbers without reducing the total number of teachers being developed might be a bridging (introductory) PGCE. This could help avoid the situation where potentially ill-prepared students get 'lost in the system' and fail. It could also potentially avoid the slight chance of a student qualifying as a teacher without holding the most desired knowledge, skills and attitudes. The introductory PGCE could also serve as an opportunity for TVET college diploma graduates (National N Diploma) to gain access into the PGCE programme if they do not qualify for access in the standard PGCE.

Recommendation two (Develop electives for final year diploma graduates):

The PGCE has expanded over the last couple of years because of an increasing number of HEI diploma graduates pursuing it. The trend of attracting HEI diploma graduates offers an opportunity to develop education-related modules as an elective for final year diploma students at the HEI, such as the National Diploma in Mathematical Technology (NDMT). Such modules could focus on developing research and communication skills as applicable in the PGCE context. Focus could also be placed on developing SMK (CCK and SSCK). The successful completion of these modules could be linked, if finances are available, to a 'guarantee' of a bursary to pursue the PGCE FET mathematics programme. Such modules could also be focused on gaining credits to exempt students from certain compulsory modules in the PGCE. For example, the modules 'introduction to research' and 'language development and communication' could be offered in such a manner. Such developed modules could

also be offered to registered PGCE students who need additional support and training to improve their existing knowledge and skills in research, communication and SMK if found needed (see recommendation one). In addition, the inclusion of such modules for HEI diplomas is an opportunity for oversight and monitoring-focused organisations to secure data on the impact realised in various diplomas. Specifically, to evaluate whether graduates are equipped with the necessary academic skills to cope in further studies and to be granted access to meaningful employment. One affected group that could be studied is the NDMT graduates who pursued the PGCE after being unable to secure meaningful employment. Can South Africa afford to offer diplomas, especially mathematics-focused diplomas perceived as being attached to a scarce skill, that do not lead to 'guaranteed' meaningful employment?

10.3.2. Recommendations relating to the PGCE modality

Recommendation three (Revise programme orientation):

The PGCE included a two-hour programme orientation conducted by the programme coordinator. The coordinator informed students that they are subject experts and were expected to conduct independent study. Understanding that the time allocated in the PGCE is perceived as being limited, an alternative approach is potentially needed. Within this context, programme orientation could take the form of completing a worksheet or collage instead of being in a lecture format. The worksheet or collage can be developed with the aim of allowing students to communicate their existing philosophy of teaching as a profession. This can be supported by exploring why their chosen subjects (didactics) are important in a democratic country such as South Africa. This could be followed by introducing a pedagogical framework (such as the one developed by Alexander, 2015:6 presented as Table 2.3 in Chapter 2) and the model VPRO (Barton, 2009:7 see Table 2.1) to evaluate their submissions and identify potential refinement needs. Students could also be introduced to a matrix (such as presented in Table 2.2 (Beswick, 2012:133)) focusing on their chosen didactics, revealing, as an example, their philosophy of mathematics as a discipline and their philosophy of mathematics as a school subject (teaching). Students could also be introduced to a conceptual framework focused on developing professional teacher knowledge, skills and attitudes (see Figure 9.3 in Chapter 9 as a potential example) to further influence the development of their philosophy of teaching. The point to be made is that programme orientation could be delivered in an interactive format to begin equipping students with the ability to reflect on their existing knowledge and to build on this by using educational theories and models to be introduced in the PGCE as a whole.

This is possible as the closing assessment for 'professional studies' required students to present their philosophy of teaching developed during the PGCE. This allows for the opportunity to compare their teaching philosophy as stated in the beginning against the philosophy developed at the end.

Recommendation four (Revise TP delivery in the PGCE):

TP was perceived by most NQTs as being too short to have had a real impact on their development as a NQT. Practical learning opportunities could be extended in the PGCE by using full-time PGCE students as tutors in the support structures available for first year HEI students. This could occur in the morning as the PGCE students attend contact sessions in the afternoon/evening. This recommendation is not to replace TP, but to offer additional practical learning in addition to TP. To enhance the impact of TP, it is recommended that HEI PGCE graduates are employed as teachers/lecturers to serve as a mentor for PGCE students during TP. By using HEI PGCE graduates, it is argued that such teachers/lecturers should be able to understand PGCE student needs and the process they are following to become a qualified teacher. Within this context, there is a need to offer support to NQTs championed by the HEI education faculty and/or the HEI Alumni. As a starting point, Appendix N (Teaching on a shoestring) is presented to stimulate the realisation of this recommendation. Appendix N was written for a textbook (cancelled by the publisher) to serve as a resource to practising teachers. It is included as an example of an outline for a potential follow-up programme to offer support to NQTs. This offers an opportunity to build a relationship with NQTs who can serve as mentor teachers during TP in the future (and potentially pursue further studies at the HEI). Such a programme can also produce data on the impact realised by the PGCE and the training and development needs of the NQTs.

Recommendation five (Revise one-on-one consultations):

The modality of guided self-study used in the PGCE was assumed to be supported by one-on-one consultation sessions to an ever-increasing body of students. Instead of holding one-on-one consultation sessions every week, group consultation sessions could be scheduled and guided by verbal requests or suggestion box submissions to assist a specific group of students experiencing similar challenges. Alternatively, consultation support can be offered by using verbal requests or suggestion box submissions on specific topics/questions to include/answer during the next contact session.

10.3.3. Recommendations relating to the PGCE curriculum

Recommendation six (Develop content unique to the PGCE context):

The time allocated to the PGCE is perceived as limited, mainly because of the practice of using content developed for the four-year B. Ed. in the one-year (eight months) PGCE. Within this context, it is recommended that content unique to the PGCE context should be developed in conjunction with existing B. Ed. content. It is advised that such content be developed using MRTEQ stipulations and a conceptual framework focusing on developing professional teacher knowledge, skills and attitudes (such as Figure 9.3 in Chapter 9). This would create original content most suitable for the PGCE context. As an example, the PGCE should include engagements focusing on SSCK to equip NQTs with the ability to link existing CCK with newly-acquired PCK by using SSCK engagements/content as a bridge. Alongside the process of developing unique content, the HEI can revise all PGCE-related communication to ensure a standardised message is maintained on the structure and modality of the PGCE at the HEI. This would promote the delivery of a quality and coherent programme and potentially avoid unnecessary duplication of content and engagements. For example, NQTs experienced 'mathematics didactics', 'professional studies' and 'educational management' as duplicating content and engagements relating to subject administration. Understanding that time is perceived as limited in the PGCE to equip a NQT with all the needed teacher knowledge, skills and attitudes, is there time for duplication of content and engagements?

Recommendation seven (Develop a TVET College context PGCE):

NQTs who were/are employed as TVET college lecturers mainly experienced challenges with the state-prescribed curriculum in the PGCE. There is a potential need to offer a TVET college context-specific PGCE in addition to the existing PGCE mainly focusing on the school context.

Recommendation eight (Amend the MRTEQ):

The PGCE curriculum specifics were/are dependent on teacher educators' discretion, policy guidelines and student expectations. Teacher educators' discretion potentially dominates decision making with the PGCE curriculum. To influence teacher educators' discretion, it is recommended that the eleven policy expectations placed on NQTs (see Table 2.8 in Chapter 7) be amended, as an example, to the revised list of policy

expectations placed on NQTs (see Table 2.9). This is arguably needed to better clarify the differences of expectations placed on teachers and therefore the training and development needs of NQTs to guide decision making relating to the PGCE curriculum. In addition, it is recommended to revise the clarification of the five types of learning associated with the acquisition, integration and application of knowledge for teaching purposes (DHET, 2015:10-11). This recommendation involves including a conceptual framework on developing professional teacher knowledge, skills and attitudes (such as Figure 9.3 in Chapter 9) to guide decision-making relating to teacher education curriculum. The current MRTEQ policy guidelines are valuable, but are potentially too generic and broad to promote the most desired quality and coherence potentially achievable. In addition, it is argued that policy should include an example of modules comprising, as an example, a PGCE, to promote a common philosophy on the purpose, modality and curriculum. A proposed structure to begin the development of the above recommendation is presented in Table 10.1.

Table 10.1: Proposed PGCE structure based on existing modules

Electives	
Didactics A Mathematics or Business Studies	Didactics B Subject linked to Didactic A (including TP evaluation)
Compulsory	
Didactic C Computer Applications Technology (CAT)(Including Life skills-ICT skills)	Didactic D Life Orientation (including health and safety in education)
Educational management	Perspectives on education
Professional studies	Research methodology (including communication and language development)

Table 10.1 presents a proposed PGCE structure to guide curriculum decision-making, based on the existing 2014 modules used at the HEI. The two electives highlight the key product being produced by the PGCE at the HEI, namely, teachers for the business studies and mathematics streams. The compulsory section includes two additional didactics. The rationale for this is the enhanced probability that the remaining compulsory modules can be delivered by linking theories to at least one of the four didactics (mathematics, business studies, CAT or life-orientation) SMK. This should enhance the process of guiding students to link existing SMK with newly acquired PCK. The two compulsory didactics (C and D) also allow for short modules such as 'ICT skills' and 'health and safety in education' to be delivered within the context of teaching and learning (avoid generic workshops). Making CAT the compulsory didactic C also offers the opportunity to introduce all students to the process of using ICT to teach (develop TPACK further). This should also redirect government funding (potentially

supported by CSI) to provide all PGCE students access to a computer/laptop to complete didactic C CAT. The 'module research methodology' merges the two modules ('introduction to research' and 'language development and communication') to promote the delivery of a module focusing on learning and teaching. Specifically, it is merged to include engagements focusing on action research on SMK, PCK and TPACK, to produce written reports to develop research and communication skills, academic literacy and professional teacher knowledge, skills and attitudes. It is further recommended to include a list of compulsory readings attached to each of the stated modules to influence the curriculum. Such a list could be reviewed and published annually by the DHET to support the MRTEQ. Such a list can also highlight gaps to promote further research in areas with limited research/publications.

10.3.4. Recommendations relating to the PGCE assessment process

Recommendation nine (Link all PGCE assessments to a research project):

Assessment in the PGCE could be enhanced by linking all assessments to a research project focusing on describing teacher knowledge, skills and attitudes categories. It could also be linked to documenting the process that is followed to learn to teach. This could promote programme coherence by revising the timing of content delivery and related assessments. For example, referencing (which was scheduled at the end of 2014) could be presented and assessed in the beginning of the year in preparation for other assessments. Linking assessments to a research project could also assist teacher educators to publish and contribute towards the body of knowledge on learning to teach by using the data generated by the assessments.

Recommendation ten (Reduce printing paper by using technology platforms):

NQTs experienced the process of continuous assessment, as used by the HEI, as costly because of printing expenses. The process of completing assessments could be converted into an electronic format and supported by developed applications to reduce the need (and cost) of printing and photocopies. This will involve providing all students with a laptop or tablet with pre-loaded applications to allow them to complete assessments. This can be designed with the intention of securing data, which the applications could potentially assist in analysing. This should assist teacher educators to assess and provide constructive feedback to the ever-increasing student numbers. This also serves as an opportunity to collaborate with corporate firms to gain access to CSI, to fund laptops/tablets and the development of assessment-based applications.

The success of this project could be documented and form the basis of publications to contribute to the body of knowledge focusing on learning to teach. To promote the realisation of the above, a training programme could be developed for teacher educators to equip them with the knowledge and skills required to access CSI funding from corporates, to provide enriching engagements and resources for students. As an example, training could focus on applying for CSI to fund laptops/tablets for students and the development of applications to complete assessment on such devices.

Recommendation eleven (Revise TP assessment and observation):

The HEI appoints part-time evaluators to assist teacher educators in assessing the ever-increasing number of students during TP. Because teacher educators do not evaluate all the students, teacher educators are not always sure of the development actually realised in all students because of PGCE engagements. Teacher educators also noted that TP-linked assessments and reports do not clarify the development of a student. Within this context, the laptops/tablets and assessment applications (see recommendation ten) could also serve to evaluate students during TP. This could allow for an opportunity to rethink the assessment of TP by reducing the need for HEI representatives to physically evaluate all students. Creative assessments could be designed to provide sufficient evidence that the students increased their knowledge, skills and attitudes because of TP engagements. Such assessments could be designed on the principle that the mentor teacher completes all evaluation and mentoring as guided the assessment requirements (and who preferably attended a training workshop to clarify expectations placed on evaluators and mentors during TP). These TP-linked assessments could provide data allowing teacher educators to publish journal articles or books to build on the existing body of knowledge focusing on learning to teach.

10.4. The contribution of the study

This section highlights the contribution made to knowledge and research methodologies in the context of learning to teach in the context of a PGCE programme.

The first contribution is a case study focusing on the under researched area of learning to teach by those completing the PGCE ITE route in South Africa. As such, it adds knowledge to how prospective teachers are prepared to teach mathematics in South African schools and TVET colleges. In particular, it presents context specific descriptions of professional teacher knowledge, skills and attitude categories as

developed because of the PGCE selection process, modality, curriculum and assessments (see section 9.3.1 – 9.3.2).

The second contribution is towards the under researched area of how NQTs use the knowledge, skills and attitudes developed during the PGCE to cope in a classroom context. In particular, it highlights how the modality of the PGCE based on guided self-study and continuous assessment (with overlapping deadlines) equipped NQTs to cope in a classroom context with limited mentoring or support. Although the PGCE was perceived as being a success in equipping NQTs for the classroom context, specific constraints were identified which impacted adversely on the experiences of NQTs. The constraints identified relate to the PGCE selection process, modality, curriculum and assessment process (see Chapter 8).

The third contribution is the process followed to build two complimentary conceptual frameworks to summarise insights gained from literature (see Figures 3.2 and 4.9 (or Chapter 2, 3 and 4). These complimentary frameworks guides the design of the study as well as the analysis of findings (see Chapter 6, 7, 8 and 9). Specifically, it provides a framework for the analysis of ITE programmes and may be used by future researchers interested in: (1) how teachers learn to teach; and (2) how they use their learning in the context of their pedagogic enactment in the classroom. It also provides a tool for understanding better how teachers are prepared to teach and how this is translated into their experiences as NQTs in diverse school contexts.

The fourth contribution is methodological. This study serves as an example of how to explore ITE programme experiences of learning to teach using a longitudinal qualitative approach. This approach specifically contextualised the research design followed by using narratives to clarify sampling, data collection methods (interviews and document analysis), data analysis and trustworthiness (see Chapter 5). The approach should be of value to future researchers pursuing a similar research design or research topic.

10.5. Closing

This Chapter serves as the formal closing of the thesis titled: Experiences of learning to become a further education and training mathematics teacher – a case study. The thesis started off (see Chapter 1) by clarifying the rationale for pursuing the study (the process of becoming a teacher by following the PGCE ITE route) by discussing the importance of mathematics as a school subject, good teaching as being complex in nature and initial teacher education in South Africa. Literature was reviewed and

presented as three chapters focusing on teacher knowledge, skills and attitudes (Chapter 2), the PGCE (Chapter 3) and learning how to teach (Chapter 4). The qualitative case study methodology (Chapter 5) was contextualised before four data analysis focused chapters (Chapter 6 to 9) were presented. Each of the four data analysis chapters are linked to a specific research question (either the research question or one of the three sub-questions). The closing Chapter (Chapter 10) addressed findings, recommendations and the contribution of this qualitative case study.

Reflecting on the thesis as a whole it is suggested that the future of teacher education in South Africa potentially involves an ever-increasing number of students pursuing the PGCE who completed a diploma. This means that there is an increase in the number of qualified teachers being produced because of the practice of accepting diploma graduates in the PGCE ITE route. The quality of the PGCE, influenced by national policy, is highly dependent on teacher educators' discretion and the willingness and ability of students to actively participate in the PGCE as a process in terms of its modality, curriculum and assessment. Within this context, national policy should have clear stipulations and tools to influence teacher educator discretion to promote a quality and coherent PGCE. In so doing, the noble aims of enhancing learning for all in South Africa can be influenced for the better.

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APPENDIX A: RESEARCH INFORMATION SHEET

RESEARCH INFORMATION SHEET

STUDY TITLE:

Experiences of learning to become a Further Education and Training mathematics teacher

INVITATION PARAGRAPH:

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following carefully.

WHAT IS THE PURPOSE OF THE STUDY?

Mathematics as a school subject is perceived to be one of the most important subjects due to its ability to serve as a 'gatekeeper to academic and professional success (Blömeke & Delaney, 2012:258). This is because 80 percent of job growth is said to occur in fields requiring a sound background in mathematics (McElvy, 2009:27). The sad reality is that in South Africa only 'approximately one in seven youths obtain a grade 12 pass in mathematics' (DBE, 2011a:68). Only about one in eight youth who pass Grade 12 'fulfils the requirements for Bachelor studies at University' (Department of Basic Education, 2011a:66). An undeniable contributing factor to this phenomenon is the fact that various 'schools are chronically short' of qualified mathematics teachers (Chetty, 2014:92; Spaul, 2012:12). More and better qualified mathematics teachers are needed in the South African education system (South Africa, 2007:i). This is why this study reviews the experiences of student teachers enrolled in the Postgraduate Certificate in Education (PGCE) Further Education and Training (FET) mathematics programme and their experiences in the classroom. The following research question guides this study: What are the learning experiences of PGCE FET mathematics teacher trainees during initial education at a university of technology and how useful do the trainees find these experiences as NQTs?

WHY HAVE I BEEN INVITED TO PARTICIPATE?

You have been sampled to participate in this study due to your involvement in the PGCE programme under review. In total, five teacher educators (as representatives of the University of Technology) and ten newly qualified teachers (NQTs) are to be randomly sampled.

DO I HAVE TO TAKE PART?

Your participation in this study is voluntary. You may withdraw your consent to participate in the project at any time during the project. If you decide to withdraw, there will be no consequences to you. Your decision whether or not to be part of the study will not affect your continuing access to any services that might be part of this study.

WHAT WILL HAPPEN TO ME IF I TAKE PART?

A case study research methodology is used to examine the experiences of initial teacher education in a PGCE FET mathematics programme offered by a university of technology. All that is required from you is to participate in an individual semi-structured interview. Teacher educators will be invited for an interview before end 2014. NQTs will be invited for an interview after the first term in 2015 with a potential follow up interview in August 2015.

WHAT ARE THE POSSIBLE DISADVANTAGES AND RISKS OF TAKING PART?

There will be no harm or discomfort associated with participation in this study.

WHAT ARE THE POSSIBLE BENEFITS OF TAKING PART?

As a participant, you will be granted an opportunity to reflect on your own development needs as well as reflect back on what you have achieved so far.

WILL MY INFORMATION IN THIS STUDY BE KEPT CONFIDENTIAL?

Every effort will be made to protect (guarantee) your confidentiality and privacy. I will not use your name or any information that would allow you to be identified. However, we are often identifiable through the stories we tell. In addition, all data collected will be anonymous and only the researchers will have access to the collected data that will be securely stored for no longer than 2 years after publication of research reports, or papers. Thereafter, all collected data will be destroyed.

WHAT SHOULD I DO IF I WANT TO TAKE PART?

To take part in the study please complete and submit the consent form for project participants. To ensure that contact can be made to schedule a convenient time, date and place to conduct the interview(s),

please complete the biographical questionnaire and submit it to me along with the completed consent form.

WHAT WILL HAPPEN TO THE RESULTS OF THE RESEARCH STUDY?

The results of this research will be used to meet the requirements of a DEd degree from CPUT. The thesis will be made available by CPUT's library in hard copy and soft copy format. It is hoped that a journal article will emerge from the thesis. All publications that emerge from the study will be advertised on CPUT's website via the Centre for International Teacher Education (CITE) link.

WHO IS ORGANISING AND FUNDING THE RESEARCH?

This research is conducted as a student of CPUT located in CITE. I am using my personal funds supplemented by a bursary from CPUT for part-time doctoral students.

WHO HAS APPROVED THIS STUDY?

The research has been approved by CPUT Faculty of Education research committee and ethical clearance has been granted by WCED and CPUT.

