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KWAZULU-NATAL**

**INYUVESI
YAKWAZULU-NATALI**

**EXPLORING TEACHER LEARNING THROUGH CONSTRUCTION AND USE OF
TEACHING RESOURCES IN AN ADVANCED CERTIFICATE IN TEACHING (ACT)
PROGRAMME AT UNIVERSITY OF KWAZULU-NATAL.**

BY

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DECLARATION

I, Violet Makwara, declare that **“Exploring teacher learning through construction and use of teaching resources in an Advanced Certificate in Teaching (ACT) Programme at University of KwaZulu-Natal”** is my own work, and that all sources consulted and quoted have been indicated and acknowledged by means of complete references.

I further declare that this research has not been previously submitted for the award of a degree at another university.

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ABSTRACT

Insufficiently trained teachers at the foundation phase (FP) may delay the realisation of quality education for all. Therefore, having adequately trained teachers for the foundation phase sets a solid foundation for children's learning in later phases. The aim of this research was to gain an insight into the kinds of knowledge the FP teacher-students on the Advanced Certificate in Teaching programme at the University of KwaZulu-Natal learnt, the ways in which they learnt and how the learning improved their practices through the construction and use of teaching resources. A qualitative research design within an interpretive paradigm was adopted for this study. Fourteen (14) teachers were conveniently sampled to explore their views on what and how they learnt through the construction and use of teaching resources. Semi-structured focus group interviews, lesson observations and photographs were used for data generation.

The results of the study revealed that the teacher-students acquired mostly General Pedagogical Knowledge and Pedagogical Content Knowledge although they also confirmed that they learnt Subject Matter Knowledge and Knowledge of context through accommodation and assimilation. Furthermore, the teachers said that their practices improved from constructing and using teaching resources in their classrooms.

Based on the results of the study, it was therefore recommended that FP teachers should always use appropriate teaching resources in order to accommodate all children. This would make learners responsible for their learning as they could also discover new knowledge. However, as this was a small study, more comprehensive research into teacher learning at the foundation phase was recommended.

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DEDICATION

This work is dedicated to my husband Cephas, as well as my lovely children Charlene, Cephas Junior and Anotida Cebo, who allowed me time and served as a constant inspiration to work towards the completion of this work.

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LIST OF ACRONYMS

ABET	Adult Basic Education and Training
ACT	Advanced Certificate in Teaching
CCK	Common Content Knowledge
CRA	Concrete Representational and Abstract
DOE	Department of Education
ECD	Early Childhood Education
FET	Further Education and Training
FP	Foundation Phase
GPK	General Pedagogical Knowledge
HSRC	Human Sciences Research Council
JPTD	Junior Primary Teachers' Diploma
NPDE	National Professional Diploma in Education
NQF	National Qualification Framework
PGCE	Post-Graduate Certificate in Education
PCK	Pedagogical Content Knowledge
SCK	Specialized Content Knowledge
SMK	Subject Matter Knowledge
UK	United Kingdom
UKZN	University of KwaZulu-Natal
US	United States

CHAPTER ONE

1.0 Introduction

This research explores teacher learning from the construction and use of teaching resources in an Advanced Certificate in Teaching (ACT) Foundation Phase (FP) programme at the University of KwaZulu-Natal. In this chapter, I begin with a discussion of the background which provides details of the programme and debates around teacher learning at FP and teaching resources. This is followed by the rationale and critical questions. In the next section, I present literature review, conceptual framework, theoretical framework and the research methodology in which the issues of trustworthiness and ethical issues are tackled. This chapter ends with a description of the chapters which make up the thesis.

1.1 Background

1.1.1 The ACT FP Programme

After training as a Foundation Phase teacher and teaching at that level in rural schools for six years, I moved to KwaZulu-Natal where I got a teaching post at a High School in Pietermaritzburg's urban area. Coupled with this, I got a part-time tutor opportunity at the University of KwaZulu-Natal's (UKZN) ACT FP programme. This opportunity at UKZN kept me close to the FP teaching. Throughout the tutoring experience, I always wondered what and how these foundation phase teachers learnt through the construction and use of teaching resources. I also wondered whether the learning changed their practice as foundation phase teachers in any way. Teaching resources are an important component of each of the eight modules of this programme. However, this study focused on teaching resources constructed in numeracy and literacy modules.

The ACT FP is a new programme offered at this level for the first time in South Africa (Ebrahim, Verbeek & Mashiya, 2012). UKZN offered this programme for the first time in 2013. Foundation Phase, also known as the Early Childhood Development (ECD) phase, refers to the period from Reception (Grade R) to Grade 3 (Hugo, 2010). The ACT FP at UKZN is a 128 credit

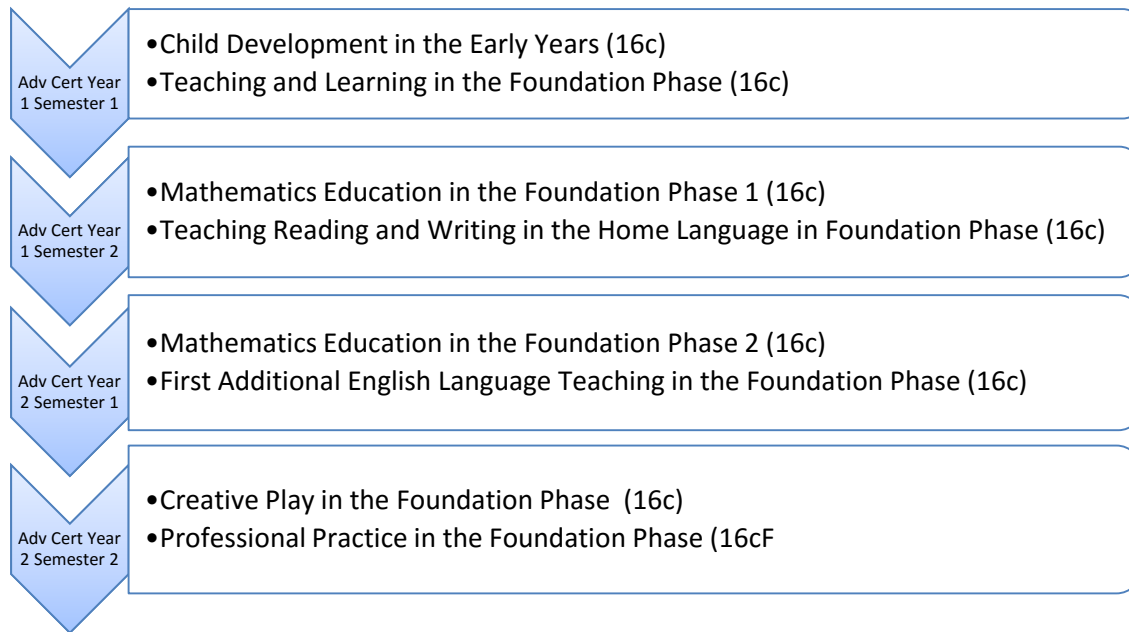
programme which is offered through mixed mode delivery to teachers who wish to obtain a National Qualification Framework (NQF) Level 6 qualification (Ebrahim et al., 2012). Mixed mode delivery combines face-to-face tuition and distance learning (Mukeredzi, 2013). The programme duration is two years and since these teacher-students are full time teachers, they attend classes on Saturdays and during school holidays.

The aims of the programme are to:

- Accredit the professional development of teachers with a prior qualification in the Foundation Phase teaching at a lower level, or to retrain qualified teachers in a new teaching subject, namely teaching in the Foundation Phase.
- Deepen subject matter knowledge, general principles and methodology in relation to teaching Grades R-3.
- Develop appropriate knowledge, skills, values, attitudes and dispositions of educators within the fields of the Foundation Phase curriculum, policy and pedagogy.
- Enable students to develop disciplinary, pedagogical, practical and situational learning reflexive competences in teaching and learning at the Foundation Phase of schooling (ACT FP Programme Template, 2012, p. 2).

The programme content consists of eight modules and students register four modules in the first year and another four modules in the second and final year. Thus, they study two modules in each of the four semesters as illustrated by the flow diagram below.

Figure 1: **ACT Programme: Module Flow Chart** (ACT Programme Template, 2012).



The ACT programme was offered to improve and develop teachers' ways of teaching literacy and numeracy at FP. The teacher-students were expected to examine, compare and explore different theories of children's literacy and numeracy development. In literacy they were exposed to different approaches and strategies to teach reading and writing, thus this is where teacher-students were expected to learn constructing charts with appropriate handwriting for different grade levels. In numeracy they were also exposed to theories of mathematics, play and how to choose and use resources to support teaching, learning and assessment. There were specific tasks which were used for the construction of teaching resources in numeracy and literacy. In numeracy they constructed different kinds of teaching resources like abacuses, charts with 2D shapes and objects, etc. In the literacy module 4 (Teaching reading and writing in the Home language in foundation phase), the teacher-students constructed charts which promoted independent reading in their classrooms. In module 7 (Creative play in the foundation phase), teacher-students constructed balls, skipping ropes and charts within the topic 'Playing with the curriculum' which leads to teaching through play at FP. The teaching resources constructed by the teacher-student were meant to help both the teacher and the learners during the learning process.