CONTACT FOR FURTHER INFORMATION

If you have any questions prior to your participation or at any time during the study, please do not hesitate to contact me: Jacques Verster 084-888 2153 / jvster3@gmail.com
Additionally, queries concerning the manner in which the study has been conducted can be directed to the supervisor of the study: Prof. Yusuf Sayed (021) 959 5832 / [sayedy@cput.ac.za](mailto:sayed@cput.ac.za)

THANK YOU

Please accept my thanks for reading the above and considering participating in this research project

DATE

06/11/2014

APPENDIX B: CONSENT FORM

CONSENT FORM FOR PROJECT PARTICIPANTS

Research title:

*Experiences of learning to become a
Further Education and Training mathematics teacher*

I agree to take part in the above Cape Peninsula University of Technology research project. I have had the project explained to me and I have read and understood the Information Sheet, which I may keep for records. I understand that agreeing to take part means that I am willing to:

- ✓ Be interviewed by the researcher
- ✓ Allow for the interview to be audio taped
- ✓ Make myself available for a further interview should that be required

I understand that and information I provide is confidential, and that no information that I disclose will lead to the identification of any individual in the reports on the project, either by the researcher or by any other party.

I understand that I will be given a transcript of data concerning me for my approval before being included in the write up of the research.

I understand that my participation is voluntary, that I can choose not to participate in part or the entire project, and that I can withdraw at any stage of the project without being penalised or disadvantage in way.

I consent to the processing of my personal information for the purposes of this research study. I understand that such information will be treated as strictly confidential and handled in accordance with the ethical guidelines as stipulated by CPUT's ethics policy.

AUTHORISATION: I have read the above (including the attachment titled: Research Project Information) and understand the nature of the study. I understand that by agreeing to participate in this study I have not waived any legal or human right and that I may contact the researcher at the Cape Peninsula University of Technology (Jacques Verster 084-888 2153/ jvster3@gmail.com) at any time. I agree to participate in this study. I understand that I may refuse to participate or I may withdraw from the study at any time without prejudice. In addition, I understand that if I have any concerns about my treatment during the study, I can contact the Chair of the Centre for International Teacher Education (CITE) at the Cape Peninsula University of Technology (Prof. Yusuf Sayed (021) 959 5833/ [sayedy@cput.ac.za](mailto:sayed@cput.ac.za)) at any time.

Participant's signature: _____

Date: _____

Student number: _____

Researcher's signature: _____

Date: _____

Contact details (to be cut from consent form and used to make contact to organise a interview)

Name: _____

Contact no(s): _____

E-mail(s): _____

APPENDIX C: E-MAIL CONTENT (TEACHER EDUCATOR)

Dear [Teacher Educator Name]

You are being invited to take part in a research study focusing on the learning experiences of student teachers enrolled in the FET PGCE Mathematics programme. The aim is to understand the knowledge and competence they develop and their application in a classroom context in their first year of teaching. As part of this study I would like to speak to you as the teacher educator to understand your perceptions of the trainees before end 2014.

Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. For this purpose please refer to the attached documentation (Research Information Sheet; Consent Form). I am also attaching a draft interview schedule.

If you have any questions prior to your participation or at any time during the study, please do not hesitate to contact me: Jacques Verster 084 888 2153 / jvster3@gmail.com

If you have any concerns about the study, please call or e-mail my supervisor: Prof. Yusuf Sayed (021) 959 5832 / sayed@cput.ac.za

Thank you in anticipation

Jacques Verster
Doctoral Student
Centre for International Teacher Education
Cape Peninsula University of Technology
Cape Town
South Africa
Email: jvster3@gmail.com / jverster@parliament.gov.za
Tel No: 084 888 2153 / 021 403 3683

APPENDIX D: INTERVIEW SCHEDULE (TEACHER EDUCATORS)

Experiences of learning to become a Further Education and Training mathematics teacher

CITE, CPUT, 2014

Synopsis

This study seeks to reveal experiences during initial teacher education using a case study research methodology to examine experiences of initial teacher education in a PGCE FET mathematics programme offered by a university of technology. Five teacher educators (as representatives of the University of Technology) and ten newly qualified teachers (NQTs) will be randomly sampled. The following research question will be used to guide the proposed study: What are the learning experiences of PGCE FET mathematics teacher trainees during initial education at a university of technology and how relevant do the trainees find these experiences as NQTs?

Interview Schedule: Teacher Educators

General-Introduction

1. It would be helpful if you would begin by describing your current role in the PGCE programme and how you came to occupy this position
 - a. Probes/further exploration
 - i. What were you doing before you took on this position
 - ii. What is your academic background – where did you study, what publications have you produced, etcetera.
2. Can you briefly describe the changes concerning initial teacher education in South Africa since you have been a teacher educator
 - a. Probes/further exploration
 - i. How has the changes affected your current role as a teacher educator?
 - ii. How has the changes affected the PGCE programme you are a part of?

Curriculum design and teaching approach

3. Is it possible to reveal your contribution in the design of the PGCE programme you are involved in?
 - a. Probes/further exploration
 - i. How does the curriculum allow for flexibility concerning the experiences offered to teacher trainees during the PGCE programme
4. What is the department's philosophy concerning the PGCE FET programme?
 - a. Probes/further exploration
 - i. How does your personal philosophy of the PGCE programme compare to the departments philosophy?
5. How would you define and describe your teaching approach?
 - a. Probes/further exploration
 - i. Do you see yourself as being more democratic or autocratic- Please explain why you see your teaching practice in this way.

Skills and Knowledge

6. Considering the PGCE programme you are involved in, please explain how it develops a teacher trainee's pedagogical knowledge.
 - a. Probes/further exploration
 - i. What role does the teaching practicum (with specific focus on the school mentor) play in developing the pedagogical knowledge gained during lectures?
7. Based on your experience, what subject content knowledge do you believe trainee teachers acquire from participating in the PGCE programme you are a part of?
 - a. Probes/further exploration
 - i. Are you able to elaborate on specific experiences that focus on developing a trainee teacher's specialised content knowledge?
 - ii. What role does the teaching practicum (with specific focus on the school mentor) play in developing content knowledge of a teacher trainee?
8. Is it possible to reveal specific experiences that was aimed at developing the mathematics beliefs of trainee teachers
 - a. Probes/further exploration

- i. How is a teacher trainees' vision and philosophy of mathematics influenced
- ii. How is a teacher trainees' understanding concerning the role of mathematics in society influenced, etcetera.

Support and Resources

- 9. Considering the context of the PGCE programme you are involved in, what support is made available to teacher trainees by the university to assist them with their studies?
 - a. Probes/further exploration
 - i. How are teacher trainees assisted if they experience learning difficulties or personal challenges affecting their academic achievement?
 - ii. How are teacher trainees assisted to secure employment as a NQT?- What role does the alumni play? What role do the teaching practice schools play, etcetera?
 - iii. How does the university assist teacher trainees to participate in sport and culture activities?

Concluding question

- 10. Please reveal any other relevant information that comes to mind concerning the experiences of teacher trainees during initial teacher education in the classroom context.

APPENDIX E: E-MAIL CONTENT (NQTs)

Dear [NQT Name]

You are being invited to take part in a research study focusing on the learning experiences of teacher trainees who were enrolled in the FET PGCE Mathematics programme in 2014. The aim is to understand the knowledge and competence you developed and its application in a classroom context during your first year of teaching. As part of this study I would like to speak to you as a Newly Qualified Teacher (NQT) to understand your perceptions of the PGCE.

Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. For this purpose please refer to the attached documentation (Research Information Sheet; Consent Form; Draft Interview Schedule).

If you have any questions prior to your participation or at any time during the study, please do not hesitate to contact me: Jacques Verster 084 888 2153 / jvster3@gmail.com

If you have any concerns about the study, please call or e-mail my supervisor: Prof. Yusuf Sayed (021) 959 5832 / sayed@cput.ac.za

Thank you in anticipation

Jacques Verster
Doctoral Student
Centre for International Teacher Education
Cape Peninsula University of Technology
Cape Town
South Africa
Email: jvster3@gmail.com / jverster@parliament.gov.za
Tel No: 084 888 2153 / 021 403 3683

APPENDIX F: INTERVIEW SCHEDULE (NQTs)

Experiences of learning to become a Further Education and Training mathematics teacher CITE, CPUT, 2014

Synopsis

This study seeks to reveal experiences during initial teacher education. To clarify, a case study research methodology will be used to examine experiences of initial teacher education offered by a university of technology in a PGCE FET mathematics programme in the classroom context. Five teacher educators (as representatives of the University of Technology) and ten newly qualified teachers (NQTs) will be randomly sampled. The following research question will be used to guide the proposed study: What are the learning experiences of PGCE FET mathematics teacher trainees during initial education at a university of technology and how useful do the trainees find these experiences as NQTs?

Interview Schedule: Newly Qualified Teachers

General-Introduction (background information)

1. It would be helpful if you would begin by describing your current role and how you came to occupy this position
 - a. Probes/further exploration
 - i. What did your initial degree/diploma involve
 - ii. What other qualifications have you completed, etcetera.
 - iii. What other work experience do you have, etcetera.
 - iv. Why did you decide to do the PGCE programme at CPUT?
2. How would you define and describe your teaching approach?
 - a. Probes/further exploration
 - i. Do you see yourself as being more democratic or autocratic- Please explain why you see your teaching practice in this way.
3. How would you describe the first term of teaching as a classroom teacher?
 - a. Probes/further exploration
 - i. Where you taken through a formal induction process?
 - ii. Where you exposed to a mentor teacher to ease you into the school processes, etcetera?

Curriculum design and teaching approach

4. Is it possible to reveal your thoughts concerning the overall design of the PGCE programme you have successfully completed?
 - a. Probes/further exploration
 - i. How did the curriculum allow for flexibility concerning the experiences you were exposed to during the PGCE programme
5. What do you believe was the department's overall goal concerning the PGCE FET programme?
 - a. Probes/further exploration

- i. How did your personal goal or your expectations of the PGCE programme compare to the departments overall goal?
- 6. How would you define and describe the teaching approaches of the teacher educators (lecturers) in the PGCE?
 - a. Probes/further exploration
 - i. Did you experience the teacher educators to be more democratic or autocratic- Please explain why you see their teaching practice in this way?
 - ii. Do you see yourself as being more democratic or autocratic – Please explain why you see your teaching practice in this way?

Skills and Knowledge

- 7. Considering the PGCE programme you successfully completed, please explain how it developed your pedagogical knowledge.
 - a. Probes/further exploration
 - i. What role did the teaching practicum (with specific focus on the school mentor) play in developing your pedagogical knowledge potentially gained during lectures?
- 8. Based on your experience, what subject content knowledge do you believe you acquired from participating in the PGCE programme you successfully completed?
 - a. Probes/further exploration
 - i. Are you able to elaborate on specific experiences that focused on developing your specialised content knowledge?
 - ii. What role did the teaching practicum (with specific focus on the school mentor) play in developing your content knowledge?
- 9. Is it possible to reveal specific experiences that was aimed at developing your mathematics (or potentially teaching-learning) beliefs
 - a. Probes/further exploration
 - i. How was your vision and philosophy of mathematics influenced?
 - ii. How was your understanding concerning the role of mathematics in society influenced, etcetera.

Support and Resources

- 10. Considering the context of the PGCE programme you successfully completed, what support was made available to you by the university to assist with your studies?
 - a. Probes/further exploration
 - i. How were you assisted if you experienced learning difficulties or personal challenges affecting your academic achievement?
 - ii. How were you assisted to secure employment as a NQT?-What role did the alumni play? What role did the teaching practice school play, etcetera?
 - iii. How did the university assist you to participate in sport and culture activities?

Concluding question

11. Please reveal any other relevant information that comes to mind concerning your experiences in successfully completing the PGCE now that you have experienced your unique classroom context.

APPENDIX G: FOLLOW UP E-MAIL CONTENT

Second e-mail content to encourage a positive response:

Dear potential participant,

Thank you for providing me with your e-mail address.

To clarify the attachment of the invitation e-mail:

This is a self funded project.

All that is needed from you is to participate in a reflective interview guided by the questions in the interview schedule (there are no right or wrong answers).

This project will give you insights into the research process and hopefully encourage you to pursue further studies of to DEd/PhD level.

The schedule for interviews is for the period 23 March till 8 April 2015.

If possible please forward the preferred date, time and venue to potentially conduct the interview.

I look forward to our potential meeting.

Best,

Jacques Verster

APPENDIX H: TEXT MESSAGE CONTENT (NQTs)

Good Morning and congratulations on being sampled to participate in a DEd research project title: Experiences of learning to become a FET Mathematics teacher. Please forward your e-mail address to receive further details or alternatively respond to this message directly to request a phone call. Best, Jacques Verster jverster@parliament.gov.za jvster3@gmail.com

APPENDIX I: 2014 PGCE TIMETABLE

PGCE – TIMETABLE: 2014 (Programme Guide 2014)

FROM	TO	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
11:00	11:45			<i>SD: Life Orientation (1.29)</i>		Understanding the timetable <i>*ITALICS – FIRST YEAR</i> *BOLD – SECOND YEAR <i>*FULL TIME STUDENTS attend both the italics and bold blocks</i> <i>*SD Life orientation replaces DIDACTICS B for sport graduates</i> <i>*Business Management 2 (extra subject for some students who have been informed)</i> <i>*LIFE SKILLS will be offered during the year/term as a series of two day courses</i>
11:45	12:30			<i>SD: Life Orientation (1.29)</i>		
12:30	13:15		<i>(Business Management (0.44))</i> 2	<i>SD: Life Orientation (1.29)</i>	<i>(Business Management (0.44))</i> 2	
13:15	14:00		<i>Business Management (0.44))</i> 2		<i>(Business Management (0.44))</i> 2	
14:00	14:45		<i>SD: Life Orientation BD 202</i>			
14:45	15:30		<i>SD: Life Orientation BD 202</i>	<i>Intro to Research (NR2)</i>		
15:30	16:15	<i>ICT Skills (2.26) SD CAT/IT</i>	<i>SD: Life Orientation BD 202</i>	<i>Intro to Research (NR2)</i>	<i>Language and Communication (NR2)</i>	
16:15	17:00	<i>ICT Skills (2.26) SD CAT/IT</i>	Didactics A	<i>Intro to Research (NR2)</i>	<i>Language and Communication (NR2)</i>	
17:00	17:45	<i>ICT Skills (2.26) SD CAT/IT</i>	Didactics A	<i>Intro to Research (NR2)</i>	<i>Language and Communication (NR2)</i>	
17:45	18:30	Educational management (nr 2)	Didactics A	<i>Perspectives (NR2)</i>	Prof (NR2) Studies	
18:30	19:15	Educational management (nr 2)	Didactics B	<i>Perspectives (NR2)</i>	Prof (NR2) Studies	
19:15	20:00	Educational management (nr 2)	Didactics B	<i>Perspectives (NR2)</i>	Prof (NR2) Studies	
20:00	20:45	Educational management (nr 2)	Didactics B	<i>Perspectives (NR2)</i>	Prof (NR2) Studies	

APPENDIX J: PGCE MODULE'S PURPOSE AND PERIOD ALLOCATION

PGCE modules' purpose and period allocation (Programme Guide 2014)

SUBJECT	PURPOSE	PERIODS	SELF STUDY
<i>Professional Studies</i>	<i>Introduce learners to learning facilitation and educational media, as well as teaching practice</i>	4	8
<i>Language Communication and Development</i>	<i>Develop and improve learners' oral and written skills in English, the most common language of learning and teaching</i>	3	6
<i>Educational Management</i>	<i>Provide learners with conceptual and practical knowledge of educating policy, management skills and conceptual frameworks for learning facilitation</i>	4	8
<i>Perspectives on Education</i>	<i>Provide learners with conceptual framework underpinning educational processes. These include theoretical, historical and comparative perspectives</i>	4	8
<i>Introduction to Research</i>	<i>Develop learners research skills</i>	4	8
<i>Life Skills – ICT Skills</i>	<i>Develop learners working ICT skills, including Windows, word processing, spreadsheets, presentations and database use</i>	3	4
<i>Health and Safety in Education</i>	<i>Develop learners basic first aid skills and introduce learners to health and safety legislation (First Aid; Health & Safety Legislation; HIV/AIDS Education)</i>	*	*
<i>Subject Didactics (two subjects)</i>	<i>Introduce learners to subject policy, curriculum development, learning and teaching strategies, and assessment in a specific subject area.</i>	3 (A) 3 (B)	8 (A) 8 (B)

APPENDIX K: LESSON PLAN TEMPLATE

LESSON PLAN TEMPLATE			
Name of student:	Lesson number:	Date:	Lesson duration: 45 minutes
Subject:		Grade:	Number of learners:
LESSON OUTCOMES for this lesson (Do NOT use the Learning Outcomes and Assessment Standards from the old NCS)			
Teaching methods (<u>[underline]</u> appropriate block/s)		Media/resources (<u>[underline]</u> appropriate block/s)	
Direct instruction: Teacher presentation and explanation; Question and answer; Class discussion; Group discussion; Practice Inquiry: Investigation; Problem solving. Simulation: Role play Co-operative learning: Jigsaw; Work in groups; Pairs; Numbered heads; Co-op Co-op; Round robin; Pass the hat. Other: Practical work; Game; Brainstorming; Hot potato; Gallery walk;		Textbook Chalkboard Whiteboard Smart board Posters Handouts Board charts Graphs Pictures Overhead projectors Newspapers Magazines Flip charts Flash cards Exhibits Television Slide presentation (PowerPoint) Video Recordings Radio	
LEARNERS EXISTING KNOWLEDGE:			
ATTACHEMENTS ON SEPARATE PAGE – Attach planned questions with answers; attach content (your own work-no copies from textbooks or PowerPoint slides)			
TIME SLOTS	LESSON PHASES	ACTIONS OF EDUCATOR	LEARNERS' ACTIVITIES
5 to 10 minutes	INTRODUCTION Link to existing knowledge		
15 to 20 minutes	DEVELOPMENT Supply brief list of new concepts/content under this heading (Full notes should be attached).		
10 minutes	CONCLUSION Emphasise outcomes		

APPENDIX L: ASSESSMENT PLAN TEMPLATE

The learning being assessed:	
Analysis of potential assessment mechanisms:	
A brief summary on how feedback after each assessment activity was handled:	
	Tick when attached:
The assessment itself	
The proposed assessment criteria, memoranda or solutions (answers with mark allocation, assessment criteria or rubrics).	
A copy of at least one learner's answer	
Reflection of the assessment activity	

APPENDIX M: REFLECTION TEMPLATE

ASSIGNMENT:
TOPIC:
DATE:
<ol style="list-style-type: none">1. Describe which aspect(s) was/were <u>successful</u> and explain why 2. Describe which aspect(s) was/were <u>unsuccessful</u> and explain why. 3. Describe how this can be improved. 4. Explain why you feel that the stated outcomes were achieved or not achieved. 5. Further remarks:

APPENDIX N: TEACHING ON A SHOESTRING

Teaching on a shoestring

(A) Introduction

Self-Reflection 1

Why do you have a desire to teach? Do not read any further until you have answered this question.

The answer to the above question is the starting point that will equip you to teach in any environment. Keep your answer in mind throughout this chapter. Review your answer constantly as it might change as you grow as an individual.

This chapter has one aim: To provide you with a tool to constantly refer back to in order to ensure that the resources available to you as a teacher is used to its full potential. Under-resourced classrooms are a common occurrence in almost all education systems. Even if you have all the resources available on the market, you most probably don't have enough time to use all the resources to its full potential. Thus this chapter is not only aimed at equipping teachers in underprivileged schools, but also teachers working in private schools.

This chapter will introduce you to strengths, opportunities, weaknesses and threats. Once you understand what strengths, opportunities, weaknesses and threats are, you will design a decision-making tool to help you create a challenging, action-based and stimulating learning environment. Lastly this chapter will introduce you to a decision-making tool available to evaluate the tool you designed yourself. This will be followed with information concerning motivation in general as well as developing interpersonal skills.

(B) Limited resources vs. unlimited needs

Self-Reflection 2

State all items (including people) that could be used as a resource in a classroom or learning activity. Think outside the box.

Discuss your findings with fellow teachers, students, etc. The more people you speak to the more resources you will identify

No matter how much you have, it is human nature to desire more. Concentrate on what you have; use what is available to you.

Success is not only achieved by people who have everything.

The great success stories are those of people who achieved what they wanted to by using the little they have.

(C) Strengths, Weaknesses, Opportunities and Threats

Self-Reflection 3

Make up your own definition for strength and write down a few examples of strengths that you have as well as strengths in your/a school.

Make up your own definition for weakness and write down a few examples of weaknesses you have as well as weaknesses in your/a school.

Compare your answers to the information provided below.

Make changes to your definitions where necessary.

Revise Self-Reflection 1 and 2 and make changes as you see necessary.

What is a strength and weakness?

Ehlers et al (2005:63) defines a strength as *'a resource or a capability that the organisation has which is an advantage relative to what competitors have'*. For the purpose of this chapter, strength will be defined as an ability or resource available to a teacher at the current moment.

Ehlers et al (2005:64) defines a weakness as *'lack of, or deficiency in, a resource that represents a relative disadvantage to an organisation in comparison to what competitors have'*. For the purpose of this chapter, weakness will be defined as an ability or resource which is not available to a teacher at the current moment.

Make sure you understand what strengths and weaknesses are. Discuss it with other students if you are not sure. The aim: use your strengths to overcome your weaknesses.

Self-Reflection 4

Make up your own definition for opportunity and write down a few examples of opportunities that you have available to you and to the school.

Make up your own definition for threats and write down a few examples of threats that you have as well as threats to the school.

Compare your answers to the information provided below.

What is an opportunity and threat?

Ehlers et al (2005:64) defines an opportunity as '*a favourable situation in the organisation's external environment*'. For the purpose of this chapter, opportunity will be defined as an ability or resource that exists, but it's not yet available to a teacher at the current moment.

Ehlers et al (2005:65) defines a threat as '*an unfavourable situation in the organisation's external environment*'. For the purpose of this chapter, threat will be defined as the lack of ability or resource that could have a negative effect on the teacher in the future.

Make sure you understand what opportunities and threats are. Discuss with other students if you are not sure. The aim: use your opportunities to prevent threats from occurring.

Self-Reflection 5

What have you learned so far?

Are you aware that you are your greatest strength?

Are you aware that you are in control of your destiny and that this fact is your greatest opportunity?

Revise Self-Reflection 1 and rewrite your answer so that it can be used as your life 'motto'.

How do I identify strengths?

You already have a definition for a strength. You have already given examples of strengths. The main thing to keep in mind when identifying strengths is that it must be an ability or resource that you already have and are able to use effectively. Everyone is good at something and every school has some resources, even if it is only one teacher and no buildings.

Examples of strengths are:

- Appropriately qualified teachers.
- Teachers who are passionate about their careers.
- A school that has established a disciplinary procedure that everybody in the school understands and uses correctly.
- Creative teachers who concentrate on solutions rather than problems.
- A chalkboard in the classroom.
- A sports field available to the school.
- Etc.

How do I identify weaknesses?

You already have a definition for a weakness. You have already given examples of weaknesses. The main thing to keep in mind when identifying weaknesses is that it must be an ability or resource that you need right now, but you do not have the ability or resource available right now.

Examples of weaknesses are:

- Teachers who are not appropriately qualified.
- Teachers who are not passionate about their careers.
- A school that does not have a disciplinary procedure that everybody in the school understands or uses properly.
- Teachers who are not creative and does not concentrate on solutions put prefer to focus on problems instead (complaining is easier than doing something).

- No chalk boards in the classroom.
- No access to a sports field.

Strengths are for example your personality, qualifications, experience, beliefs, values, etc. You are your number one strength. Weaknesses are for example being shy, not a good communicator, unable to work in a team, impatient, etc. Always believe in yourself and focus on your strengths. By focusing on your strengths, your weaknesses can be controlled. We overcome our weaknesses by identifying them and then using our strengths to reduce the effect of the weakness on our daily lives. Life-long learning and the hunger for personal development is the key to eliminating weaknesses. Never stop asking questions and make sure that you become a professional listener.

Self-Reflection 6

What is meant by the term life-long learner?

What is meant by personal development?

Read up on listening skills and write a short report in point form explaining the qualities and characteristics of a good listener.

How do I identify an opportunity?

You already have a definition for an opportunity. You have already given examples of opportunities. The main thing to keep in mind when identifying opportunities is that it must be an ability or resource that you could turn into a strength in the future. Opportunities are all around us. Just keep your eyes open and keep up-to-date with changes.

Examples of opportunities are:

- Bursaries are available in order to develop teachers further.
- Businesses are willing to support education by means of donations, excursions, etc.
- Workshops that are organised by Unions, the Department of Education, Universities, etc.
- Networking opportunities by joining professional bodies (people can be identified to be guest lecturers on specific topics).
- The immediate community can be approached to assist the school in various ways (e.g. building a library, etc.)
- Etc.

How do I identify a threat?

You already have a definition for a threat. You have already given examples of threats. The main thing to keep in mind when identifying threats is that it must be an ability or resource that can cause a weakness to develop in the future. Threats are future weaknesses and must be identified in advance; otherwise it will cause problems.

Examples of threats:

- The availability of drugs.
- The threat of HIV/Aids.
- The problems with the education system in general.
- The shortage of funding for schools.
- Etc.

Self-Reflection 7

What is meant by the term 'pro-active'?

Identifying opportunities is being pro-active. The world is full of opportunities and it is up to you whether you use opportunities or not. There is an old saying: *'When opportunity knocks, some people complain about the noise'*.

Opportunities are the strengths of the future for the pro-active.

By identifying opportunities and turning them into strengths one will be able to overcome weaknesses and threats.

An example: There is a rumour that in ten years there will not be enough educators to meet the demand. That means that if this rumour is true, the supply of qualified educators will be low and so the people that are qualified as educators will be in demand. This will also require creativity and the use of technology from educators of the future. To make up for the shortage of educators we might be teaching thousands of learners by offering lessons over the internet, television, etc. A pro-active educator will ensure that they are computer literate and aware of how the media can be used in the future. The pro-active educator will also ensure that they are familiar with methods of teaching in an under-resourced classroom; as the majority of schools are behind in technology. This is one of the biggest challenges and opportunities for educators; how do we educate all the citizens of South Africa effectively in order to eliminate the socio-economic issues preventing South-Africa from living up to its full potential.

Self-Reflection 8

What is meant by socio-economic issues? State a few examples.

Research the role of the educator in solving socio-economic issues?

Identify other issues not related to socio-economic issues that can have a controlling effect on education?

Discuss your answers with as many people as you can. Here is a chance to be pro-active. Contact the unions, department of education, etc. and request a workshop concerning socio-economic issues and other issues that have a controlling effect on education.

(H) Using strengths to take advantage of opportunities

You should understand that opportunities are simply strengths of the future. It is important to know which strengths you already have in order to improve on them in the future by taking advantage of opportunities. The same process also helps you to overcome weaknesses as you can go for training concerning aspects that you are not too familiar with e.g. you are not familiar with an environment analysis and so you request that your school or district offer a workshop concerning this learning outcome or alternatively you undertake an informal research project to clarify the concept for yourself.

Self-Reflection 9

Go back to your list of opportunities and strengths. Identify the strengths that will allow you to take advantage of your identified opportunities. Write down plans that you can use in order to take advantage of the identified opportunities. (Use your strengths to take advantage of your opportunities).

(I) The positive side of weaknesses and threats

You have identified weaknesses and threats. Are they really weaknesses and threats? Ask yourself the following questions:

- What is it that I want?
- What is it that I am getting?
- What can I change that will allow me to get what I want?

Rewrite your weaknesses in a positive way e.g. instead of 'I am impatient' write 'I'm given opportunities to develop patience'. In this way a weakness becomes an opportunity. Another example could be that you consider your school to be under resourced, rather think of it that your school is offering you the opportunity to develop your creativity in the classroom by utilising the limited resources available. The most valuable employee in an organisation is the one that always comes up with solutions, not problems. People are attracted to positive people.

Self-Reflection 10

Rewrite as many of the threats and weaknesses that you identified earlier in a positive manner so that they can be viewed as a strength or opportunity.

(J) Bringing strengths, opportunities, weaknesses and threats together

You must have noticed that we are heading towards a SWOT analysis. We have already identified and explained strengths, weaknesses, opportunities and threats. Now it is time to bring them all together.

Self-Reflection 11

Rewrite your identified strengths, weaknesses, opportunities and threats in their corresponding column:

<u>Strengths:</u>	<u>Weaknesses:</u>
<u>Opportunities:</u>	<u>Threats:</u>

What do we do now?

Self-Reflection 12

SW Strategies	STRENGTHS S1- S2- S3- S4- S5-	WEAKNESSES W1- W2- W3- W4- W5-
OPPORTUNITIES O1- O2- O3- O4- O5-	SO Strategies	WO Strategies
THREATS T1- T2- T3- T4- T5-	ST Strategies	WT Strategies
OT Strategies	SOT Strategies	WOT Strategies

Do not let Self-Reflection 12 confuse you. Here are the guidelines in order to use Self-Reflection 12.

- Choose the strengths, weaknesses, opportunities and threats from your SWOT analysis that you consider to be the most relevant. Rewrite these in the blocks with the appropriate heading e.g. strengths under strengths, etc. The numbering is already provided (that is the purpose of S1-5; W1-5; O1-5; T1-5).
- SW Strategies: In this block write down the plan(s) that you can think of using your strengths to overcome your weaknesses.
- SO Strategies: In this block write down the plan(s) that you can think of using your strengths to take advantage of opportunities.
- WO Strategies: In this block write down the plan(s) that you can think of using your opportunities to overcome weaknesses.
- ST Strategies: In this block write down the plan(s) that you can think of using your strengths to overcome threats.
- WT Strategies: In this block write down the plan(s) that you can think of using your weaknesses and threats in a positive manner (yes, this will be difficult).
- OT Strategies: In this block write down the plan(s) that you can think of using your opportunities to overcome threats.
- SOT Strategies: In this block write down the plan(s) that you can think of using your strengths and opportunities together to overcome a threat.
- WOT Strategies: In this block write down the plan(s) that you can think of using your opportunities to overcome your weaknesses and threats (kill two birds with one stone).

Self-Reflection 12 is only a suggested tool. If it is easy and convenient for you to use, use it as your decision-making tool. Do not limit yourself with this tool. Design your own tool. Research existing tools and adjust them to meet your demands. Be creative.

Self-Reflection 13

The following tasks are essential. Do not rush yourself. Attempt to complete all the activities mentioned below within two months.

- Design your own decision-making tool that will allow you to utilise limited resources in order to satisfy unlimited needs.
- Organise a workshop with fellow students and share your decision-making tool with them. Do they understand your tool? Allow your fellow students to present their decision-making tools as well. Do you understand theirs? (Make it a habit to share resources).
- Interview teachers and find out how they make decisions to ensure that their classes are interesting and informative. Especially in under-resourced schools.
- Contact Unions, the Department of Education, SACE, etc. and request a workshop focusing on decision-making in under-resourced classrooms.
- Write a training manual that can be used by inexperienced teachers in which you share your findings. (Who knows, your training manual might be used by Unions, the department of education, SACE, etc. to deliver the requested workshop mentioned above).

(K) Interpersonal skills in the classroom

Self-Reflection 14

The Beginning need not be the end

You have started at ABC school. You are employed as the business studies teacher for Grade 10-12. It is day one and you enter your classroom. The room is small and overcrowded. There are learners sharing a chair because there are not enough chairs in the classroom. You have a chalkboard and outdated posters on the wall. The School Principle introduces you to the class and leaves you to teach. How do you introduce yourself to the class and how would you use your first lesson effectively?

The first day went well with only a few incidents. It was relatively easy to keep the learners attention on the first day. During the third day your problems begin. Learners are becoming disruptive in the classroom. Half the class do not have textbooks. Learners do not bring pen and paper to school. The first formal assessment was given to the learners and on the due date half the class have nothing to hand in.

How do you handle the problems stated above?

Did you handle the situation in the same way as the students next to you? Discuss your responses.

Discuss your answer with practicing teachers and compare your answer to their methods of handling the above situation.

Rethink your original response and adjust your response by taking into consideration what you have learned after discussing your response with fellow students and practising teachers.

'In the opening seconds, our subconscious survival instincts kick in and our mind and body decide whether to run or fight or interact, whether this person offers an opportunity or a threat, whether they're friend or foe' (Boothman, 2002:1).

It is vital that you consider and plan your introduction to each and every class that you teach. Your introduction must be in line with your reason for teaching as identified in Self-Reflection 1.

Advertise yourself. You are the classroom's biggest resource!

Make sure that the learners know why you are there. Develop a short introduction speech that you can use in order to advertise yourself as a teacher. People do judge a book by its cover and students will judge you based on the first meeting. People respect people that stick to their beliefs and values and as a teacher you have a direct influence on the lives of your students. Be consistent and fair and allow learners to develop a professional relationship with you. Be their mentor. Make sure that you treat the learners entrusted to you the same way that you would like your children to be treated by a teacher one day. Learners are immature; they will take chances and most probably test your patience, don't let them.

Don't take yourself too serious and be able to laugh at yourself. Everyone makes mistakes and there is no mistake that can't be fixed with patience and time.

Self-Reflection 15

Define the following terms:

- Mentor

- Advertise

- Interpersonal skills

Using Self-Reflection 1 along with everything that you have learned so far and write down a short speech that will take no more than 10 seconds to say that advertises you as a teacher. Use simple and easy to understand language. Memorise your speech so that you can say it without thinking.

'Remember: it's the singer, not the song' (Boothman, 2002:231).

Your advertisement written down in Self-Reflection 15 must be backed up by you. This means that you have to use the correct tone of voice, eye contact, body language, clothing, attitude, etc. It is important to create a package for your speech that enhances your message and that does not distract listeners from your message. It is impossible to get learners excited when you speak in the same tone the whole time, etc.

Self-Reflection 16

You have your speech completed from Self-Reflection 15. Practice your speech in front of your bathroom mirror. Say your speech out loud using different voice tones and facial expressions that represents the following emotions:

Excitement; Anger; Love; Envy; Impatience; Anxiety; Confidence; Disappointment; Guilt; Sadness.

You will notice that the meaning of your speech changes depending on the emotion represented.

Organise a meeting with your fellow students and say your speech to the group. The group must then try to identify which emotion you are representing. Allow each member of the group a chance to say their speech. Provide constructive feedback to all participants.

'Wear great clothes - more people will listen to you' (Boothman, 2002:147).

Your clothes that you wear are an extension of your personality. You do not have to wear a suit to look professional. Think of the popular Mandela shirt that Nelson Mandela wore to various formal occasions.

It is important to find clothing that suits your personality and budget. It is vital to go back to Self-Reflection 1 as well as Self-Reflection 15 and 16. Why do you teach? What is the core of your advertisement telling people about yourself? The message you wish to tell other people must be supported by your choice of clothing.

Self-Reflection 17

Page through magazines and look at the image being presented by the clothes and facial expressions of people inside the magazine. Look at people when you are at a mall, what image are they trying to portray. Try to identify which career a person might be in based on their clothing. Approach these people and simply ask them if they are currently in the identified career. Walk through clothing stores and try to identify clothing that you think will suit the image you wish to portray.

After you have completed the mini-research project above apply what you have discovered

- Dress up in order to portray the image you wish to convey.
- Ask your colleagues, friends, strangers, etc. what image they associate you with.
- Ask for constructive feedback.
- Go to speciality clothing stores and ask the people working in the store to give you advice concerning the image you wish to portray (advice is for free).
- Mirror your image on people that you consider to be successful and who has the image you wish to portray.

So you have worked on your facial expressions and developed/enhanced your understanding of clothing/fashion. What about the rest of your body? Where do I keep my hands, how should I stand and is posture really important? *'For unless the actor himself knows what he means by every movement he takes, his audience cannot be expected to understand'* (Bourne, 1967:44). Movement and gestures with your hands and sometimes legs must enhance the message that you wish to convey and not distract the listener. Mannerisms that serve no purpose and that are signals of nervousness must be avoided. Be natural, comfortable and true to yourself.

Self-Reflection 18

You have your speech completed from Self-Reflection 15. Practice your speech in front of long mirror. Say your speech out loud using different voice tones, facial expressions as well as body movements that represents the following emotions:

Excitement; Anger; Love; Envy; Impatience; Anxiety; Confidence; Disappointment; Guilt; Sadness.

Your attitude, posture, movements and tone gives the same speech a completely different meaning.

Organise a meeting with your fellow students and say your speech to the group using everything that you have learned. The group must then try to identify which emotion you are representing. Allow each member of the group a chance to present their speech. Provide constructive feedback to all participants.

Write a pamphlet in which you explain how to use attitude, body language, fashion/clothing and your voice in an under-resourced classroom.

(L) Motivation

It is important to stay motivated concerning teaching. As soon as the teacher is unmotivated, how can one expect the learners to be motivated? Learners must feel welcome in your presence and then they will make you feel welcome in their presence.

'Fear is a motivator for some. Success is a motivator for all' (Fritz, 2005:143).

Allow learners to achieve success. Everyone knows that success leads to success. Allow all learners to complete an activity in which they can achieve success. No one enjoys failing all the time.

'All achievers have helpers' (Fritz, 2005:143).

You are not alone in this world. Research the total population of planet earth if you do think that you are alone. Everybody needs help in order to be successful. Surround yourself with people that you can help. In the future all these individuals will provide assistance to you.

'The Higher up you go in an organization, the more you need to let other people be winners, not yourself. -Marshall, Goldsmith, Executive Coach' (Fritz, 2005:143).

Remember why you are teaching (refer back to Self-Reflection 1). You are a teacher and a teacher helps other people become the best that they possibly can become. If you are in the classroom for another reason you might become disappointed and unmotivated. Allow other people to win, they will remember you and when the time is right you will receive your reward.

'If you are the type of person who has knowledge but people are afraid to talk to you, you can expect isolation or maybe even sabotage' (Fritz, 2005:142).

If you cannot show appreciation for your learners, you cannot expect them to show appreciation for you. Find out the interests of your learners and deliver the course material referring to these interests. Learners will put in more effort if the information is provided to them in a format that seems relevant to their daily lives. Learners often ask the following question: Where will I use this in 'real' life? Provide them with an answer to this question.

'Everyone in a group may have ability but it will not become a team unless and until there is mutual respect' (Fritz, 2005:140).

Learners are immature and do not always make rational decisions. You as the teacher must be mature and you must make rational decisions. Have respect for learners even if they don't respect you. Be the example. Be the bigger person and allow learners to make mistakes and provide assistance to develop the learner holistically. You were young and in high school as well: Remember how you felt and coped with school life. How would you have liked the teachers to behave towards you when you were in school?

'Children need love, guidance, ... and limits' (Shaffer, 2002:623).

Be a teacher, not a parent or a friend. Be approachable and professional. Learners must understand that there are limits with you. You are there to help them onto the right path, not there to punish or torture them with school work, but to help them become the best that they can be.

Self-Reflection 19

Define the following terms:

- Motivation

- Teacher

Answer the following questions:

- What is motivation?

- How to motivate yourself?

- How to motivate others?

- Use at least five references.

(M) Conclusion

You are the greatest resource that any education system could wish for. People are the most important component on planet earth. Teaching allows an individual to participate in the development of society as a whole. You do not know what your learners will achieve one-day. Maybe one of them starts an enterprise and employs millions of people. The potential of mankind is unlimited. Make informed decisions and always research for improved methods to make decisions. The power is literally in your hands.

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APPENDIX O: TRANSCRIBED TEACHER EDUCATOR INTERVIEW SAMPLE

Transcribed interview two

Date: 28/01/2014

Duration: 01:12:49

Me: Thank you very much for being willing to participate. It is really appreciated. If at any time you feel uncomfortable we can stop. If at any stage you feel that you don't want to participate it is all deleted. The first question is meant to be a relaxing question and I hope it is: It would be helpful if you would begin by describing your current role in the PGCE program and how you came to occupy this position?

I2: Currently... I love this one. Nice first question. Currently I am merely a lecturer on the program as of 2015. Ahm... I will be lecturing Professional Studies. I ... up until last year was the coordinator of the program here. I was the coordinator of the PGCE since its inception in 2003 and prior to 2003 I was the coordinator of what was then called the National Higher Diploma Secondary. Which was the old Technikon qualification for... for what became the PGCE. As the coordinator at the time we were responsible for putting the curriculum together internally. I was really involved in designing the internal curriculum for the... for one of the PGCEs. Which was the PGCE for FET. I coordinated that for the past decade. Ah... Our numbers in the process... I was involved in marketing... teaching the subjects... I couldn't find students... or lecturers for... and ja I pushed the numbers up from less than 10 students to... this year I think we have accepted 207.

Me: And last year, how many students were there?