1.1.2 Programme assessment

In this ACT FP programme, there are three forms of assessment: self-assessment, peer assessment and formal and informal assessment which is conducted by tutors. Teaching resources form one of the key tutor formal assessments in the programme. Teaching resources refer to materials available to a teacher in class on the particular day they are conducting a lesson (Guloba, Wokadala & Bategeka, 2010). From this understanding, one would say teaching resources in this programme form part of the tools in these teacher-students teaching boxes or bags which are vital for performing teaching tasks. In the context of this study, teaching resources are artefacts (e.g. dominoes, tangrams, flash cards, charts, ropes, balls, abacuses, etc.) which the teacher-students construct for use as teaching aids or resources in their classrooms. Machaba (2013, p. 1) points out that, “it is recommended that teachers use a variety of teaching methods complemented by concrete objects or artefacts in order to accommodate all children.” In this study, constructing these real objects was viewed as vital as it would allow these teacher-students (as learners) to manipulate them which would hopefully enhance their understanding. Similarly, Piaget (cited in Stuart, Akyeampong and Croft, 2009, p. 31) argues that “...in mathematics, children would need to use counters for addition, as physical or concrete objects to enhance comprehension.” Hence, it is the duty of the teacher to avail concrete materials so that the learners can see mathematics as real and therefore enable them to become problem solvers. In this vein, these teacher-students, through constructing and using these teaching resources in their classrooms with their learners, they may also gain different kinds of knowledge. Emphasis was on concrete detail in the construction of these artefacts to ensure they appealed to the appropriate stage of learning of the learners. Therefore, teaching resources are an important resource for every teacher in any learning situation as they concretise learning. In the absence of concrete objects or teaching resources in the teaching and learning process, comprehension is often compromised (Stuart et al., 2009).

Assessment is a process of obtaining information in curriculum operations in order to make decisions about student learning, curriculum and program, as well as education policy matters (Akker, 2003). Hence, tutor-assessment for each module in the ACT FP programme included workbook activities, construction and presentation of teaching resources, written assignments and examinations. Teaching resources and their presentation contributed 10%, written

assignments 40%, and the examination 50% (ACT Programme Template, 2012). Self-assessment complemented tutor assessment and enabled the teacher-students to reflect on their practices and tasks given, which enhanced their learning, given that reflection promotes learning (Masinga, 2012).

Teaching resources and assignments were part of the formal formative assessment in each module. Formative assessment is defined as a process used by teachers and students during instruction that provides explicit feedback to adjust on-going teaching and learning to improve students' achievement of the intended instructional outcomes (Coffey, 2011). Wilson and Scalise (2006) propound that timely feedback and revision on activities congruent with learning goals is "extremely important" for developing adaptive expertise, learning transfer and development. Therefore, while teaching resources were assessment tasks, these teacher-students were also expected to learn from such engagements. They were expected to learn from the development and presentation of teaching resources. Specifically, they were expected to learn through reflection during construction and presentation of these teaching resources. Teacher-students would reflect and be able to compare their own work with those ideal images and then make some changes that are consistent with ideal images, thereby learning from the process (Wilson & Scalise, 2006). In addition, tutor assessment through feedback and critique on the construction of those teaching resources would help them understand whether they were doing things correctly. After feedback and critique from the tutor, the teacher-students presented these teaching resources in class and received further critique and feedback from both peers and the tutor. This promoted interaction, reflection and learning. The ACT programme is practice-based. This means the programme does not only require students to read and write, but also to apply what they learnt and reflect on the successes or failures. It also requires them to learn from that reflection. Learning is therefore not only a theoretical exercise but a practical and experiential one (Thorn & Prest Talbot, 2009). Given that this is a new programme with these many forms of assessment, it was vital to understand whether and how these FP teachers learnt through teaching resources and in what ways that learning changed their practice.

Throughout my tutoring, the question of whether these ACT teacher-students experienced any learning through construction and use of teaching resources, the kinds of knowledge that they acquired, how they acquired it, as well as whether the knowledge changed their practice,

remained inadequately answered. Hence, this study investigated the kinds of knowledge that these ACT FP teacher-students acquired, the processes through which they acquired that knowledge in development and using teaching resources, as well as how that influenced their practice as FP teachers.