I2: We accepted a 170. There is a link between the PGCE and the economy. That's my view. As people... many people take... get into teaching with something like a PGCE as a second option. Couldn't find work so therefore I want to become a teacher or ahm... maybe I want a second option when I get older. So ahm... what we have noticed is something like and this is where maths comes into it... ahm... throughout the... about 10 years ago if we had one engineering student... one maths graduate ahm... on the PGCE it was a good year. Three was a really good year. This last year I think we had something like 10 engineering graduates doing the PGCE FET and that sort of say engineering graduates are not being able to find work. And are therefore looking for a R12 000 a month job instead of a R50 000 a month job. But so ... the link or the increase in the numbers is part due to an extensive marketing process that we have gone through. Ahm... on the hand but I suspect it is because we were not able to find work elsewhere...

Me: Okay. And what did you do before you started working here?

I2: I worked as a lecturer at [specific TVET] College which was then called [specific FET college]. It was only one campus in [specific area]...

Me: Fantastic... Your academic background, where did you study and ...

I2: I did a HD Commerce at Cape Technikon which is now the BEd FET. You might want us to at some stage talk about structures. In the 1980s we had the HD four year teachers qualification or you had HD Postgraduate. Which was the Universities equivalent of what is now the PGCE. HD Commerce Secondary. I qualified as a Business Teacher.. I didn't want to go... Then realised I couldn't study further and then convinced my parents that I go do something at [a specific HEI]. I did a BA in African Economic History. It might be interesting in your paper. Ahm... followed that... once I had those two qualifications I got myself a job as a Business Studies Teacher at [specific TVET college] I taught Office Practice, Marketing and that kind of thing. Four years later I got a job at [specific technikon] teaching business. And from there taught business, merit promotion. Was given these two little courses to coordinate the two HDs. We moved here to expand the BTech (unclear) school. In 2003 were conflated those three into the PGCE. In the process picked up a BEd at [a specific HEI], a Masters at [a specific HEI]. Ahm... took advantage of the research publication and academic tourism opportunities. Ahm... just finished my PhD. We are waiting for one examiner to submit the report....

Me: And are you planning to publish anything from your PhD?

I2: I have already... in terms of that I ... I already have had two papers accepted... One in Cape Town in a few weeks time and one in Malta. Which I am hoping I will get funding for. But... the PhD was on mentoring as a concept in FET colleges...

Me: So when you say mentoring as a concept, is it during teacher practice for teachers or ...

I2: Ahm.. the topic evolved. It evolved from own practice at [specific TVET college] and then my practice with teaching... within... with the NHDs here. The vast majority of college lecturers start working without a qualification. I think the policy document 2008 states that 68% of college lecturers are professionally unqualified, which is why we offer our PGCE part-time and we offer the NPDE part-time as well. . Ahm... my issue was around how do college lecturers learn their teaching trade . Ahm.. and the answer lay somewhere in they teach themselves and they learn from other people, they learn from managers and I tried to conceptualize that learning from ahm... I picked up from the reading that various definitions of mentoring links to self-mentoring, peer-mentoring, Formal mentoring, informal mentoring, horizontal

mentoring, vertical mentoring... this whole construct. There is a plethora of research out there. So I developed the concept of mentoring as a multi-dimensional form of internal... sorry... informal learning. And then I used that to go and see how 15 college lecturers developed their trade. The only requirement was that the 15 people had to be in Business studies so that I could have an apples vs. apples kind of thing. And ahm... I then went through six questions... less than yours... asking them what got them there, what development process was there and how they developed themselves. But in the process of that I ahm... there was a couple of opportunities to go to conferences and publish in the field of mentoring. So I went to India I went to... I think I went to 4 or 5 conferences papers on mentoring in the college environment already. I was asked then to go to India to go do a presentation at an HR Conference. It was quite nice. And from that I got a chapter in a book on mentoring and coaching but within the Business Environment. So ja, there is 4 or 5 things I have published already. And ahm... I've got a couple of publication contracts coming... I need to have finished by the end of April. But when that is done I will start looking at how to slice the PhD up into a variety of pieces of "salami".

Me: Definitely. Next question: Can you briefly describe the changes concerning initial teacher education in South Africa since you have been a teacher educator? More specifically how has these changes affected your current role as a teacher educator?

I2: I can describe it into detail that would put you to sleep.

Me: More specifically how the changes affected your role as a teacher educator?

I2: Remember teacher education is determined by state policy. So when I joined teacher education there was a policy framework for technikons, there was a policy framework for... when I started teaching there was a policy framework for... the apartheid based one. There was a policy for the four general race groups and there was a policy framework for the various Bantustans Provinces and wara wara... There was 29 Education Departments when I started teaching. Each had its own policy framework which I didn't know then. Ahm so when I started my teachers qualification there were only whites and coloureds in our class. And ah... our class was the first class at [specific technikon] that was multi-racial... at [specific technikon].

Me: Do you mind stating the year of that?

I2: It was 1983, or no I am lying 1982 was the first one. Glyness Schreeder, the now recent Dr Gluness Schreeder and I was in the same class. Ahm.. at that stage whites and coloureds needed a four year qualification to be able to teach at a high school. Blacks needed a three year qualification. Ahm... and that sort of stayed in place... that was a thing in place till just before I started at [specific] Technikon. Ahm... a funny experience I had at [specific TVET] College we went to go to a workshop at [specific] College and there was a different pack of documents for whites, coloureds, indians and blacks. Although we had the exact same presentation... they had to give it to different state officials. So I started my teaching career in this environment where you and I got two different packs of the same notes. Because you were in the DET and I was in the Department of Education something something something with a long name. When I joined [specific] Technikon they were in the process of restructuring qualifications and part of my job at [specific] Technikon was to.. because of the expansion was to ... ahm... of [specific] Technikons qualifications. When I did my HDE in the eighties, only universities could offer a teachers qualification. We take a step back, in the seventies technikons could train high school teachers. Early eighties, the policy said only universities can so the course that I did, the first three years of the four years of the HD was at [specific] Technikon and the fourth year was at [specific HEI] for English people and [specific HEI] for the Afrikaans people. I got my job at [specific] Technikon when that policy framework changed and the people spoke of NATED 151 as a policy framework for teacher education. I have never seen it, but if I could get hold of a copy it would be quite nice. So I was led to believe that when I started working in teacher education NATED 151 was the policy document that determined teacher education for the country. There was a framework for Technikons and a framework for universities ahm... hence you had a Technikon doing a NHD and a University doing a HDE. So we then... starting teacher education I got my job because of the changes. ND Commerce at that stage open only to blacks, whites and coloureds they would still do the HDE at [specific HEIs]. In my second year, 1985, ahm... it was opened... the policy then changed and we then we looked... we developed the National Diploma Commerce ahm... followed by a National Higher Diploma- two years later in 1997 the National Higher Diploma was changed to a BTech for all technical qualifications except education. And we had this issue of ahm... what was... the three so called post grad courses that we had... one was NHD Technical for artisans, NHD secondary for people wanting to go into school teaching and what became known as the BTech post-school education- people that wanted to go to colleges and the like. That stayed around, 1999 I think it was, the Minister of Education who... at that stage... high schools were under/offered by universities and primary school were still under state control. This campus, Cape Town College of Education, was where primary school teachers trained and they did a DE Diploma in Education followed by an HDE. Ahm.. so you had... ja... ahm... the Minister then said colleges... they went through a ten year process of amalgamating. The post apartheid-amalgamations. 1992 or 1990 there was still in Cape Town coloured colleges, black colleges, white colleges, Indian colleges. One of the campuses of [specific] College was DETs teachers training college. A place just up

the road, [specific] College was the coloured training college and this was the white college. There was two, one here and one in Rondebosch. So they amalgamated into single colleges of education, 1999 I think it was, by 1999 they were given the condition to either close down, or grow to more than a thousand students, or amalgamate with a Higher Education Institution. Ahm... at that stage we had an acting dean who was [name] and we had three senior lecturers at [specific] Tech School of Teacher Education. The smallest school in the country. We started speaking to two mayor colleges, [name of area] and [name of area] and they amalgamated into [specific] Technikon. We moved here and they... some of the staff moved to [name of area]. Arrival here ahm... coincided with the development of the new teachers education policy the Norms and Standards... the NATED 151 were replaced in the late 90s by thing called the Council of Teacher Education Policy (COTEP). They had a framework. COTEP was then replaced by what is called the Norms and Standards of Teacher Education. Norms and Standards was introduced in 2003 which provided a single qualification framework. A single qualification framework for all teacher education. So... at that stage it is interesting.-Afrikaans Universities, what was now called a PGCE, was called a HED or a HOD. English universities called it a HDE. That's for schooling- you had a HDE secondary, HDE postgraduate, HDE primary, HDE pre-primary. So you would get HDEs which was a fourth year Diploma. HDEs which was a postgrad qualification. Then you had as well, for higher education, you had degrees. Here we had a BTech post-school. There was... it was a complete "scrambled egg" of qualifications and linked to origins of the university, colour and language of the university, political affiliation of the university. You might be too young to remember fundamental pedagogics vs. Liberal approach vs. the Marxist approach. Ahm... we lived it in the eighties. So there was this horrible... there was this "mix-match" of stuff... Norms and Standards had determined that all teacher qualifications fall within a specific framework and we you had therefore the structure that you now know, BEd as one route and a degree or diploma is another route followed by a PGCE. Then Honors, Masters, Doctorate... When that came out we were obliged to close-down. Our BTech postschool was a nice market ahm... the BTech postschool was open to college lecturers as well as people working in training institutions. The NHD technical was for artisans and the NHD secondary was for school teachers. We were then obliged to ahm... the policy for Higher Education was separated from schooling. So there was a possibility to develop a qualification for Higher Education. I was hoping that we could do the... convert the BTech into a postgraduate diploma, but for institutional political reasons the BTech was closed down and what then became known as the HDHET Higher Diploma in Higher Education and Training was taken... sent to Fundani. And for a year or so we collaborated and then those who were collaborators walked away as it just was not worth the cooperation. One sided cooperation is not really cooperation, it's called bullying. Ahm... and then here we then converted the College DEs, the Technikon NDs all into BEds and we converted... we closed-down... we phased out the HDES and BTechs and replaced it with the PGCE. Ahm... the PGCE on the one hand and there was this gap as I told you earlier, there was this void for artisans-the HD technical and for them we developed a National Professional Diploma in Education. The NPDE which we called FET because that made a little more sense than TVET at the time. PGCE or the registration process was the last of the national technikon registration processes. Technikon -[area name] registered it all for us- and made a complete mess of it - I almost said ball-up but I won't. Ahm.. they registered it... the person that registered it registered it in terms of the requirements of the Norms of Standards and not in terms of how you are going to structure it. So we had this... so they developed for the PGCE a subject structure and a registration structure. And those of us who were involved... we had to sort of try and match these two and it was extremely difficult. Ahm... and in the end when the HETC did the audit of the teacher education in 2008 all the UoTs got horrible reports because there was a lack of cohesion within the qualification, but that was later. When we registered, they registered six potential PGCEs, its foundation phase, intermediate phase, senior phase, FET, HET and training and development. And ahm... the decision made at the institution was to convert the old HDE postgrad junior, senior, primary into a HDE ISP and the old NHD secondary and BTech post school to convert that into a PGCE FET. Ahm.. given the... the politics was quite interesting at that time and there was this constant struggle between the technikon and later the UoT to develop policy and the last of the college people trying to maintain their structure under a new name. Short thing was when the course coordinator and the HOD... course coordinators of the PGCE ISP and the HOD of the GET department retired, that PGCE just disappeared. Ahm... the PGCE FET we then didn't get involved... I think at the time it was a good idea... we didn't get involved in training and development, we didn't get involved in HET in Higher Education because it became a very very gray area because it was quality assured by the ETDP SETA. So anyway, the PGCE FET then developed into what is currently one of the big qualifications in the faculty. Our intake is twice the number of any of the BEds intake per year because they run over four years. They have four hundred students but for the past two years we have taken in the access of 100. Ahm... the structure... the way in which we structure the PGCE internally is to have... to focus on what UoTs want. Our major product is Business teachers ahm... and secondly is mathematics teacher. The PGCE requires that a person arrives with two teaching subjects. In case for a Business teacher, Business and Accounting is common. Major challenge that we have at Technikons or UoTs is that the National

Diplomas aren't aimed at the Norms and Standards. If you take for example a National Diploma in Marketing has Business Management as one major and Marketing Management as another major. But it is actually one school subject, business studies. If they have accounting¹ we can't take them- their accounting competency is just not enough. We find the same within the accounting qualification ahm... they have accounting 3 but economics¹. We is really an introduction to economics which means they can't go and teach economics. So ahm... we then made compromises in terms... for other things that have developed. The school subject Phys Ed disappeared. But we had quit a number of sport people coming to us and saying I am teaching Life Orientation. People like yourself saying but I am teaching catering I am teaching consumer studies. So we then did an extended curriculum for tourism, catering and sport people. Ahm... but for many... looking at what we have now in terms of Business Studies we have ... the biggest single sector. Business studies with a combination of either tourism, cooking, sport that's consumer studies, sport, accounting and CAT which is the computer applications and technology... the thing for which typing was replaced. And then we have the maths option... which is our second biggest... big single subject. Maths tends to be linked to technology – the engineers we get so electrical, mechanical, civil. So a person will commonly come in with one of those engineering qualifications. For the past couple of years ahm... the maths has expanded as well to... because one of the faculties I am not sure... offers a course called Mathematics Technology which effectively as I am concerned, so don't quote me, develops a person for unemployability. So they end up with a maths major and a major in general science or something similar. So what we tend to do is what we have been doing for the last couple of years is we have ahm... expanded there. Our PGCE has a number of generic subjects and two subject didactic like curriculum studies is aimed at what we can offer. We also... because of the number of teachers working in education unqualified... which will scare you... there is no stats available... the state won't give you stats. They admitted 30 000 about 5 or 6 years ago, nationally, but that is only officially departmentally appointed people. Ahm... schools with governing bodies... up to three quarters of the school is... are governing body appointed teachers. And a vast majority of governing body appointed teachers are not professionally qualified. We have had people on our PGCE... there is one woman specifically works at a R70 000 a year school. She was involved in writing the CAPS document for her subject but she is still unqualified. So we offer the PGCE part-time as well, and there we have a range of other university – traditional university subjects and we get a couple of maths people... a person with a BSc from [specific HEI] or a person who is teaching... we had a person last year... she had a Masters degree in some form of Biology and she was teaching in one of the big schools just down the road here but she wasn't professionally qualified. So she had a Masters degree in Biology, Honours including Mathematics... ahm... so we tend to offer it to that kind of person. Ahm... 2017/2016 the Norms and Standards will be replaced by two documents... two policy frameworks: one for teacher education and one for colleges. And what we are now saying is what is the PGCE FET, which was actually six PGCEs, now we are planning to offer three PGCEs as of 2017. One is the PGCE FET, the other one is a PGCE SPFET and the third one is going to be called the Advance Diploma in Education for Technical and Vocational Education. And ahm... the minimum requirements for teacher education without telling us what teacher education qualifications must look like and the policy framework on professional qualifications for TVET lecturers is the second document... so we are currently in the planning process... and looking at what [person's name] had in his hands he probably has copies of this .. and now he would probably like to know that this proposal is in order... because this proposal has to go through now for it to be ready by the end of the year so that we can offer these things in 2017.

Me: So lots of changes. Thank for all of that. Good Background. Can I go to the next question?

I2: Please

Me: You have basically gone into this a little bit. Is it possible to reveal your contribution in the design of the PGCE programme you are involved in? Obviously you have already gone through all your contributions, but specifically now to the subject content and things like that. What contributions have you had there?

I2: Internally I designed the course. You know we were given a... there was a SAQA registration document and there was a Technikon Principals Registration Document. Ahm.. but the Technikon Registration Document had six names for six different subjects and... effectively I managed the process of populating that and then over the years managed the process of developing it...

Me: So basically the whole course?

I2: I did the course ja...

Me: And the content of all the subjects, was it up to the lecturers to decide what content to use...

I2: That is the philosophy that one uses in higher education, ja jou say, you are the subject expert so you tell me. And then you say... uh arg uh... do you really want to do that. As far as the PGCE is concerned, I now in the interested of the course... partly because of the politics of the institution... of the faculty. Post incorporation of colleges and post the merger... ahm... I didn't have much formal power but I had quite a bit of informal power. I leaned on that for... too make sure that I got the right people in. The first year that we moved in here the HOD gave me a list of people, for example the communication

person was a primary school teacher, trainer of primary school language. She couldn't speak at... she couldn't even communicate, let alone speak with ahm.. to people who came from [specific] Technikon who were engineers who wanted to go work at a college. And she wanted to speak about Shakespeare but they needed to learn about how to write a letter. So I made... over the years I have ensured that the right staff gets in and that worked very well up until 2010, ahm... when the new regime decided that HODs will manage that. The HODs manages this in terms of and this is confidential: Not in terms of who is available or in terms of who he should use, but who is available in terms of time on the schedule and there is one or two specific people that is a problem.

Me: When you say confidential you mean you do not want it transcribed?

I2: Ahm... you can transcribe it but if you are going to say that there are certain PGCE lecturers that shouldn't be there: I will say no I didn't say that and that you misunderstood me.

Me: Noted

I2: Any Higher Education course involves a compromise between what the coordinator wants, what the students want and what the subject specialist thinks they should have... and you have to respect that. So I might not like what you are doing in your course, but if you are the subject expert in for example ahm... maths education or art education. I do not have the right to say that that is not how you train an art teacher. You know how to train an art teacher, I must just influence you in such a way that your training of an art teacher at the PGCE level equates to the training of a Business Teacher at PGCE level. And that is usually where I pick up the problem where a person pitches too low or pitches too high. And that is where you can't say you are pitching this too low they are not primary school kids, or you are pitching this too high and that is why they are failing. And so the one thing is that I designed the course as a whole, and I've strongly influenced who works on the PGCE and most of the members of staff on the PGCE have been doing it for a while. Because most of the subjects are after 16:30 most of the staff members are getting paid extra for that and so again... also given the politics of this institution... ten years ago... to fill the PGCE I had to go to the individuals... for instance we had a science didactic application one year and I went to the HOD to ask if we could use the science person and she said well that is Harold but Harold is too busy: I went to Harold and said do you want to work in the evenings, he said yes why and I said well this is what I need. He has now become my science and biology person, a brilliant (unclear)... and of course there was political fall-out because of it. Sue me fire me type of thing. So I ahm... I'm not responsible for appointing staff but I am the key role player in ensuring or deciding who... and ... I am happy to say that as of January 2015 it is now someone else's baby ... ahm... the reason it was handed over is... you need to understand the physiology and the physiology politics of taking over the colleges. Teacher education in the 90s... was a dying trade. We took over these colleges on the condition that the faculty remained financially viable. The man who stood at the door earlier had no problem in saying we simply could no longer afford to appoint two lecturers, you will do this work. And also he is quite persuasive. You tend to be if you run a programme in Higher Education. So... and I have been accused... other people accuse me of being to them like he is with me... so it is quite fun. And ahm... so... we... understand that it was a dying trade and we had a shortage of staff and ahm... and we needed to find people who are willing and able to teach the courses. And that itself was a challenge at that time. So I ... when we moved in here I coordinated two courses which became three... for staff viability reasons... the three courses closed down which became two... the three courses had total of let's say 30 people. Which has now grown in the past... to an excess of 300 students if you take the NPDE and PGCE together. That is over and above my teaching load and my research load and...

Me: And the students find work, although it increases the students find work?

I2: There is... The notion of the late 90s in the first part of the century... that there is a shortage of teachers was a bengu mathematical issue, it was a mathematical issue and not linked to actual needs. Remember the ANC promised free education for all, they then rewrote that as free education for all within the first ten years. At a ratio of 40 learners to one staff member. So as schools... the number of... departmental teachers were reduced, so the number of governing body posts increased. So there has never been a shortage of students for the PGCE and there has never been a shortage of jobs for those teachers. In fact, in the Western Cape, there is still a shortage of teachers. An look... forget for a second of the poor schools... Rondebosch, Herschville, Wynberg, the number of people teaching on those school, were parents are paying 60 000 to 80 000 rand a year for.. per kid. The number of teachers working there who are professionally unqualified... it shows you the shortage of teachers. Ahm... and it is not just maths and science...

Me: So we are back at the economy again, it just means that so many people with other qualifications are not finding work so they become teachers?

I2: So there is a positive. There is an absolute positive. I was asked years ago... out of your questioning: What is my view of PGCE graduates who go and work overseas? I said it is really cool because they go and work overseas for two or three years and then come back. A thousand pounds a month ... a hundred pounds a day sounds great until you realize that accommodation costs you 20 pounds a day ahm... food costs you five pounds a day...

Me: You live in pounds

I2: Ja, you... you will never be qualified a teacher because the process that they go through to professionally qualify a teacher means that you will... there is a total market for ex-colonial teachers- South Africans, Indians, Australians, New-Zealanders ahm... I have been told that West-Indies are quite popular... South Africans, Indians and West-indies are apparently the vast majority of the...

Me: Of the cheap education labour?

I2: Yes, of the cheap education labour. There we go. In the UK. But very few of them actually end up being able to accredit themselves as teachers.

Me: Because the schools don't keep them there long enough?

I2: No no, there is a policy framework and ah... it is linked to who can immigrate and who can... it is linked to who can get job permits and who can immigrate... So they tend to come back four or five years later experienced...

Me: And they worked in bad schools so...

I2: As somebody said to me: A school in Parow is nothing compared to a school in London...

Me: I have heard that as well. Thank you. Next question: What is the departments' philosophy concerning the PGCE FET programme?

I2: Which department?

Me: The one you are in right now, like this unit that you are in ahm... what do you believe it is for ... the PGCE... what is it that you are trying to achieve...

I2: I've said that, Ill repeat it. For a vast majority of people the PGCE is a second option. You tend to find people will go and study something else, and then realize that is not for them and then the question becomes: Then what will I do? And one of the options then become a PGCE or people go and study something else with an interest in teaching, and then come to us. Ahm... or people will go and find work... or not find work and come back to us. So out of three, only one out of the three are positive. But that is not necessarily does not mean that you will have two kinds of teacher going out there negatively. Very often the kind of person that gets into teaching does it because they are sociologically forced. So our philosophy is accepting that people who haven't made it elsewhere, or decided not to make it elsewhere, needs... wants the second option. Ahm...

Me: So sorry, it is not linked to the economy necessarily, you are also saying that it is linked to the person?

I2: Its linked... I am sort of a Business Teacher by trade... there are psychological factors, sociological factors and economic factors. And very often a combination of the three gets a person in. Ahm... and each individual will have their own story to tell.

Me: So if I can say the worse it goes in the economy the better it is for the PGCE programme?

I2: From an economic perspective, that is what I am suggesting, ja.

Me: I am just double checking that that is being said.

I2: As the economy is doing this (draws a line graph going down in the air) the PGCE has been doing that (draws a line graph going up in the air). A couple of years ago I had three lawyers applying ahm... the number of engineering students that are applying ahm...

Me: Sorry, so if a Lawyer applies, what subjects would they go for?

I2: We would look at the BA, you see...

Me: I was just thinking what subjects a lawyer would be taking in the PGCE

I2: All three we didn't take in, but say BA Law, they would probably have English and Afrikaans as a major, or say BCom, they will have accounting and business as a major...

Me: How often do you have someone that has business and maths as a major?

I2: Here not often, at traditional universities quite often because at a place like [specific HEI] they have a Bachelor in Business Science, especially with an accounting major, it is a recommendation that you do maths. So... more so it would be accounting and maths than business and maths. Ahm... we don't get them at all here which is why I divide my ... just from a timetable perspective... my didactics into an A and a B. And Maths and Business is my two As. So it's Business and Maths and ... and the Maths and tends to go engineering or science and life sciences or science and biology. Were Business will tend to go with all the others.

Me: So just out of interest: You have got about 200 students?

I2: Last year 170.

Me: So last year you had 170. Do all 170 do the additional subjects at the same time...

I2: Ja...

Me: So they get to network with each other...

I2: Ja, there are 5 major subjects or rather 5 common subjects. Professional studies, Education, Educational Management, Language and IT skills. Ahm.. those they all do together and most get credit for IT skills. But they will sit in together as a group. And it is only for their curriculum studies, which we still call didactics that ahm... that they are separated.

Me: Ok...

I2: The philosophy though so... on the one hand is acceptance that people do not necessarily come for positive reasons. But, ahm... once here they need to accept that there is a policy framework within which we work and we will not compromise and there is an expectation of standards which we will not compromise. We are having an interesting situation now in that the year before last we took in the first couple of... Interesting O and T Office Management and Technology they tend to become... they are highly qualified secretaries and call themselves office managers but tend to find themselves jobs as secretaries. And if you look historically the O and T was the ND legal secretary studies of years ago. Their two majors is information processing, which is typing on a computer and business admin which is accepted for business studies. CAT is a school subject which has replaced typing. And what we have found two years ago is that a couple of people who had CAT majors, failed ICT skills competency test. And... they were registered so we let it through. They came from a specific University of Technology and we then ahm... like last year we didn't let any of them in (coughed). Last year we made it quite clear that if they fail we will make them deregister. Legally we would have had a problem as we were trying to force them. This year... but then we had the issue again of they... within six weeks or eight weeks of starting they were staying in a class... but they simply could not teach computers... because they didn't know the programmes. So this year we insisted that anybody who registered for CAT as a didactic does a competency test. And it is interesting how many people are failing and what letters we are getting from Fathers and Lawyers and threats and that kind of thing. So we cannot compromise on the standard. An very often people... you get a phone call to say that I just want to do the one year to become a teacher. And I... I reorientate them over the telephone so I'm... people come in not necessarily for positive reasons but once they are in here they either meet the standards or they don't. Ahm... we have about a 10% drop-out rate which is cool if you have 20 students as three or four leave. So I don't do maths very well. If you have 150 students and 15 leave... the question arises from management as to why. And we will... we accept the fact that you haven't made it as a engineer... you decide to go into teaching and suddenly you realize that it is not sitting back and doing nothing and having holidays. There is a lot of work involved. And very often after the first teaching practice we have and Exodus of about 10%. Ahm... within the classroom the philosophy is very specifically University of Technology orientated. If you look at our PGCE compared to [specific HEI], compared to [specific HEI], compared to [specific HEI], the internal philosophy is very different. And one of the reasons why we are sought after specifically when it comes to [specific HEI] and [specific HEI] students... they prefer coming here then to going to those universities. Although we all offer a PGCE FET ...

Me: And with the PGCE, how many students continue their studies further to Honours in Education?

I2: The vast majority...

Me: Do they?

I2: Ja... Ja... there is a challenge... what they can do in Honours is a challenge. And myself and [person's name] is having a nice little argument at the moment. You need to have passed the subject at BEd level to third year level. A person let's say who has got maths 3... and a lot of our maths students... in fact it is the first year for many years that we are offering BEd Honours in Maths and the key reason is our Mathematical Technology and Engineering students... Who are now following the PGCE with Honours in Maths. If you have... the major problem we have is with business studies... because most people end up with Business 2 and which is minimum entrance requirements... Tourism person for example has Tourism 3, which is the one didactic, but Business 2, which is your second didactic, which means you can't get into Honours Business Studies and that is a... so I tend challenge... for those people I tend to focus on the Honours in Educational Management... that requires two years work experience. But this year one of the Tourism people... and I know her and I actually coached her and gave her the right information and she is challenging the notion that if you have Tourism Management 3 and Business 2 you should be qualified to do Honours in Education in Business Management. But the vast majority end up doing Honours and a lot of them end up in Masters...

Me: Okay that is good... Then... just more to you personally now. How would you define and describe your teaching approach? Democratic... Autocratic... However... your teaching approach? Obviously in the PGCE context.

I2: Situational ed. Ahm... the... I am a management person by trade... I teach management and ahm... educational management is where my Masters was in so I don't believe in... that anybody is autocratic or democratic or Laissez Faire... you can be useless you can be what they call Alturistic... you can be dam useless and some of them work in this very corridor... ahm... I am one of them but I... When it comes to the PGCE...

(Knock on the door: "Person: I know you are busy... I2: Yes sir. Person: Can this client wait for you... it is about the specialization?. I2: Has Mr. (Unclear) spoke to you? That was the third thing I had to speak to you about earlier ? I am just busy with an interview? Person: I am sorry. I2: Give us another 15 minutes. Person: He must then just wait for you because I don't know what is the background and I am not the HOD, you understand? I2:Ja... Me: Do you want to deal with him? I2: You can supply us with the information... Let Mr. (unclear) wait because we are busy with this gentleman's PhD interview. Person: Then come back to my office then ok.. I2: Ill come to your office ja... (door closes)).

I2: Failed... and now suddenly doesn't understand why...

Me: Sorry the worst part when you are at a FET college when some people come to choose a career and they say: I want to become a doctor and you say sorry we offer Hospitality which has nothing to do with medicine. So what do you offer?

I2: Cooking

Me: So ja I will take that...

I2: In that case, or what we have... a college lecturer wanted to "smokkel" marks from me: "I got 44, just help me a bit". And I say if a student came to the college: "No you have to understand that we have a system" – "Well here we have a system too". Okay.

Me: Exactly. So we are going a bit of track here. So teaching approach...

I2: So in terms of teaching approach.. ahm.. PGCE is more Laissez Faire than for the rest. Laissez Faire very specifically in that it's not leaving students to do their own thing but it is providing them with the scope and parameters within which to operate. Many people think of a Laissez Faire approach to teaching as "let them do their own thing". With the PGCE we need to give them scope to be able to do ... their minds flow where it wants to go.

Me: Because they are already subject experts?

I2: Were it wants to go rather than... with a BEd they will for example in didactics they will be taught certain things in the first year, certain things in the second year, taught certain things in the third year... In the PGCE we will introduce them to the ideas which they will then utilize. . Ahm... more Laissez Faire than with the BEds... my own one I tend to move from ahm... pretending to be autocratic when we start ... and moving to a more democratic approach late in the year...

Me: As relationships are built?

I2: Ahm... as relationships are built and as people develop their own educational maturity. A lot of people come for negative reasons, a lot of people come because they just want their second year. And you actually need to... some of them you need to... some need to "skrik" to be able to move. The need to realize that they can fail.

Me: This is real

I2: They need to realize that there is such a thing as anywhere else as plagiarism. Ahm.. and... what I got away with as an undergraduate student... needs to... I am not just gonna sit out 8 months and then get my certificate. That needs to be...

Me: And the assessments, do they get three chances?

I2: All subjects are continuous assessment. So no, they don't get three chances. But all assessments are developmental. But there you pick up the problem. Ah... where a person "screws" around the first term and they end up with a 43% at the end of the year. The number of large muscular males who major in sport who have cried in my office is quite significant: "Maar Meneer, ek het rondgeneek in die eerste kwartaal". So to circumvent that I tend to lean towards autocratic in the beginning and soften up as we go through. It is linked partly to a person's own academic maturity, and partly to the requirement of the course so you know... you have 8 months to get a person a ahm... moving from say a cook to a cooking teacher... you go through that whole introduction mature decline relationship process in 8 months. One cannot have a leadership or management style with the PGCE... I tend to re-align it per class...

Me: Thank you. Now considering the PGCE programme you are involved in, please explain how it develops a teacher trainee's pedagogical knowledge. And especially within the practicum.

I2: We only focus on pedagogic knowledge. Ahm... they arrive as content specialists. So we... and this is the issue I was telling you about earlier concerning the CAT people. Ahm... I warn them... and that is part of my presentation on Monday for the new coordinator... is to explain to them how they got in. An to warn them that they are subject matter specialists... if a person stands in class and says I don't know... I'm practice teaching and during those few weeks they are doing ACCESS, and you say I don't know ACCESS... then you have no right to be there. So that is... that's autocratic... they come in as subject matter experts. The qualifications that they have... has certified them as content matter experts. If a person has Maths 2, Maths 1 they come with the school level stuff... so a person who has passed Maths 2 can't now come and say o well I don't really know Pythagoras ...

I2: Or I don't understand Probability, they can't come with that?

Me: Ja... because that is what you have got to go and teach. And then all we really do is we hone... we introduce the pedagogic knowledge skills and values. Which they then attach to their content knowledge. Ahm... I tend to say we have Professional studies... my subject which forms the backbone. That is general... general education practice, it used to be called in the old days ahm... general didactics, it used to be called ahm... curriculum theory, it used to be called ahm... teaching practice, it used to be called... teaching media, it used to be called teaching methods. Those things all together forms Professional teaching studies. And there we work through the general theory of the curriculum process. From the philosophies all the way down to assessments and management. Linked to that we then have the... and I sort of say left and right, we have the didactics, the curriculum studies... you say we are coming in with Maths... a Maths and Engineering person... you will then end up saying that Maths and

Engineering are your two didactics. You will then... within the Maths and Engineering didactics class be introduced to the school curriculum and the planning and... everything...within the first term, before the teaching practice, you will be introduced to the school curriculum in its entirety. And all you as a person should be able to do is say "I know that, I know that, I know that... oops, I don't know that, let me go and study. So we develop your subject specific pedagogical knowledge within the didactics, and then the broader issues, the management issues and the theory of education issues and so forth, we develop in the other subjects. Ahm... which is education, education having two sides which we call perspectives, which is a combination of comparative, philosophy, psychology, sociology, all those kind of things. Which we conflate into ah... into themes. And then educational management which is your classroom, institution and legal environment. So Professional Studies delegates you generic classroom pedagogic skills, values and attitudes. Your ahm... your two didactics looks specifically at the application of your subject matter expertise into pedagogic expertise and then there is the... the broader subjects which is the ... focus on the broader knowledge component of you as a teacher.

Me: And does the PGCE recognize the concept of specialized content knowledge, that specifically teacher held knowledge of a subject?

I2: That... that's the focus of the didactics. You will go and say do Business and Consumer Studies, and that's what you will focus on: Consumer Studies and on Business.

Me: Ok. Based on your experience, what subject content knowledge do you believe trainee teachers acquire from participating in the PGCE programme you are a part of? You already basically answered it, is there anything else you would like to contribute?

I2: No, categorically they arrive with their subject matter expertise. If they are not subject matter experts we cannot take them in. And that the policy determines... that's why they say a minimum entrance requirement is two subjects passed to second year level at university level. And universities have the right to add additional requirements. So we do not allow a person in if they are not already a subject matter expert. Which differs from the other PGCEs... [a specific HEI] offers a PGCE in senior and intermediate phase... and then they top up the knowledge. There is one exception in the PGCE to certain extent which is Life-Orientation, sport people come in but then we double up the periods where they... they know two thirds of the Life-Orientation syllabus. Ahm... and it needs to be topped up. So with the exception of Life-Orientation, people come in as subject matter experts.

Me: And they are treated as such?

I2: Yes

Me: Perfect. And is it possible to reveal any specific experiences that was aimed at developing the mathematics beliefs, or just general teaching beliefs, or the subject beliefs that they have?

I2: I can't speak for maths, but that is integrated in... that is an integral part of any teacher education qualification ...

Me: Do you have any examples of specific experiences that the students are exposed to, that specifically aims at their beliefs to change it, specifically practicums that are organized, or a specific outing that is organized?

I2: I don't understand then by what you mean by beliefs?

Me: Ahm... what they believe the value of education is, the purpose of education, to change, for example someone who has twelve years of exposure to teaching, they could have been good or bad exposure to teaching, now they come and do the PGCE, they have this whole thing about what teaching is...

I2: The philosophically correct answer there is "every minute of every day of the PGCE is aimed at that".

Me: It is aimed at that?

I2: A person comes in as a Chef, they leave as a cooking lecturer. What are they? And I have seen with one of my BEd part-time group: One person she is a lawyer working at the [specific TVET college], the other one is a chef working at the school of skill. Every now and then when they end up arguing, there status comes out. You can't tell me I'm a Chef, I'm respected in my line of work. I think they have developed a relationship since then. It was interesting watching them discuss that, but ahm... the PGCE... any... ja... is aimed at ahm... converting a person's identity from one into another. An ahm...

Me: So every minute of the PGCE is aimed at that...

I2: That that... you ... Ja... What you do is you take... say an engineer comes in... Are you familiar with the Activity Theory?

Me: Just explain it please again?

I2: Engelstrom?

Me: I have definitely read it, but I would like to know from your perspective?

I2: I don't have a perspective. He speaks about activity systems, engineering will be an activity system. And... take take... let's get back to a chef. The kitchen will be an activity system. There are certain tools, rules and division of labour. Ahm... a classroom has different... is a different set of rules, tools and division of labour. So what we are effectively doing is we are moving from... them from one work... one identity environment to another identity environment. This man is hopefully joining us as a Masters student soon, he is going to be looking at the Pedagogics... or sorry not pedagogics at pedagogy as a

method of doing that. So ja... one must realize that you are taking an engineer, chef, tour guide, sport scientist, ahm... and you are converting them into a...

Me: A nurturing caring teacher?

I2: A nurturing caring teacher then...

Me: Okay. Perfect. There we have that, Second last question and the last one is just an open ended one. Considering the context of the PGCE programme you are involved in, what support is made available to teacher trainees by the university to assist them with their studies? Like additional support provided, I know there is a library, as a walk around here I see there is some form of clinic around here...

I2: With the PGCE one doesn't need it. And I have learnt that over the years. The new course coordinator sat in that chair a while ago ahm... and asked me a couple of days ago about orientation. I run a two hour orientation programme and which she is now going to be doing. And she said 'but what about the library, what about writing skills?'

Me: That should be there.

I2: You know. The learning assessed... assumed to be in place is based on a graduate qualification. We are working with graduates.

Me: They have been in the university before so they should understand?

I2: Ja... ja... there are some issues around certain universities, there is for example one or two UoTs in the Eastern Cape where it appears they... they manage to qualify artists ... National Diploma in graphic design were a person can't paint. Art... painting or whatever... it has a specific subject name. Is one of the majors. It appears that they qualify O and T people who have never touched a computer... or can't switch a computer on they struggle to switch a computer on. They can't differentiate between ACCESS or EXCELL and WORD. So we get them sometimes and then we handle them one on one. Ahm...

Me: So the faculty basically takes this responsibility on to themselves?

I2: Ja, ja. So the model that we apply, the philosophical model that we apply... is an academic one. You are a graduate, you have worked through all this before, you should be able to do this...

Me: You should know what a university exists out of?

I2: Ja ja. If you don't know how to use a library, how... what... where have you been the last four years. If you don't know how to write an academic article, where have you been for the last couple of years?

Me: And psychology stuff, anything like that? Is there student support that type of thing?

I2: You see... Student support is around. If a person is about to ... to... excuse the pun: "blow a gasket", there is somewhere where we can go. And we keep a very open door... It was easier when we were smaller but it became difficult now that we are bigger. Ahm... PGCE students tend to be quit robust. They tend... you KNOW when there is a problem. And it is just difficult to say how, you know...

Me: And they are adults?

I2: You just KNOW that there is a problem. And ahm... they are very quick to share their problem with you. Ahm.. my challenge is often how to channelize the problem? The person who has learned how to teach business, will quickly realize that the Business Lecturer is not practicing what she is preaching...and then sort of have to take it back to the person and work it out. And so... the social models of student assistance that you have for undergraduate students ahm... we tend to not use and apply here. Ahm... and... so we apply the academic model: That person is a graduate and a certain level of skills, academic skills and writing skills and so forth... that you would expect from a graduate. Every now and then when you catch a person with... involved in plagiarism... and they say they "but I didn't know". I have developed over the years quite a heavy course guide, it is about 30 pages long, in which you try and work through a lot of this stuff. Because a person comes and says: "I didn't know I had to know everything about the school subject". We remind them, on various occasions. Or "I didn't know that you also apply the principles of academic writing here". So... and I would say "Nou lieg jy mos vir my?". We manage those as they come, but there is an acceptance that you are working with a graduate student and that is communicated with them. We work with adults and if you are not going to work with us as adults we are going to pick up a problem. Ahm...

Me: And employment, to assist them with that?

I2: Teaching practice tends to sort out employment. In fact... I don't have a problem with students finding work. I have a problem ... I've had a problem over the years with students wanting to go work in September...

Me: Because the school really wants them?

I2: Because the school really wants them...

Me: And the Alumni, does that ever play a feature for the PGCEs, is there...

I2: Yes... there... Ja. Ahm...

Me: Is there an Alumni specifically for the PGCEs?

I2: Not specifically no, but... go to [specific TVET colleges various campuses]. Mention my name, then you will see... We have had 20 years of PGCEs going to schools and colleges. Lesser schools because they are broader, but at the colleges they definitely. I mean we take...

Me: Sorry, so PGCE students have been doing practicums in FET or now TVET colleges for ages?

I2: Ja... If a person's subject leans towards a TVET subject, then I recommend that their second teaching practice they do at a college.

Me: So they do two teaching practices, beginning of the year?