1.2 Focus and purpose of the study

The focus of the study was therefore to explore teacher learning from the construction and use of teaching resources. The aim was to gain insights into the kinds of knowledge the FP teacher-students gained how the knowledge was gained and in what ways the learning influenced their classroom practices.

1.3 Rationale

This study focused on how FP teachers on the ACT programme learnt through developing and using teaching resources, the knowledge that they gained and how that changed their practice. Given that I specialised in the FP teaching, insights from this research would be of maximum benefit to my work and responsibilities. DoE (2001, p. 9) define “early childhood development (ECD) (Foundation Phase) as an umbrella term that applies to the processes by which children from birth to at least 9 years, grow and thrive, physically, mentally, emotionally, spiritually, morally and socially.” ECD White Paper 5 (DoE, 2001 p8) states that “by the age of 2½ years, a child’s brain has achieved 50% of the adult weight, and by the age of 5, the brain has grown to 90% of its adult weight.” For this reason, Crawford (2001) stresses that the FP is critical for laying foundation for all children's future learning. During this period, children are particularly ready for learning (Ormrod, 2005). Thus, opportunities must not be lost as one of the goals of education is understood as not to fill the child with facts from pre-selected course studies, but rather to cultivate their own natural desire to learn through various approaches, content, activities and resources (Montessori, 1966). In other words, the aim should not only be to make the child understand, and still less force him/her to memorise, but to touch their imagination and to enthuse them to their innermost core. This can be achieved by providing a rich classroom learning environment, as well as giving them rich sources of materials to make discoveries and grow (Montessori, 1966). Teaching resources are some of the materials that can enhance those discoveries and that growth. This can be achieved if the FP teachers possess the adequate

knowledge, aptitudes and skills to capitalise on children's desire to learn during this period. One way of acquiring the knowledge on the ACT programme was through construction and use of teaching resources. Hence, the need to explore the kinds of knowledge gained through teaching resources.

In addition, poor matric results in South Africa have been associated with poor teaching and inadequately equipped teachers at the Foundation Phase (Hugo, 2010). Therefore, it is important that teachers handling such a critical period are adequately prepared and equipped with appropriate knowledge, skills and values to be able to build those strong foundations as the use of teachers with limited knowledge has been linked to lower-quality teaching and poor student outcomes (HSRC, 2005; Kruijer, 2010, Mukeredzi, 2013). The FP teacher-students are expected to acquire knowledge and understand how children learn at this age, as well as to understand how to make lessons effective hence, construction of teaching resources would contribute to their learning and enhance their teaching.

As practical tasks, constructing teaching resources are a means of demonstrating teacher-students' learning and a method of exploring their thinking to stimulate learning. Kutz, (1999) points out that, practical tasks help teachers to: ensure that students have completed and comprehended the theory behind those tasks; determine how well they understood concepts; comprehended and envisioned application of these tasks and the learning they gained from their construction. Furthermore, literature review revealed limited research work on the FP teacher learning globally and much less around what and how these teachers learn through construction and use of teaching resources. Thus, researching these aspects might contribute in closing this gap in knowledge. Given that ACT FP is a new programme in South Africa, first launched at the UKZN, I wanted to understand what and how these teachers learnt through both making and using these teaching resources.

1.4 Research questions

1. What kinds of knowledge do the foundation phase teachers acquire through the construction and use of teaching resources in the ACT FP programme?

2. How do foundation phase teachers learn through the construction and use of teaching resources in the ACT FP programme?
3. In what ways do teachers say that the construction and use of teaching resources on the ACT FP programme improves their practice?

1.5 Brief overview of literature

The literature review will consider aspects of teacher learning, teacher knowledge and teaching resources. The literature consulted was drawn from international, regional and local sources and generally stretches from 2004 to 2014 where the work of some theorists and empirical studies is presented. I also consulted some dated sources such as Montessori (1966) and Shulman (1987) (because of the pertinent information contained therein). The literature helped me to understand how my study fitted into the broader context and current debates and at the same time offered a broader understanding of what has been studied, the current state of research on FP teachers and areas that need further research.

1.6 Conceptual framework

The domains of teacher knowledge provided by Grossman (1990) who draws on Shulman (1987) and others form the conceptual framework of my study. Grossman (1990)'s work offers insights into the domains of knowledge that the teacher-students acquired during the ACT FP programme which include; General Pedagogical Knowledge (GPK), Subject Matter Knowledge (SMK), Pedagogical Content Knowledge (PCK) and Knowledge of Context. According to Grossman, these form the cornerstone of professional knowledge for teaching.