I2: No, first four weeks of the second term, first four weeks of the third term. And remember... take something like business, a school employs one business teacher if they offer business studies as a subject. Your average place in [area name] and [area name], two thirds of the lecturers are qualified business teachers. Some PGCE students, BEd students and NPDE students are working primarily at colleges, more so than at schools.

Me: So PGCE and BEd?

I2: I mean ... the BEd that [person's name] runs is a BEd FET EMS, so they major in CAT, Business... so if you go for example to a... three quarters of the people working at [specific TVET college], from the campus manager ahm... to the post level 3's working with her, a number of Post level 2's and the lecturers either did a BEd here or a PGCE or a NPDE. Ahm... I had a funny experience last year were I went to see a NPDE student for teaching practices... we have a specific form... and the student went to one of his PGCE graduate friends and said "[name of interviewee] is coming, what should I know?". And he took out his PGCE stuff and said that is what he wants to know. "So I blew a Gasket and well he had to re-do it because his whole planning process was incorrect?

Me: Was it outdated?

I2: Ja... No, it serves a different purpose. A first year NPDE student we look for different things in a class than what we would look for from a PGCE student. So, there is no specific association of PGCE graduates, but ahm...

Me: But also the Alumni in general of [HEI], is it not really a big support structure for students?

I2: I am not a [HEI] graduate so I wouldn't know. Ahm.. I wouldn't know. But the informal network is quite strong... it is quite amusing getting there... I would go and visit one person and as the door opens close there is a whole range of people I will have to say hello to, simply because from Campus Managers all the way down it is graduates of primarily the PGCE...

Me: I see you've been here 20 plus years (referring to the long service award certificate on the desk/wall).

I2: Ja, that is about 19 years too long.

Me: Last question; any other relevant information that comes to mind concerning the experiences of teacher trainees during initial teacher education in the classroom context?

I2: You have got enough... If you want... I know have a better idea by what you mean by documentation. Identify what you want and most of it I have as PDFs that I can mail to you

Me: Perfect. Thank you, I will definitely make use of that.

I2: If you want to understand the PGCE, you must understand the policy framework. And ahm... you know... the evolution of the policy framework. If you "skeem" through the Norms and Standards' you will be ok, if you 'skeem' through the (unclear) you will be ok.

Me: Thank you (recorder off).

APPENDIX P: TRANSCRIBED NQT INTERVIEW (TELEPHONIC) SAMPLE

NQT Interview 1 (Telephonic):

Date: 26/03/2015

Duration: 25:09

(Phone ringing)

NQT: Hello

Me: Hi good afternoon, how are you?

NQT: I am good and you?

Me: Good stuff than you. It is Jacques Verster speaking here and I would just like to know if you are good for the recording now or are you a bit busy?

NQT: Ahm... don't I have to prepare the questions that you would be asking me?

Me: Most of it... it should be pretty general knowledge for you because you went through it. Can we try to go through some of the questions or would you prefer to go through it first?

NQT: Ahm... we can... you can come with the questions now...

Me: Okay, let's try it. Thank you very much. The first question, quite a simple one. It would be helpful if you would begin by describing your current role and how you came to occupy this position in education?

NQT: Sorry...

Me: For instance you are a teacher right now, how did you come to that role, what background do you have, what other experience do you have?

NQT: Oh, I don't have any experience...

Me: So you are a fresh graduate?

NQT: Yes, I am.

Me: So you did the PGCE and what degree or diploma did you do before the PGCE?

NQT: Before the PGCE I did the National Diploma of Mathematical Technology...

Me: In Mathematical Technology... So you have no work experience before this job as a teacher you have right now?

NQT: Ahm... well actually I won't call it an experience because it has a... it was in-service training where I went for six months. Actually less than that, it was five months. I went to Stats SA and I did a project.

Me: Okay. What was the project? What did it involve?

NQT: Well the project was about... I had to have questionnaires and have people... you know like what you are doing. I had to prepare a questionnaire and then give it to people to answer because I was under a programme called Maths for Stats.

Me: Okay, brilliant, and your teaching, where are you teaching now?

NQT: I am teaching at a High School called Nguvovu

Me: Okay, you said a high school...

NQT: Ja...

Me: Which grades are you teaching?

NQT: Grade 8 and 9 I have Natural Science and Grade 9 again I have a Math Class and in Grade 10 I have got Physics.

Me: Okay, so you do Grade 10 physics as well?

NQT: Yes...

Me: Okay, so you are more a physics than a Maths teacher in the school?

NQT: Right now, yeah.

Me: Brilliant and thank you very much. And how would you describe your teaching approach or your teaching style?

NQT: My teaching style?

Me: Would you say you are more autocratic or more democratic?

NQT: What do you mean by autocratic? Help me differentiate between the two so I can position myself?

Me: No problem whatsoever, autocratic like your way is the only way and you are quite strict and so on and democratic you let the children decide which direction the class goes in and so forth.

NQT: Ahm... so far I would say... the kids... most of my learners are a bit disruptive so I wouldn't say I give them... I try to divert classroom towards what I am trying to do and I do allow questions.

Me: Okay brilliant and the grade 8 and 9's are difficult I will agree with you there. It is a difficult group.

NQT: Yes...

Me: And how would you describe your first term of teaching as a classroom teacher? How have you found it?

NQT: The first term?

Me: Ja, now that you have been teaching for a term and you had your own class, how did you find it? Was it difficult... was it easy...

NQT: It was challenging. It was challenging and there was much to learn and there is a lot of work because I have to focus on familiarising myself with the content. Because I am a PGCE student and I have never been a teacher before and All I had was teaching practice which was for a month. For that month I only taught two classes and it is just... it was very limited because... I had to be teaching with teachers in the classroom and they would say that this is very hard. Some would go to an extent to show that this is how you teach. But now... here... I have to do things my own way and sometimes I have a lot of work to do because I have to control the books. See that the learners are doing their homework. And also time... the lesson time has got 30 minutes and it is not every day that I have a double period which is an hour. So I have to plan very carefully what am I doing today and how do I do it. And also another thing... I am trying to explain to you that it is challenging and ahm... you find that I have a diverse group of learners I have to manage and during the lesson I have to mark I have to set a memo, you know I have to do all these things and it is my first time so I try to juggle between all those things at the same time. So right now I can say that it is challenging. Every day that passes I feel more and more that I can do it much better...

Me: Thank you very much, brilliant. Next: Is it possible to reveal thoughts concerning the overall design of the PGCE programme that you have completed?

NQT: Ahm... the design?

Me: All those modules and subjects that you had to do, just overall the PGCE, did you find it useful?

NQT: Ahm... well yeah it did comprise of quite a few things. The administration part... I wish the teachers gave us an idea or gave us an example or a sample of how a class mark sheet should look like and what is expected of us to do. Because now when I come to the school and I just... It was my first time seeing that... it is not that it is complicated. It was just that it was my first time seeing it and you have to do it while under pressure. It was kind of difficult and I think that in the programme they could add that. This is how the template looks like or this is what they will expect you to do in it and also when it comes to controlling the... I think the major part of it would be the class mark templates, they can put it in somewhere... that would be good.

Me: Okay...

NQT: Another thing that they could add... Ahm... I think so far I have mentioned the major part.

Me: Thank you. So next question: What do you believe was CPUTs overall goal with the PGCE programme? Has that ever been communicated to you?

NQT: The what?

Me: The overall goal, the reason why the PGCE exists. What was the reason told to you?

NQT: I am trying to think about it... Ahm... I can't remember it being explained...

Me: So why do you think the PGCE exists? What do you think is the purpose of the qualification?

NQT: I have never thought of that. Ahm... I don't know... An example I did the National Diploma of Mathematical Technology course right and I didn't want to continue with that so I could do the PGCE.

Me: Okay perfect, thank you very much. The next question: How would you describe the teaching approaches of the lecturers in the PGCE?

NQT: The teaching approach?

Me: Ja, of the lecturers. Was there any specific lecturers that really stood out or...

NQT: All of them were different. There were those that were strict and those that... in their classrooms you felt more relaxed and felt you could interact with them.

(Phone died – ringing)

NQT: Hallo

Me: Sorry about that, I don't know what happened there. Sorry for interrupting you there...

NQT: O yeah, I don't think there was one that really stood out for me. I could go up to my lecturers and talk to them about what they were saying...

Me: Thank you very much. Next one: Considering the PGCE programme that you have successfully completed, please explain how it developed your pedagogical knowledge?

NQT: Ahm...

Me: How to teach? How much were you introduced to what to teach during the university days?

NQT: Well, pedagogical knowledge and where I am now?

Me: Yes

NQT: Okay, for me being a PGCE student I have never been a teacher and I didn't know much teaching except from the things that I know from being taught. I thought that it did a great job because it introduced me to what teaching is all about. And how I should do it... the options and that there isn't just one way. It didn't only give me one option.

Me: Okay...

NQT: You can do it in different ways. I think that part. That part was very clear especially because I didn't know anything about it.

Me: Okay, well done. And then what subject content knowledge were you introduced to during the PGCE?

NQT: What subject what?

Me: Subject knowledge, or content knowledge for Mathematics and Natural Sciences as you say you majors were. Were you introduced to any content knowledge during the PGCE?

NQT: Content Knowledge?

Me: Ja... the curriculum of the school, the actual content that you have to teach right now, were you introduced to any content?

NQT: No, no no no. They told us that we are the experts. So we should know the content already. It takes us back to ahm... why does it exist.

Me: Yes.

NQT: We are people that already know what we are doing because we are at a certain level so they didn't introduce us to anything. They would just by example say that we could do something like this... this is how you can do it but it wasn't anything specific, it was just an example. It wasn't anything big

Me: Okay, and your initial degree or diploma that you did, do you think that that equipped you adequately with content knowledge?

NQT: Content knowledge for what I am teaching right now?

Me: Yes.

NQT: Ahm... maybe in the first year yes... but... In the first year I learnt it to pass not learning it with my mind thinking I am going to be a teacher one day. I learnt it knowing that this is what I have to know now and I need it to move to the next year or the next semester. So that was my mindset...

Me: Okay, and you would say that the content during the diploma was good content? It is helpful today?

NQT: Ahm... no.

Me: And any of the textbooks and things that you used to finish the diploma and the PGCE, do you use any of them now in the classroom as a reference?

NQT: Do I use what?

Me: Any of the textbooks or notes that was given at university, during the diploma or the PGCE, are there any of those notes that you know find useful when you teach?

NQT: Ahm... no. The Stats part, I can say that those notes might help me because it is now part of the school syllabus. The only time I learnt stats was at university so I can say that that helped me in teaching now. Except... we didn't do Geometry in... I did Geometry at High School but at university we didn't do Geometry. And also if you look at... most of the things that we did at high school... It was like the high school content that I had was the basics, the basic basics of what I need to know in the university so it kind of helped me to be able to solve or understand the maths. But not that it was something that I can take and study. Maybe, well I haven't really met a question or content that I had to go (I told you that I teach grade 9 Math) and research for and search for the answer in my university books. I can't say that, not that I remember.

Me: Okay. Thank you very much. And were there any specific experiences aimed at changing your beliefs of what teaching is and what mathematics is for?

NQT: Was there any?

Me: Anything that happened during the PGCE that was specifically aimed at your believes about teaching and the value of mathematics in our society?

NQT: Ahm... I don't know if this will be right as an answer but... As a maths learner I felt that there was something more that needs to be taught in order for me to understand somehow... especially when I learnt that ahm... it is very important that the content be taught to the learners towards their everyday life. If you can find that connection between the two. Maybe it will be a bit more interesting. And also how to apply it. So when it came to that it showed that with mathematics it is not just about the theory but that there is also another part that is tied to everyday life. That made it a bit interesting for me to think that okay now in each and every lesson I have to make sure that the content that I teach to the learners includes something so that they can say okay this is how I can apply it to my daily life... I don't know if that is the right answer...

Me: Perfect, perfect, thank you very much for that. Next question: Considering the context of the PGCE programme that you have successfully completed, what support was made available by the university to help you finish your studies?

NQT: Ahm... I have a bursary, I applied for a bursary. Is that what you are asking?

Me: Ahm... The bursaries, and the library. Was it helpful? The clinics, student support, SRC, the total support structure, was it there for you?

NQT: Ahm... the library was... at the beginning of the year... or when we are not writing or when we don't have a lot of assignments, then that is when the library is helpful because there is a lot of books there. But immediately when there is tests or assignments everybody goes to the library and they take books. The books would be there but there would not be enough.

Me: Okay.

NQT: When it comes to the computer lab, ahm... Not all of us have internet or printers at home. When it came to printing you know sometimes you would find that the printers are not working. Or if they are the computer lab would be full and so you would have to use your own money to go print or you have

to wait for the long queue provided you did your work on time and you are ready to print. And ahm... when you do the PGCE you usually do it at night so transport... transport was not provided it is not...
 Me: Thank you, transport is not something I taught about, please continue...
 NQT: There was no transport so we had to find our own transport which was at some point... not that it was difficult but it was late at night. Maybe if they could have a school bus... we can pay it can go from the campuses to our homes... or even the residences. That could also... that would have been helpful in a way.
 Me: Definitely, and the clinic and student support? Did you ever visit them, were they ever relevant for you?
 NQT: No, I think the clinics and everything are available but there never was a point where I actually had to use them but they were available.
 Me: Okay, thank you. And sport activities and culture activities, did the university assist you to participate in any of them?
 NQT: Ahm... I said I was already a student at CPUT but from a different campus. I knew that in the university there was sports but I never went to join. The university or the lecturers never motivated us to go...
 Me: And the alumni, did they ever feature while you were a student?
 NQT: Nope, I have never met any of them in my life.
 Me: You never met any of them?
 NQT: Nope.
 Me: Perfect. Last question: Any other information that you have for me that you think might be relevant?
 NQT: Ahm... in the whole experience of being a maths teacher... ahm... I think that sometimes it is also helpful that... I think that the university should maybe do a six months mentorship where graduates can work hand in hand with teachers to see what is going on rather than just throwing you into the den of lions. At the end of the day you have to figure out everything for yourself. Teachers should get involved in helping new teachers and that would be good. There should be some kind mentorship...
 Me: So you would say that you were not introduced to any form of induction with the school that you are working at?
 NQT: Ahm... well in the administration part there was... but I expected more. It wasn't as I expected. But it was big but not so much...
 Me: So they basically took you to the class and said teach?
 NQT: (Laughing) So okay, I think after a week because when I went to the school they were writing their monthly tests. So I had to wait till after that but on the following week I had to go to class and I was told this is where you start and then you have to go teach
 Me: Thank you very much, it is really greatly appreciated. The moment the study is written up I will send you a copy via e-mail.
 NQT: Thank you very much.
 Me: Have a wonderful day (recorder off)

APPENDIX Q: TRANSCRIBED NQT INTERVIEW (FACE-TO-FACE) SAMPLE

NQT Interview 4 (Face-to-face):

Date: 27/03/2015

Duration: 41:39

Me: Baie dankie vir jou tyd, meneer is meer as welkom om te werk tussen in en so aan. Daar is 11 vroe met opvolg vroe tussen in net om seker te maak...

NQT: Okay

Me: Die eerste vraag, kan ons dit maar in Engels vroe?

NQT: Ja

Me: It would be helpful if you would begin by describing your current role and how you came to occupy this position?

NQT: Ahm... okay. I previously worked at a... a specialist in the telecommunications industry. Ahm... so after I started a business... it didn't go well. I looked for a job again and unfortunately there wasn't a job somewhere... someone then mentioned you know that a... don't you want to like lecture? So I came for the interview here and at that time there wasn't any other jobs. And they phoned to say: Listen here, when can you come in to start and a... the salary that they offered was very low...

Me: As supposed to your previous...

NQT: Ja, compared to what I earned I thought we'll I don't have anything else so let's go. And then I am still doing it, I am doing the same... the same place. So the reason why I decided to do the PGCE... it wasn't something that I planned to do but it "sucked" like sucked me in. So I thought: Okay, in order for them to pay me a better salary I have to do the teachers diploma. So I said kwaai man, since I have been here since 2011 and ah... I decided to do the PGCE last year. So that is basically the reasoning behind it. Because I've got a national diploma electrical engineering.

Me: Okay, from where?

NQT: From CPUT

Me: Okay

NQT: So I'm a old student. I mean you can see my student number 183 so it is from the 1980's. I did it in 1986.

Me: Okay.

NQT: From 1986 I studied electrical engineering there...

Me: So other work, It was the telecommunications industry before...

NQT: I worked in the telecommunications industry ahm... different telecommunication companies, transtel, emkom, heavy heavy in telecoms and then I worked for Vodacom for about 12 years.

Me: Sho, that is a lot of experience you are bringing to the table.

NQT: So I've got... it is like... honestly I feel like I am only using so much... but what can I do (laughing) You know? So Ja I felt that ah... I did some training when I was working in the corporate environment so I think I am a natural speaker. And obviously the courses that I did there was not recognised here. I've got a whole list of courses which are just irrelevant in this environment.

Me: Sho, so your role exactly here... you are a teacher...

NQT: I am a lecturer

Me: Subjects:

NQT: Well they through me into the deep end. I started off teaching maths, engineering science ah.. electrical trade theory and ahm... industrial electronics.

Me: On NCV or NATED

NQT: On NATED N1 to N3

Me: N1 to N3

NQT: Ja, So I teach... today I still teach all of them. Except I focus more on the electrical side because the trade is very... the lecturers seems to be quite scarce. So I focus on Electrical Trade theory N1 to N3 and Industrial Electronics N1, N2 and N3.

Me: Okay, and you whole plan to finish the PGCE, is there plans to study further to potentially work at CPUT or is PGCE the end of the line.

NQT: Look, I think with the PGCE was I didn't have money to do it and I applied for a bursary and I was fortunate and I got the bursary.

Me: Okay.

NQT: From I believe there was bursaries available so I did it. And I must add that I enrolled for part-time which was a two year course and I finished it in a year because they had mistakenly enrolled me for full-time. So I thought... Mr Smit said try it for a week and see how it goes. And the way the subjects was structured... it was actually funny. The part-time people they came before the full-time people. The course was somehow structured... so I thought what is the point I might as well stay then for the extra two. So I did the whole lot. I did full-time and I was working.

Me: And you coped, it wasn't too strenuous?

NQT: It was hectic in the sense that I worked here till two a clock and then I left here... to campus and that started at 15:00.

Me: The traffic...

NQT: Ja so... every day, four days a week.

Me: And there was no support with the petrol and the transport?

NQT: From who?

Me: From CPUT?

NQT: Ja it cost me a lot of money.

Me: I can imagine because it is a...

NQT: Ja it cost me... it was strenuous on the petrol bill although the fees where paid. So ja but I finished it hey.

Me: Well done...

NQT: Four distinctions

Me: Well done

NQT: So... and then you I want to go do the Honours and the Masters but time man. Time and money and also I don't see the immediate benefit. I am still waiting for the company to update my salary because they want a copy of my diploma...

Me: And you have to graduate first...

NQT: Which I must get at graduation. And the other problem is, I don't know if this is part of the question?

Me: Please continue

NQT: I just got an invite for graduation and graduation is gonna cost me like R550 just to hire the grounds and stuff for the night...

Me: But you don't have to go, you can still get your...

NQT: So I am not gonna go I am just gonna go pick it up...

Me: It just gets awarded on that day...

NQT: Ja

Me: You can always go and pick it up afterwards...

NQT: Ja, but I just thought when I read the first time, It was in Cape Tech in town. You just go in there put on the gown and you go and shake the rector's hand and take a photo and there you go. But now you must hire the thing (laughing).

Me: It's an industry

NQT: They are making money from it ja...

Me: Definitely, thank you. The next one: How would you define or describe your teaching approach? You mentioned a bit about you were in corporate training and stuff...

NQT: Ja... I did a lot of training courses in the corporate environment and ahm... work place interaction skills and those kind of things right. I think my Approach to teaching is very practical because I am a hands on guy. It is not like... I come from... I work from memory... You know so I visualise everything... If I explain something like a transformer or something it is... I have this practical memories and thoughts because I built stuff myself. I still build circuits...

Me: So you do a lot of storytelling based on your experiences?

NQT: Yes, a lot of storytelling based on experiences. Because on every aspect I can tell them a story basically of what had happened...

Me: And the lecturers that you were exposed to in the PGCE, has that influenced your teaching style, the way they were lecturing?