1.7 Theoretical framework

Illeris' (2009) theory which offers guidance on how people learn frames this study. The types of learning: cumulative or mechanical, assimilation, accommodation and transformation (Illeris, 2009) help in unpacking the data and understanding what and how the teacher-students learnt and, whether the learning changed their teaching practice.

1.8 Methodological approach

This study employed qualitative research design within an interpretive paradigm. Creswell (2010) states that qualitative research studies involve probing for more in-depth understanding of a phenomenon instead of casual relationships. It also permits respondents to elaborate their perceptions thereby enabling the researcher to elicit more detailed information. Given that this study seeks to understand what and how the ACT teacher-students learnt from their perspective, the qualitative design was found to be the most appropriate. My sample was made up of 14 participants. This is in line with qualitative research which recommends small samples in order to gather in-depth information (McMillan & Schumacher, 2010). Focus group interviews, semi-structured observations and photographs of teaching resources which provided for data triangulation were used as data generation instruments for this research.

1.9 Structure of the study

The study is organised into six chapters as follows:

Chapter one has presented the background information and set the scene for the study. It explains the purpose and focus and discusses the rationale for the study. The chapter gives pointers to the literature review, conceptual and theoretical frameworks and the methodology employed.

Chapter two presents a review of related literature in the field. It looks at concepts like teacher learning, teacher knowledge and teaching resources. It also analyses the empirical studies done by other scholars around these concepts. In chapter three, the conceptual and theoretical frameworks will be presented.

Chapter four presents the research methodology. It describes and justifies the research design that is used for the study and the procedures employed for the selection of the participants. It also describes the research paradigm, the research methods techniques, and aspects of trustworthiness. The chapter concludes by addressing some ethical issues.

Chapter five presents data findings and analysis based on the research questions. It seeks responses to the key research question: “What and how do foundation phase teachers learn through construction and use of teaching resources?” The chapter is divided into two sections: the kinds of knowledge that the teachers gained and the types of learning through which that

knowledge was gained. Finally, chapter six summarises the findings and draws conclusions and recommendations.

1.10 Conclusion

In this chapter I have introduced the study. The chapter outlined the background, context, research questions and the rationale of the study. The next chapter focuses on the literature relevant to this study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The previous chapter gave an overview of the study, highlighting important aspects like the background information as well as the rationale for this study. This chapter presents the literature review. The literature presented in this chapter is drawn from international, regional and local sources and it is arranged conceptually. The purpose of this study was to explore the Foundation Phase teacher learning from the construction and use of teaching resources. The sources referred to in this study were generally from 2004 to 2014 where the work of some main theorists and empirical studies are presented. I also consulted some seminal sources from as far back as 1984 like Shulman (1987) because of the pertinent information contained therein. Boote and Beile (2005) point out that literature review is an evaluative report of studies found in the literature related to one's selected area. Thus, the purpose of this literature review is also to provide a context for the research, justify the research, and ensure the topic has not been done before or is not just a 'replication study'. While literature review also helps to identify gaps in previous research as well as to refine, refocus or even change the topic, it also shows where the research can be located within the existing body of knowledge.

2.1 Teacher learning

Kelly (2006, p. 506) defined "teacher learning as a process by which teachers move towards expertise." This implies that teacher learning does not end but is an on-going process. On the same note, Tobin and Jakubowski (1990) define teacher learning as a process of change that makes teachers rebuilding their personal images. This definition shows that teachers are the agents of change in their own classrooms. In the context of this study, ACT FP teachers could make a difference in their teaching through the construction and use of teaching resources made on the programme.

Bertram (2011) contends that knowledge-in-practice (knowledge acquired through experience) is most developed and practiced in the school situation. Kelly (2006) claims that knowledge-in-practice and knowledge-of-practice (propositional knowledge that is developed through research) could not be separated. What Kelly (2006), drawing from Schon (1983, 1987) calls 'knowledge-in-practice' which Sternberg and Horvath (1999) call 'tacit knowledge' or a process of 'knowing' is a kind of knowledge that is distributed or stretched across people and settings. The process of knowing-in-practice does not reside within an individual at the psychological level. Rather, it is a dynamic process which is socially shared and distributed across participants and resources. In other words, it is a process resulting from the collaborative actions of teachers and students together and both their conceptual resources like theories or knowledge and materials/resources such as books or computers in the context of their own work.

The knowledge is specific and unique to particular classrooms or school settings. Hence, professional knowledge may be viewed as knowledge-in-practice which encompasses tacit knowledge; that is knowledge in professional activities, which cannot be fully expressed but can be created by practitioners in the context of their classroom practice. However, Kelly does not give a comprehensive definition of knowledge-of-practice. He mentions that this kind of knowledge encompasses content knowledge, for example, in the modules of Mathematics in the Foundation Phase, Teaching Reading, as well as Writing in the Home Language in Foundation Phase. Teachers use knowledge of pedagogical approaches and the knowledge of common errors which children often make when learning certain subjects such as mathematics and literacy. This kind of knowledge encourages teachers to think, in as much as it promotes interactions and negotiations with learners in the classroom.

The focus of this study is in line with these researchers in the sense that the study is exploring what teachers learnt and how they learnt in constructing and using teaching resources. This is in line with Kolb (1984, p. 41) who states that "Knowledge results from the combination of grasping and transforming experience." The assumption here is that as these teachers construct and use teaching resources (for example, flash cards, abacuses) they are combining knowledge of practice and knowledge-in-practice. Kelly (2006) further states that knowledge-of-practice encompasses content knowledge, pedagogical approaches of class management, learner discipline, and assessment. In other words, it is the principles of practice which are often

acquired formally through programmes or workshops. Hence the ACT FP teacher-students will acquire different kinds of knowledge formally and informally or experientially. Formally through attending class sessions and informally as they practice in their classrooms.

A lot of research work has been done on the phenomenon of teacher learning. In the UK study, Wilson and Demetriou (2007) brought together the ideas about teacher learning from both teacher education and workplace learning literature. Their study examined what and how newly qualified secondary school teachers learnt in the early years of their career. Their research explored ten newly qualified secondary school teachers. Wilson and Demetriou (2007) found that teachers mainly learn through day to day classroom activities and informal dialogue with colleagues. Their study is similar to this particular study as it focuses on what and how teachers learn. However, the difference lies in the context because Wilson and Demetriou's study explored qualified secondary teachers while this study focuses on what the Foundation Phase teachers learnt through the construction and use of teaching resources as part of, or as a requirement for a foundation phase formal programme. Another difference is that the teachers in this particular study were learning as they practiced in the schools.

Wilson and Demetriou (2007) used semi-structured interviews with 3 teachers in their second year of teaching and seven teachers at the end of their first year of teaching. It is important to mention that participants in this study had teaching qualifications and had embarked on a formal programme to upgrade their knowledge and skills. While Wilson and Demetriou's (2007) study revealed that teachers learnt through day to day classroom practice and dialogue, this study seeks answers on whether the ACT FP teachers also learnt something through the use of teaching resources in classroom practice. The study by Wilson and Demetriou (2007) however did not address the issue of what the newly qualified teachers learnt through classroom practice and informal dialogues. My study goes further in revealing the kinds of knowledge that they gained through use of teaching resources in the classroom.

Another study by Hagger, Burn, Mutton and Brindley (2008) is based on approaches that student teachers employ in their own learning. This is also a UK research which was conducted with 14 student teachers following a one-year postgraduate course within two well-established school-based partnerships of initial teacher learning. Hagger et al's study relates to this particular study because it is focusing on teacher learning. The difference is that this study seeks answers on

teacher learning through the construction and use of teaching resources. The focus of the UK study was on the approaches that the student teachers take to their own learning. The above researchers (Hagger, et al, 2008) found that the degree of intentionality in the student teachers' approach to their learning appears to be a key issue. Hagger et al, (2008) found that the challenges facing teacher educators is to design curricula that enable student teacher learning to become competent beginning classroom practitioners and to build strong foundation for their lifelong learning and professional development. Their findings highlighted the tremendous potential and scope for learning that the positive orientations of many of the student teachers opened up. It was also found that there are limitations to what beginning teachers with little accumulated experience of practice can learn from simply looking back on what they have done. The research points to the importance of taking account of the individual learners' agenda about what and how they should learn. My study is concerned with eliciting how teacher-students learn in order for them to become competent classroom practitioners. This is clear in the objectives of the study as highlighted in Chapter One. Hagger et al, (2008)'s study informs my study since finding how teachers learn may enhance these particular aspects in the training of subsequent cohorts of ACT FP teacher-students buttressing the foundation for lifelong learning and good classroom practice.