NQT: I enjoyed my studies in the PGCE because... and I enjoyed the fact that when I was lecturing and studying I could come back the next day and try that thing. For example, I still use a lot of those skills. I remember being in the Maths Didactics we did the different group styles like ahm... circle the sage... you know where you have group studies in the class where you break the class up in groups and you let the groups... you give them tasks to do and you put in a sage in. You know that one clever person. I still use it because I find that it works well. So it definitely enhanced my learning in... it's brought the teaching part of the job... I basically I came to the class and I worked from the textbook and explain from experience and got the student interested. But now I got that teaching expert part you know, things about curriculum ahm.. lesson plans. I remember the first time I came here lesson plans was... I didn't do lesson plans and I would stand there in the class. I would .. the first time I would get to a point where students will ask you something and you don't know... and they know when you don't know. And it works out when you plan your lesson. And you know it is funny because you would think that the old lecturers would do that but nobody actually could explain to you that. So yes it was for me it was... now that has to be done properly.

Me: Okay, fantastic. And how would you describe this first term of teaching now graduating from the PGCE, this first term that you have gone through now, has it been different from previous...

NQT: My load man... you see... the administrative part of the job has now become hectic and the load is heavy and I somehow felt that I couldn't really put all that teaching experience in. Like what I use to do, the previous one while I was studying: I gave them even tasks like make-up charts ahm... I gave them little... I broke them up into groups and gave them charts. I tried different things. It is almost like it gave me all these tools and I threw it in the class and I would see what worked. What is working in the class. And it is fancy things to have but not necessarily works in every environment. So it gives you that variety...

Me: So you would say there is a change in the way that you teach now after the pGCE then before you did the PGCE? There is a definite...

NQT: Yes, there is a deeper understanding...

Me: Deeper understanding...

NQT: Ja...

Me: But not all the tools are always implementable because of administrative...

NQT: One of the things that I am using now which I never used before which I found was very well ahm... is a flip-chart...

Me: Okay

NQT: And when we did media you know methods in media (laughing) in the course and I looked and there was only two flip-charts on the campus. Only two, can you imagine that... and it is supposed to be a teacher's aid. So I got an old flip-chart and I use it because it is excellent. I can page back all the time. It is better than a PowerPoint presentation because... you know with the power problems that you have... there is never a machine available...

Me: You might stick your memory stick into a laptop and suddenly it is deleted...

NQT: You know what I mean. So I can go to a class and I know that I can pull out that presentation now and I do not have to rewrite it... save time. And now because I am doing two classes teaching then same subject. So it saves... So I am using more media in the class.

Me: Okay

NQT: And ahm... I never knew you must start on the left hand side of the board. It is weird hey? You must start, when you write on the board, you must start from the left hand side and not on the right hand side. I used to start in the centre and move either way. But apparently you are supposed to start from the left to the right..

Me: And you found that that works better...

NQT: No, it doesn't really work for me. You know its...

Me: Something to keep in mind...

NQT: Ja, it something... it is nice to know what is supposed to work because obviously it has been worked out over years. There is a reason why they say you must start on the left towards the right.

Ahm ja...

Me: Unless you are doing a mind-map...

NQT: Ja...

Me: Perfect, thank you. Now is it possible to reveal your thought concerning the overall design of the PGCE? How the package it together, all the modules and the short courses they put together?

NQT: Mmm

Me: What is your opinion on that?

NQT: Look I did the whole thing one shot ah... It was hectic. I think it is... I wouldn't rate it as an easy course. Maybe somebody thinks you know it is a year these guys they don't deserve it. Because I heard it, there was even a Professor that came in and said straight away, this guy the Professor came in and said you guys you are not real teachers. I won't send my son to you as a teacher because I don't consider you teachers because you just come in and do one year and you want to be on the same level as a student teacher...

Me: Completely disregarding your initial qualification...

NQT: And I thought and I looked at this guy and I was going to respond, and I thought... and this is now a Professor at CPUT... and I thought I am not even going to bother talking to you... So anyway what I am saying: from my perspective having the knowledge and background that I have, looking at the PGCE, it is an excellent course. Ahm... it definitely gives you the necessary skills. You must remember that whoever does a PGCE is already an expert in their field.

Me: There you go...

NQT: The PGCE is not going to enhance... the PGCE didn't enhance my electronic or my engineering or... all it did was add that extra component to me... it's like telling me ahm... it just showed me the teaching environment. But enhancing the way that I teach my skill... ahm... in a academic fashion you know, that is what it did. It brought that component to it. So I think it was extensive, I don't think... I won't right it off and say it is an easy one year course. It was a lot of work because it's continuous assessment. I constantly... it is like you are never on holiday. You must remember I was never on holiday: When I was on holiday here I am going to college there, when I am on holiday there I am working here. And when you come back from holiday at CPUT they throw you just like that into

assignments. Now you must know that it is eight subjects it is eight assignments. And the deadlines are there and so it was hectic. But it was really a learning curve it was brilliant.

Me: And the assignments, did you find them worthwhile doing?

NQT: Yes, I keep some of my assignments the ones that... Although I found, my opinion, I just found that for the practicality of being an engineer practicality is important. I just feel that the marking... my marking wasn't... or maybe I was too practical. For example, there is an assignment. I asked the lecturer what do you want. He said he doesn't want more than three pages, introduction and then two tables. This is methods and media in the class. He wants to know, based on the topics that you teach, what media and method is preferable for each topic. So it makes sense to me because... it makes sense because let's say I am going to teach ahm... mathematics. Mathematics is best done on the board. So your media is going to be a white board or black board. I mean a movie... with mathematics you can't... you have got to do it practically. So playing a movie is not a practical media for mathematics. So I made a table up like this and it came... and I got... I just think that that guy is stingy with his marks... I got little for what I didn't understand why, I thought that it was practical. Because if I put that chart up here and I see okay today I am teaching that topic and then I can see what media I should use. To me it was practical but I got low marks. An I saw this other guy got high marks and I said can I just see and this guy had like ten pages. And I said but I asked you and you said three pages, you don't want a big long thing. So maybe in that regard the mark that you get for assignments can always be 'gippod' man. You know it is all about presentation and also the guy with the nicest paper gets a higher mark: Bottom Line. The nicest paper, even though mine was clean and neat and whatever. If you don't have nice bindings and stuff like that all plays a role.

Me: So it was very primary school?

NQT: Ja it still...

Me: So pretty flowers and things gets you a better mark?

NQT: Yes, that is a fact.

Me: Was that with all of the assignments or just specific?

NQT: Ja...

Me: All of them

NQT: Ja, I don't actually know if a lecturer goes through the actual content. I think a lecturer... he does but I suppose it is all about what you see...

Me: And the feedback that you get, because obviously you had some questions, where you given feedback?

NQT: I questioned that particular one and he said I must re-do it and I did re-do it but I didn't see him change the mark for it. But you know it is not a problem I passed so it was not really an issue.

Me: Okay

NQT: I am confident enough to know what I need to do.

Me: Definitely

NQT: So it is not really for me a major issue...

Me: Thank you for that. Now: What do you believe was CPUT's overall vision or goal with the PGCE?

NQT: I think it was just to bring expert teachers in. I think to... I think with the PGCE it is to take an expert in his field and give him that teaching background...

Me: And do you think they are doing that?

NQT: I think so yes because a teacher... a teacher is a natural thing man. I mean you can and sit and teach and learn for five years to be a teacher and still be a crappy teacher. So...

Me: So there is that X factor which you can't explain...

NQT: Ja, you get a guy who did... he is just an accountant but he is just a natural and he can explain his job. Then you get a guy who is teaching... who is learning to teach but he can't really teach anything because he doesn't have that... I think an expert in his field becomes a natural teacher, don't you think?

Me: It allows for storytelling...

NQT: Ja, but what is teaching?

Me: Exactly, it started around a fire telling stories, that is where it originated...

NQT: Exactly, what is teaching... if you think about how did the old people teach. They were the best teachers

Me: The hunting tales and the...

NQT: Hunting tales...

Me: War tales...

NQT: After the war they would sit on laps and they would tell a story, that is all that teaching is...

Me: Then children would know for example a Lion cam and they beat it this way so if it happens again they know how to beat it and the build upon experiences

NQT: Ja

Me: That is my opinion, obviously it is debatable.

NQT: Ja...

Me: Okay, next question. We already went inside there, but how would you define the teacher educators or the lecturers, where they more democratic or autocratic?

NQT: I think they were very autocratic...

Me: All of them

NQT: Ahm...

Me: So it was pretty much their way or the high way...

NQT: Autocratic with the teaching or the...

Me: With their general approach to you, how did you find your experience with them?

NQT: The different lecturers where different but generally autocratic in a sense of... I can understand why- they are dealing with over a hundred students so you can't expect full interaction, although there was interaction. It takes too much time if you have too much interaction. So I understand... autocratic... there is a... I can understand why they had to be autocratic in that instance because it was such a big class and they only have limited time so... ahm... I am okay, I am happy with it. For me, maybe because of my maturity... ahm... we were a very diverse class. From about 20 odd to about 50... I am not 50 yet but probably up till 50 odd...

Me: So everyone was represented?

NQT: Ja... and you could ask a question so I don't want to say that it was autocratic like you couldn't ask but... some lecturers you could ask more questions but some just came and delivered.

Me: And sitting with a 120 students, how was that, learning how to teach in that mixed...

NQT: Not bad...

Me: Not bad...

NQT: Not bad...

Me: Where there networking opportunities, obviously because there is a 120. So people form other schools and colleges...

NQT: It was like the normal dynamics of a class you know. You mix with who you wanna mix.

Me: Okay

NQT: Ahm... you will find... look it was diverse... it was a lot of blacks, a couple of Afrikaans, a couple of coloureds and... it's not just a racist thing, it is also a cultural thing. Like most of the coloureds where from up country, so they are different... they are just different to a normal city... ahm and you find that you mix with who you are comfortable with irrespective of colour. Like I had some buddies there which was black, Afrikaans, coloured, whatever... young. So it's...

Me: And you mixed outside the Maths, I am assuming you did Maths and Sciences as your major, or...

NQT: My didactics was mathematics and electrical technology.

Me: Did you move outside with people in other didactics or was it mainly the didactics stick with the didactics?

NQT: The... because I did a lot of subjects a few of the students who was in the class was in my didactics. So, yes... that was a smaller group so obviously it was more tight ahm... and then the electronic group was a very small group. You see that engineering... in fact in the electrical group I was the only... no there was two electrical people and the other one was mechanical and we were about four in the class. So you can see that the engineering is a very small area, mathematics is... was a very big area because you can teach it everywhere. Ahm... then obviously all the others were big groups. It was only the two didactics.

Me : Okay... Thank you for that... and you have sort off mentioned this already but just double checking in-case there is something else... Considering the PGCE programme that you successfully completed, please explain how it developed your pedagogical knowledge? You already spoke about the media, you specifically mentioned one style of organising the class...

NQT: It taught me about... ahm... classroom management, that is something that we also do. It brings things to the fore things that you maybe naturally did. So that you are more consciously aware of things that you are doing. Time management, classroom management, introduction, lesson planning, you know... classroom management, lesson management, those are important things that I now... I am even now I am busy with... you know what I am busy doing? I am busy writing a study guide...

Me: Okay

NQT: The reasoning why I am doing this is just to enhance my... ahm... how can I say... It is a lot of content man. I am doing it because I want to organise my mind better...

Me: So is the study guide for yourself or are you going to give it to the students?

NQT: No no it is for the college... My plan was to do it. So okay... the fortunate thing for me is my syllabus is entrenched in the book. Which means the guy who wrote the book took the syllabus and wrote the book. So you don't need four books to get the syllabus because it is in the book. So that is good because you can just take the book and you can teach, Module 1 Module 2 and it will just fall in line with the syllabus.

Me: And the students will have a resource they can actually work with.

NQT: Yes. So what I want to do... obviously now ahm... do a lesson plan for each one to just enhance my knowledge of the book. So that is why I am writing it.

Me: Okay

NQT: Ahm...

Me: And this was influenced by you completing the PGCE or... is this the work culture...

NQT: and money

Me: and money?

NQT: obviously, but I think its also... having done PGCE ahm... and all the assignments teacher you a lot about Word. So I don't want to lose my computer skills.

Me: You want to keep it up...

NQT: You know... I'm using this headings, you know when you write you... any assignment you use... have you ever used the automatic tables in here?

Me: Ja, the index it is brilliant.

NQT: And if you use the headings it updates everything and also puts everything in your index and content... in front, under your contents it will tell you what page it is also...

Me: Definitely, it updates that automatically...

NQT: It is excellent hey (laughing)

Me: It is amazing but you have got to play with it...

NQT: So what I am saying is all those skills I find valuable. So it is definitely.. it definitely enhanced everything.

Me: And the, what content knowledge was given to you during the PGCE, if any?

NQT: Regarding what?

Me: Your mathematics and electrical engineering, what or any content added?

NQT: No

Me: It wasn't needed?

NQT: No. It is just structure of content I think. Structure of content, setting up. Most of the assignments where teaching you things like... what assignment was: these are the SAQA credits, you must design a course based on that. So I feel at the moment that if you had to come to me: Mr. Dramat can you please, I want you to develop me training, I want you to develop training for this I would be able to confidently sit, analyse it and be able to write a training you know... for it.

Me: Jackpot, now any specific experience that you can remember in the PGCE that changed the way you believe or what you believe teaching is for and what mathematics is for, and electrical engineering, what it is for? Was there anything that dramatically changed your view?

(Silence) Nothing then (laughing) The purpose of Maths in society?

NQT: Okay maybe that yes. On a I want to say psychological level, ahm... what I have found about this job is that being an engineer you are involved in your technical knowledge but here you deal with people. So I think the people aspect of it and also what they expect from you as a teacher and what you can give. Ahm... I think that they expect too much but in any case it is a very rewarding job in the sense that you can see that... how important you are to a student.

Me: You said expecting too much, sorry for interrupting?

NQT: They... particularly I am talking about the perspectives class I had this conversation with a... the Doctor and she was saying that the new or the future is that they want inclusive education. With a they want a teacher or a lecturer to be able to deal with all these different aspects and we were talking about all these various aspects. For example disabled students, ahm... whether it be any kind of disability. And I thought about it because we have... I had an example of a student with an epileptic fit in the class or students with problems. You cannot have that student in the same class. You cannot expect a lecturer or a teacher to also be a therapist. That is why we have an officer... what is her name... she does, she deals with all the disabled students. I just thought with that don't expect too much from a teacher or lecturer in the class. I don't have time to interact with students on a personal level, although you have to be sensitive towards them. I will give you an example: We found a student in the class here, not in my class. A student that has fainted in the class and then it was investigated. Why is the student fainting in the class? And the Mother was called in and the Mother cried and said I didn't feed my child for two days.

Me: Mmm

NQT: She fainted because she didn't eat. Ho hectic is that?

Me: That is an unfortunate reality in South Africa.

NQT: So we decided as lecturers that we are going to start a soup kitchen. The problem now is people who have got food will also come. What I am saying is these are the kind of issues that I have to deal with (laughing) Hectic hey?

Me: Completely, it's... thank you for that... and then the second last question: The PGCE that you successfully completed, what support did the university give you? You mentioned there was a bursary, was there anything else: student support, was it relevant, alumni, the clinic or something. To finish the PGCE, what was there?

NQT: Like what?

Me: The library, was it useful?

NQT: Ahm... I took one book out of the library. Ah... the library was useful for that, what I needed it for. It was research, we had a problem with the research lecturer...

Me: Okay...

NQT: So I just took a research book out because I wanted to... I was at a point where the teacher lost me so I took a book out...

Me: What do you mean the teacher lost you?

NQT: Ah... You know when you get those lecturers that just doesn't... I don't know what it was but it wasn't just me it was the whole class and it was like a confusion. And I mean research is like really easy stuff. I am a natural researcher if I think about it. And ahm... I only got about 50 odd for research. But I mean I understand what research is about now. After I had gone and done my own research (laughing).

Me: But the research one, what assignment did you have to do?

NQT: I had to do a research proposal...

Me: Was it group work or...

NQT: It was group work but I did it on my own but she said she is going to penalise me because I am not doing it in a group.

Me: Do you believe you can do a proposal as a group?

NQT: Look here, I tried the group work ahm... I thought one of the younger guys said he was going to come with me. I said okay and I said what are you going to do, okay, and then I did my part. But his part was watered down. You could see that he didn't... that is what I don't like... because the one is always riding on the other one. So I don't have time for that so...

Me: A proposal is too small I would think for group work... personal opinion... I can understand a research project being group work...

NQT: The proposal... I don't know why... but I did it on my own ahm... after I finished I suppose I could have picked... I know where my weaknesses are with proposals. I would say I have a big problem with referencing people. So I think it was one of the reasons and I see if you want to be good with a Masters or Doctorate the more researchers you have... if you can put in a million research references your it...

Me: That's it...

NQT: You know you can say anything as long as you just say references guy there he said it, I didn't say it I am just using his words.

Me: Exactly

NQT: For me I don't find that because what are you actually doing. You are taking other peoples information and putting it in a piece of paper so I...

Me: Your voice only comes at Chapter five...

NQT: You don't have a voice really...

Me: Or you give suggestions during recommendations and conclusions

NQT: Yes

Me: The rest is not yours...

NQT: So what is the point, you didn't really do research in my opinion. Because I would do experimentation and I would say that this is what I found and this is what I did and there is my conclusion. I don't want to say that Piet Pompies said so and Kosie did this and that happened. I did this and this is what I found, these are my findings, somebody must come and challenge my findings. And prove it.

Me: To maybe help you that is why you look at other literature to see who is potentially arguing...

NQT: Ja, and doing a Masters or a Doctorate is actually just doing a Thesis which is this big thing where you analyse everything and put in this... and at the end of the day you know... I found that a problem but anyway that is not...

Me: Thank you for that...

NQT: I could probably go for that still, but I find the time and the effort involved and the amount of money...

Me: There are bursaries available just in case for Masters and at Doctorate level, I am not so sure about the other...but I know at Masters and Doctorate there are various bursaries.

NQT: But in what field?

Me: In education, there is a shortage...

NQT: Is there?

Me: So it is available there... but to go back, did you ever use the on-line library of CPUT?

NQT: Ahm... once I was looking for a research book, I was using the computer in the library. That is actually quit brilliant hey.

Me: But did you never use journals or go into their databases...

NQT: I wanted... I wanted... I did look for journals but unfortunately for the topic I chose there is nothing. That is the problem when you are doing research on something that has never been researched.

Me: But then it is grounded theory...

NQT: My proposal was: The impact of changes towards the NFS bursary conditions, when changes to bursary conditions affects attendance at this college. Because we have had a couple of unrests...

Me: I saw that the transport subsidy has changed, it is only for 10 km's...

NQT: Yes now that big change the students were moaning here... So my research proposal was on how the changes to the bursary conditions affects attendance at the Kayhelitsha Campus. So the only references I could find was minutes of a meeting and a couple of other colleges newspaper articles. But no journals that really did...

Me: There must have been some international journals but maybe not specifically in the South African context?

NQT: Ja, but I did use it and I found... like I said I now know that you can do something like that. It is like I didn't know that before and ja I have a basic understanding of research...

Me: And the alumni, because you were an ex student and you came back, have they featured in your life so far?

NQT: Alumni... I just use to get alumni letters because I am an old student. But never really, I just got the dear student you are part of the alumni what what and that is it. But while I was studying nothing to do with the alumni...

Me: Okay, because I know that sometimes being a alumni you get discounts on your further studies at the university...

NQT: I didn't know that because I am an alumni before I studied.

Me: So there wasn't maybe any additional bursaries or something because you were an alumni. I know because I did my Masters at the University of Johannesburg and because I did the BTech, their was alumni and you automatically got a R1000 rand off.

NQT: Oh...

Me: So student support didn't really feature and obviously you were too busy to participate in any sport or culture things that were possibly offered.

NQT: Nothing, just coming in for classes and that was it.

Me: Jackpot. Last question: Any other relevant information that you think you have concerning the PGCE that you did in 2014?

NQT: Ahm... information?

Me: Anything else, obviously you have given me a lot, I am not implying that there was not enough given. This is just a closing question to see if there is anything else you would like to say

NQT: Nothing specifically comes to mind that I can think off. Ahm... it was great to be a part of that, it was a nice team of people. But you can see that ahm... we really need good teachers in this country. Our future lies in education. The one thing I realised which is, you realise the impact of education on the country as a whole. You realise how dire the situation is in this country.