Still in the UK, Gearhart and Osmundson (2009) examined ways in which teachers learned through assessment portfolios that supported experienced science teachers in their efforts to build assessment expertise. Twenty-three (23) science teachers participated in this study. The purpose of the study was to analyse what teachers learned about classroom assessment from their work with portfolios. Their study revealed that teachers learned to construct clearer depictions of relationships among unit learning goals, and identify and align assessment points to track student progress Gearhart and Osmundson's study however did not look at how the academic teachers learnt. My study will try to understand what and how the teacher-students learnt through the construction and use of teaching resources in numeracy and literacy. Data sources in the UK study were self-reported learning and focus groups. The current study investigates how ACT FP teacher-students acquire different kinds of knowledge through the use of different teaching resources while Gearhart and Osmundson's study mainly focused on assessments portfolios. Gearhart and Osmundson's (2009) findings showed that there was a gap in teacher's understanding of interpretation as well as uses of assessment results to differentiate instruction

and provide feedback. While this study relates to my study in the sense that it focused on portfolios, which in my own study represent teaching resources, it is different in that it investigated what experienced science teachers learnt through assessment portfolios and did not consider the 'how' aspect beyond the portfolios.

In the Netherlands, Kwakman (2002) explored factors that affect teacher learning in the workplace. The study was done with teachers from 10 secondary schools in Netherland. The results of the study revealed that the frequency with which teachers participate in some activities is disappointing, considering the high value attached to them. Furthermore, the workplace was found not to be a suitable venue for learning to occur and thus chose to organise learning outside of school. The difference between Kwakman's and this study is that in this particular instance, the classroom is the workplace, where the teacher-students use the teaching resources they constructed during the course, and is therefore a suitable venue for learning. The other difference is that Kwakman's (2002) study was on teachers in secondary schools while this study investigates the FP primary school teachers enrolled on the ACT FP programme at a South African university.

In England, Cajkler, Wood, Norton and Pedder (2014) in their article based on lesson study as a vehicle for teacher learning in secondary schools revealed that learning during the lesson is the key to teacher's pedagogic development. Hence, the use of teaching resources by ACT FP teachers in their classroom may also be viewed as a way of learning that would lead them to discover hidden information about learners in different tasks. The purpose of Cajkler et al.'s study was to explore the potential of the lesson study for advancing professional practice and teacher's learning in the English secondary context. However, the current study seeks to determine the potential of teacher learning through construction and use of teaching resources. While the studies are similar in terms of learning during the lesson, the difference is in the methodology used. This study engaged the semi-structured focus group interviews, lesson observations and photographs of teaching resources while Cajkler et al., did interviews and video recordings. The lesson study project was conducted in the mathematics department with four teachers serving in a secondary school. Cajkler et al., (2014) found that the process of learning during the lessons study improved the understanding of their students, while collaboration helped them to develop less-teacher-centred approaches and at the same time created a stronger sense of

teacher community. This may imply that the use of teaching resource by ACT FP teacher-students in their lessons might enhance the learner-centred methods.

In their meta-analysis of research on teacher learning, Putnam and Borko (2000) emphasise an approach that grounds teacher learning in their experiences that are related to their classroom practices and activities. Additionally, they stated that teachers have long struggled with how to make learning experiences powerful enough to transform their classroom practices. This is in tandem with this study which also seeks to unravel the ways in which learning from constructing and using teaching resources on the ACT FP programme might have changed the teachers' classroom practices. However, the point of departure is that while the study explores what and how teacher-students learn through the construction and use of teaching aids at foundation phase, it also endeavours to establish whether the learning was transformative. Putnam and Borko (2000) also point out that what teachers learn will indeed influence and support their teaching practice in meaningful ways. On a similar note, they suggested that teachers should bring experiences from their classrooms to staff development activities to help in instructional practices. Hence, the ACT FP teacher-students might link their day-to-day practices to what they are learning from the programme and vice versa.

Murugaiah, Azman, Thang and Krish's (2012) article on teacher learning via communities of practice investigated teacher learning during the development of the English online Communities of Practice. Done in Malaysia, the study has some relevance to this study because it investigated teacher learning. The Malaysian study involving 20 teachers of English, Mathematics and Science, the content analysis study by Murugaiah et al., (2012, p. 171) found that "...members seemed to hold on to their individual traits rather than beyond them to work as a team. The lack of group dynamics affected the participants." It was also implied that teacher interactions need to be enhanced to feature more two-way interactions depicting deep learning. The instrument employed in the Malaysian study was content analysis which is different from my study.

In South Africa, Mukeredzi (2014) studied how and what student teachers in the FP, Intermediate/Senior Phase and FET learn during teaching practice. The data sources which informed her study were students' reflective journals and transcripts of the audio-recorded collaborative sessions. Mukeredzi (2014) differs from current study in that it focused on FP, Intermediate/Senior Phase and FET pre-service teachers while my study participants were

practicing teachers who were studying part-time. Among other things, Mukeredzi (2014) discovered that participants learnt and developed a range of general pedagogical knowledge (GPK) and pedagogical content knowledge (PCK) from collaborating with subject peers, collaborative and individual reflections, as well as from engagement in classroom practice and preparation of various teaching resources. Her study is closer to this particular study because both studies looked at the kinds of knowledge that teachers learnt from classroom practice, which included preparation of teaching resources.