Me: And how dependant it is on people...

NQT: And I don't know how they are going to sort out this problem that we have with education here. But the need people, they need people that can guide them. People that can implement. It is one thing to talk, but to implement...

Me: Definitely, and with the PGCE is there anything that you wish they could have added or excluded last year? Is there something that you think it would have been better if they added this or excluded this? Is there anything...

NQT: There was so much information already, I can't think of anything...

Me: And all of it was useful, there was not one subject that you think they could have maybe left?

NQT: They covered everything as far as I am concerned. I think it was... my opinion... initially I thought these guys you can see they have been doing this for years, they've got everything in that is relevant. The law, the country law, the basic law, the law of a teacher, the rights of a teacher, the rights of a child, a student, a parent. You know when you come out what is your rights as a lecturer. What is your role as a lecturer or teacher. What is expected of you from... you know you are the parent or guardian of the student. That is why a lecturer cannot have a relationship with a student. And you can see why because they really hang on your every word. It is really a position...

Me: You are an authority figure...

NQT: Ja, it is not just an authority figure it is like a Father... not a brother its a Father something figure. Me: It is an intense trust relationship.

NQT: Yes, it is almost like whatever you say to the student they take it to heart or whatever. So ja it is one of those things that you see man. That comes out and you know that this is your job and this is how... why you need to behave in a certain way.

Me: Ja okay, thank you very much. There we go, Thank you very much for your time.

NQT: Maybe it is too much

Me: No no (recorder off)

APPENDIX R: TRANSCRIBED NQT INTERVIEW (WHATSAPP)

Interview 6

WhatsApp interview

Date: 28/03/2015 & 01/04/2015 & 02/04/2015

(The NQT requested for the interview to be done in Afrikaans. Originally scheduled for 17:00 over the phone on 28/03/2015. NQT suggested we try doing the interview over Whatsapp. The following is the Whatsapp interview)

NQT: Is daar geen manier hoe jy dalk die onderhoud oor Whatsapp doen nie. J sal meer kry oor whatsapp?

Me: Ons kan probeer. Vraag 1: Dit sal help as jy kan begin deur jou huidige onderwysrol te beskryf en te verduidelik hoe jy die pos bekom het?

NQT: Hoe ek die pos bekom het: wel ek was onderwys department to ekt n bietjie gesels saam die span daar en hulle het skool hoofed om te vra hoe poste lyk. En toe kry ek n kontrak npos by John D Crawford. En ek pas baie mooi aan. Althowel ek ni my major vakke aanbied ni. Kom eke k goed oor di weg. Ek gee Natuurwetenskap vir Graad 7 (1 klas). Natuurwetenskap en teg vi grad 6 (3 klasse). Life skills vi grad 6 (3 klasse) en dan social sciences grad 4 (3 klasse). Du swat ek huidigek doen. Skool hoofed gebel.

Me: Dankie die idee werk goed. Opvolg vrae: wat was jou oorspronklike kwalifikasie wat jou toegang gegee tot die PGCE? Watter ander werks ondervinding het jy? En laaste hoekom het jy besluit om by CPUT die PGCE te doen?

NQT: National Diploma: Mathematical Technology. (Vir 3 jaar). Wel na di 3 jaar van leer het ek vir n maand by Edgars gewerk. Daarna +-9 maande by shoprite warehouse. En dan was dit my internship by Stats SA vi 6 maande. Dus al werks ondervinding. Dus juis omdat ek nie werk gekry het ni. Het ek soe bietjie ekt a klasse aangebied en soe klein bietjie n passie ontwikkel vi teaching. En toe maar besluit om dit te doen.

Me: En hoekom specific die PGCE by CPUT en nie een van die ander universiteite nie?

NQT: Wel ekt my 3 jaar by CPUT gedoen. En ek was ni juis lus vi nuwe environment buiten cput sin ni. Was gewoon aan cput se setup.

Me: Goeie antwoord, dankie. Vraag 2: Hoe sal jy jou klass gee manier/styl beskryf? (Sien jy jouself as demokraties of autokraties? Verduidelik asseblief kortliks hoekom?)

NQT: Hoe "sal" ek dit gee of hoe gee ek dit?

Me: Voorbeeld: hoe maak jy klass reels en hoe pas jy die reels toe. Hoeveel se het kinders in jou klas en sulke dinge (hoop dit help?)

NQT: Ek is n nevermind person. Soe ekt maar baie min reels in my klas lol. En wat ek maak is. Ek observe di ander onderwysers en dan probeer ek dit in my klas uk. Van di maniere help van dit help ni. En hoe mean u sien ek myself as demo of auto.

Me: Verduidelik asseblief die demo of auto voorbeeld?

NQT: Ek sal se demo. Ek hou baie van span werk. Maak als ligter/makliker. Is dit reg geantwoord? Hoeveel vrae nog? Ons kan mos die onderhoud verdeel? Ons nog net twee vrae gedoen.

Me: Natuurlik kan ons dit verdeel. In total 11 vrae (soms is dit nodig om ekstra vrae te vrae om seker te maak ek verstaan die antwoorde). Sien jy kans vir nog n vraag?

NQT: Jip os kan nog twee doen. Dan is dit mos 4. En dan 4 en 3

Me: Jy is n ster. Vraag 3: Hoe sal jy jou eerste termyn van klass gegee beskryf? (Was daar n formele "induction" program? Was daar n spesifieke onderwyser aangestel as jou mentor?)

NQT: Dit is baie heerlik. Ek geniet my. Die werk wat ek aanbied is intresant. Is net ek het n bietjie van n problem as dit ko by di discipline van die leerders. Ek dinki daar wees soe program ni "formal induction". Hulle het nou ni gese dat dit my mentor is ni maar die een mnr help my met baie. So eek neem aan hy is my mentor.

Me: Bly om te hoor jy geniet dit! Vraag 4: wat is jou opinie oor hoe die PGCE saamgestel is? (Was al die kursusse relevant vir jou?)

NQT: Natuurlik is daar baie dinge wat irrelevant was vir my. Maar ek dink dit is daar vir n rede. Ek dink die PGCE is goed saamgestel. Di program gee jou genoeg om di "real ding" te doen.

Me: En jy doen nou die "real ding". Dankie, dit was 4 vrae. Ek gee solank die volgende vraag. As jy besluit dist yd vir die volgende rondte dank an ons begin met die antwoord? Hoop dis reg met jou

NQT: Jip in di hak.

Me: Vraag 5: wat glo jy was CPUT se groot doel met die PGCE programme? (Was die PGCE wat jy ver wag het en na verlang het?)

NQT: ek dink om mense geleenthede te gee. Vir al ssos my geval. Ekti werk gekry met my qualification ni. En toe "jump" ek suma in di onderwys. Baie "kwaai" bridging course. Lol ekt total en al

iets anders verwag. Ekt gedink ek sal relax relax deur di course. Maar di course was tough vi my gewees.

Me: Dankie vir die spoedige antwoord. Is dit moontlik om te verduidelik hoekom die PGCE tough vir jou was?

NQT: Eerstens. Di take wat gedoen was, het due dates gehad wat op meka was. Ek dinki juis hulle het n assessment programme ni. En dan was baie groot en onnodige woorde gebruik wat ek moeilik gevind het om my take te doen. Ma dank God eks kla. Lol

Me: Dit is lekker as mens klaar is!

NQT: Dit is. Jy kan maar verder gaan. En kyk hoe ver kom ons. Di telefoon interview sou alweer kla gewees het.

Me: As jy weer tyd het, die volgende vraag. Vraag 6: hoe sal jy die "lecturers" in die PGCE se manier of styl van klas beskryf?

NQT: Stuur maar al die vrae

Me: Ek sal aanhou stuur dankie (sal net eers kans gee dat jy antwoord voor ek stuur).

NQT: Ek sal specify wate vraag antwoord ek. Maar stuur ma al di vrae. Kan jy ni die res van di vrae email of stu as a picture ni? Ek wil di onderhoud kla maak maar di whatsapp besigheid werk nou te lank lol.

Me: Ek kan e-mail as jy vir my n e-pos address stuur.

NQT: Cohlenf2@gmail.com

Me: Ek het gestuur. Laat weet hoe ek kan help! Geniet jou Saterdag.

NQT: Thanx. J uk.

NQT: I got the email

e-mail content send:

Dagse,

Die vrae:

Vraag 6: Hoe sal jy die "lecturers" in die PGCE se manier of styl van klas gee beskryf? (Het enige van hulle manier of styl jou manier of styl van klas gee beïnvloed?)

Vraag 7: Verduidelik asseblief hoe die PGCE jou "pedagogical" kennis (hoe om mense te leer kennis) beïnvloed het? (Watter rol het die praktiese periode gehad om die moontlike klass kennis en praktiese kennis te vereenseldig)

Vraag 8: Verduidelik asseblief hoe die PGCE jou vak kennis beïnvloed het? (Watter rol het die praktiese periode gehad om die moontlike klass kennis en praktiese kennis te vereenseldig? Was die vak kennis wat opgetel is tydens die Diploma: Mathematical Technology genoeg volgens jou?)

Vraag 9: Was daar enige spesifieke insidente wat jy kan onthou wat gemik was om jou "beliefs" in wat onderwys is en die doel van wiskunde in die gemeenskap te beïnvloed? (Wat glo jy is 'n onderwyser en wat die doel van wiskunde in die samelewing is?)

Vraag 10: Watter hulp was tot jou beskiking om die PGCE te voltooi? (Het die volgende 'n rol gespeel, "bursaries", "Library", "Student support", "Student representative council", "alumni", ensovoorts? Indien well, verduidelik kortliks hoe effektief die hulp was)

Vraag 11: Is daar enige ander informasie wat jy glo is relevant aangaande jou ondervindinge met die suksesvolle voltooiing van die PGCE in 2014?

NQT: (send all the questions above via Whatsapp) Jamer.

NQT: Vraag 6: van die lecturers was baie "unprofessional" in die sense van, Sommige tye klas tye en dan die manier hoe hulle klas gee. En daar was egter klagtes oor hulle. En dan was daar daardie lecturers wat baie "leka" en dinge wat saak maak saam os gedoen en gese. Bv. As os assess moet os assess dit wat os ge-teach het. Want baise van di onderwysers is lui om vraestelle op te stel dan vat hulle suma n vraestel en dan is daar suma afdelings in die vraestel wat j self nig e-cover het ni.

NQT: Vraag 7: weereens dink ek die program het my genoeg geleer. Ekt in itally niks geweet van die verskillende recipients (leerders) en hoe j elkeen moet leer. Maar PGCE het laat ek als verstaan en date k dit nou kan toe pas in my klas. Vir my self het due praktiese periode amper niks invloed gehad nie. Dit was hopeloos te min tyd. Ek ekt nog van daardie tyd n week uk gevat wat niemand eers agter gekom het ni. Ekt maar self weer vir my opgeskerp vanjaar toe ek begin?

PGCE het total en al niks vak kennis bygedra ni. MATH TECH dink ek was genoeg. Os het vi drie jare lank hoer wisk en eco gedoen. En os matriek vlak wisk en eco of vak kennis was oorgenoeg.

Die doel van n onderwyser is om kinders te help. En om beter n beter lewe of die geleentheid vi elkeen te gee om n beter lewe te he. Doel van Wiskunde. Ek dink almal het maar daardie basiese wisk nodig want dus oral in vidag se lewe. Ek mean as j gaan shopping doen en kani prices compare of tel ni. Watso jo kanse dan om te loose. Die doel is seke maar net om daardie basiese wisk agetrgrond te he om te lewe ann te pak.

Laaste twee replies was vi vraag 8 en 9.

(Vraag 10) Ja, dit het n rol gespeel. Ek sal se hulpbronne was tot my beskiking. En als was daar op kampus en gerieflik naby. Maak n voorbeeld van die library. Al die boeke wat ek seek het ek gekry. Dit was baie effektief. Bursary was ook effektief baie gou ytbetaal ens.

Vraag 11. Ek weet nou ni. Meskien moet ek noem dat die introduction to research nogals my tyd en geld gemors het. En hulle vi almal gewyer om exempt te word. En die meeste van die klas het klaar dit gedoen en moes dit wee doen. Dus seke maar al wat ek onthou.

Se maar as ek ni van die vraagies leka geantwoord het ni. Ek hoop jy kry die boodskappe. N onderhoud is nogals leka. Thanx.

Me: Jy het die vraagies baie lekka beantwoord, baie dankie. Opvolg vrae ten opsigte van jou antwoorde:

1) Verduidelik asseblief die klagtes oor lectore as jy kan?

2) Is dit moontlik om voorbeelde te gee van wat die "leka" lecturers gese of gedoen het?

NQT: Die gehalte van klas gee is ni op n vlak van n doc ni. En lecturers wat ni ytkom nim

Me: 3) Die week af van die teaching practise – hoekom, volgens jou, het niemand dit agtergekom nie?

Hoe het jy die papierwerk voltooi aangaande die practise?

NQT: Ok. Eks besig om rapport yt ted eel. Gan later reply

4) Verduidelik asseblief hoe jy jouself opgeskerp het in die begin van die jaar? (Het enige PGCE notas ens jou gehelp?)

5) Math Tech – Is eco economics?

Jammer oor so baie vrae, beantwoord hulle wanneer jy tyd het en sterkte met die rapport.

NQT: 'Leka' lecturers – die manier van klas gee. J voel leka 'vol' as j daar yt loop. J wil in hule klasse wees

CPUT se record houding was seke ni reg ni. Ek hou baie van admin werk soe ekt dit in n 'jiffie' kla gemak

Me: Dankie, goeie verduideliking

NQT: Ek moet se ek was n nerve reck in di begin. Maar soos dit maar gaan by elke werk. J raak gewoond. Ekt nix notas gebryk ni. Ekt dinge gevat soos dit kom.

Eco aka economic yes.

Me: Baie dankie vir die antwoorde, lyk my ons is klaar.

NQT: Baie dankie vir di geleentheid. Ekt dit geniet. En sterkte met thesis! Al swat mooi is.

Me: Sterkte met jou loopbaan en binnekort is jy aan die kant van jou thesis.

NQT: Thanx

APPENDIX S: CODING SCHEME

Chapter 6: PGCE FET mathematics structure and goals

Sub-question 1: What can a students expect when pursuing the PGCE ITE route in terms of the selection process, modality, curriculum and assessment

Code	Theme	Category
PGCE structure and goals	Selection of students	PGCE (teaching) was chosen by those in need of a second career option
		PGCE spaces increase annually due to DHET and HEI demands
		HEI diploma graduates meet PGCE entrance requirements
		Bursaries are available for most (not all) qualifying students
	Modality of PGCE	PGCE is maximum eight months in duration to deliver engagements equivalent to a four year B. Ed.
		PGCE modality is guided self-study
		Guided self-study anchored in three assumptions (potential misconceptions)
		Guided self-study assumed to be supported by one-on-one consultation sessions to an ever-increasing body of students
		Orientation assumed to adequately clarify demands attached to the PGCE modality
		Guided self-study during TP assumed to be supported by three HEI templates and a TP coordinator to promote programme coherence
	PGCE curriculum	PGCE mission is to convert a graduate in a specific field of expertise into a teacher by only focusing on PCK
		PGCE curriculum specifics dependent on teacher educators' discretion, policy guidelines and student expectations
		Mathematics didactics focused more on subject administration and general education theory
		Introduction to research mainly focused on completing a research proposal
		Perspectives on education focused on inclusive education and psychology
		Language development and communication focused more on English in the business world
		Professional studies served as the backbone of the PGCE by focusing on professional teaching practice
		Education management focused on policy, management and learning facilitation (professional teaching practices)
		Life skills-ICT skills could be delivered as a compulsory didactic C (CAT) module to develop TPACK
		Health and safety in education could be delivered as a compulsory didactic D (life-orientation) module to enhance links to education
		TP curriculum offers a summary of the PGCE curriculum
	Assessment process	Continuous assessment (tests, assignments, HEI templates and presentations) used with limited re-assessment opportunities to maintain high standards
		Distinction (minimum 75%) only achievable with initial submission (second submission acknowledged but original pas mark remained)
		'Paper heavy' assessments could be revised and delivered by means of ICT resources (such as a tablet/laptop)

Chapter 7: PGCE context specific policy stipulated teacher roles

Sub-question 2: What policy stipulated teacher knowledge, skills and attitudes were actually developed during the PGCE?

Code	Theme	Category
PGCE context specific policy stipulated teacher roles	Specialist in a phase, subject discipline or practice	Specialist in a subject discipline or practice is able to conduct self-study to overcome emerging CCK gaps
		Specialist in a subject discipline or practice is able to develop simplified examples in addition to examples found in textbooks
		Specialist in a phase is able to link prescribed curriculum to real life scenarios to maintain learners' interest
		Specialist in a phase is able to realise specific change in learners as guided by curriculum documents, curriculum theories and past (and present) experiences
	Learning mediator	Learning mediators are able to compile a subject portfolio file indicating how they select, sequence and pce the delivery of curriculum content
		Learning mediators are enthusiastic, flexible and approachable in terms of selecting the best method to satisfy both subject and learner needs
	Interpreter and designer of learning programmes and materials	Interpreter of learning programmes and materials is able to select and use the most suitable accessible media to satisfy both subject and learner needs
		Designer of learning programmes is able to write a training manual and a study guide
	Leader, administrator and manager	The role leader is able to participate during meetings and to influence school/college management to purchase additional media
		The administrator role is being literate in Word, Excel, PowerPoint and Access to complete PGCE assessments
		The manager role includes being able to create and manage safe environments conducive to learning by doing lesson planning and setting class rules
		The manager role includes maintaining classroom discipline by moving around, providing examples and asking questions to retain learners' interest
	Scholar, researcher and lifelong learner	Limited verification of highly developed literacy, numeracy and ICT skills because it is assumed to be developed during the recognised diploma
		Personal, academic, occupational and professional growth influenced by the PGCE modality of guided self-study and continuous assessment
		Reflective skills to understand successful and unsuccessful aspects influenced by completing a reflection template
	Assessor	The assessor role includes analysing reliability and validity of existing and designed assessments in terms of levels, outcomes, standards and suitability
		The assessor role includes interpreting assessment results to provide constructive feedback and influence future lesson planning and delivery
	Community, citizenship and pastoral role	This role was influenced by overcoming negative attitudes and misconceptions relating to teaching as a profession
		This role was influenced by introducing theories and discussions focusing on inclusive education and creating a caring classroom environment
		Professional ethics and behaviour involves awareness of required actions and conduct to retain learner and community trust

Chapter 8: Constraints in the PGCE FET mathematics programme

Sub-question 3: What are the constraints of the PGCE FET mathematics programme as identified by those who undertook and facilitated it?

Code	Theme	Category
Constraints as identified by those who undertook and facilitated it	'Selection of students' constraints impacting the PGCE structure and goals	Limited to none advanced standing or credits for short courses and diploma modules
		The increase in spaces without increasing time dedicated to the PGCE potentially restrict clear and intended links between all components
	'Modality' constraints impacting the PGCE structure and goals	Lack of oversight concerning the implementation of HEI policy stipulations potentially restrict clear and intended links between all components
		Part-time aspects potentially restrict clear and intended links between all components including support structures
	'Curriculum' constraints impacting the PGCE structure and goals	Lack of standardised PGCE curriculum related verbal and written communication potentially restrict clear and intended links between all modules
		TVET college context specific PGCE FET mathematics programme is needed
	'Assessment' constraints impacting the PGCE structure and goals	Limited use of prescribed materials, journal articles and 'Blackboard' potentially restrict clear and intended links between all components

Chapter 9: Equipping NQTs for the classroom context

Research question: How does the PGCE FET mathematics programme equip students with the knowledge, skills and attitudes to function as a NQT classroom teacher?

Code	Theme	Category
Equipping NQTs for the classroom context	The PGCE process of learning to teach	The PGCE FET mathematics programme structure and goals
		The PGCE FET mathematics programme process related to equipping NQTs with planning related knowledge, skills and attitudes
		The PGCE FET mathematics programme process related to identifying, developing and using learning and teaching resources
		The PGCE FET mathematics programme process related to using reflection to develop and refine a philosophy of teaching
		HEI support structures in the PGCE FET mathematics programme context
	PGCE teacher knowledge, skills and attitudes descriptions	TPACK as developed in the PGCE
		PCK (KCL and KCT) as developed in the PGCE
		SMK (CCK and SSCK) as developed in the PGCE
		VPRO as developed in the PGCE