In another South African study, Mbatha (2010) examined how teachers in the FP dual medium literacy classrooms learnt and understood the teaching of literacy. The study involved 14 student teachers studying Post-Graduate Certificate in Education (PGCE). These students were attached to mentors, while the ACT FP teacher-students for this particular study are full-time teachers. The results indicated that teachers were in favour of early introduction of Literacy in English in the FP without considering the advantages of a mother tongue based bilingual instruction. Mbatha (2010) adopted the action research contextualised within a critical paradigm which employed both quantitative and qualitative approaches including the semi-structured interviews and the questionnaire. This study is located within the qualitative research design and adopted the semi-structured focus group interviews, photographs and lesson observations. Mbatha focused on identifying how teachers learnt and understood the role and function of mother tongue literacy teaching in the FP.

The literature review on teacher learning used student teachers as their participants and focused on their learning in different disciplines. Three studies looked at what teachers learnt in their day-to-day classroom activities. Two studies focused on what and how teachers learnt while one examined what and how newly qualified teachers learnt through their classroom practices. Another study looked at how and what teachers learnt during their teaching practice. The South African studies investigated how teachers, particularly in the FP, learnt through experience and during their teaching practice. From these studies, I learnt that teachers learn in different contexts and disciplines. They acquire knowledge which would help them in their classrooms. The next section discusses teaching resources.

2.2 Teaching resources

According to Guloba, Wokadala and Bategeka (2010), teaching resources refers to the tools available in class for the teacher to use during the lessons in the class. In the context of this study, teaching resources include artefacts (for example; books, charts, balls, ropes, abacuses etc.) which the teacher-students constructed for use in their classrooms. While teacher-students would use these teaching resources to promote their teaching activities, in the ACT programme, construction of these teaching resources was meant to foster their learning. The teaching resources which the FP teacher-students constructed were meant to help them during the teaching and learning process in their classrooms. The teaching resources constructed by teacher-students were used to develop fine and gross motor skills as well as intellectual development of their learners. For example when learners throw balls to each other they develop eye hand coordination. The charts they constructed also help in developing reading skills. This means that the teacher-student constructed the resources which provide information and some were used to enhance learning in the classroom.

Putnam and Borko (2000) distinguish between performance tools which change how an activity is accomplished (for example, transparencies) and pedagogical tools which change the teacher's competences to change learners' understanding of concepts. Examples of performance tools which the teacher-students constructed were abacuses and dominoes, while examples of pedagogical tools were board games (morabaraba), story books, tangram and balls with different words, to mention a few. Putnam and Borko further point out that many teaching resources do not merely foster cognition, but they transform it. To foster cognition entails changing the mind set and improving the ways of thinking. In this study, teaching resources were meant not only to promote teacher learning, but also to transform it. The most widely adopted teaching resources are those that would be aligned with existing conceptual and social organisation of the classroom. In this case, the teacher-students constructed teaching resources that would fit within their school and classroom contexts, cultures and practices. This study was therefore prompted by the need to investigate whether the construction and use of teaching resources improved the teachers' competences as well as how this process unfolded.

In South Africa, a study by Motloung (2008) investigated both primary and secondary school educators' experiences in choosing materials for learners in the inclusive classroom setting. Fifty-six (56) educators from primary and secondary schools selected from eight public schools in Gauteng Education area participated in the Motloung's study which used only focus group interview as the data generation tool. The materials which the participants mentioned included textbooks, exercise books, pens, radios, televisions and videos. The study found that some materials were written in a difficult language for learners to understand. Motloung (2008) found that some teachers were not trained in inclusive education and that they did not understand the policies involved regarding inclusion. Furthermore, it was revealed that language in the materials was a barrier for learning, because some learners did not understand it and could not easily use the materials on their own without the assistance of the educators. In contrast, in the current study, the ACT FP teacher-students constructed teaching resources that were relevant to the learner diversity in their classrooms and school contexts, while the language used on those charts or flash cards was appropriate for the learner levels.

Asokhia (2009) in Nigeria stresses the need to make English language lessons easy and enjoyable through the use of instructional resources. Asokhia's study relates to the current study because it focused on teaching resources, although it was only for English schools. The results of the study indicated that poor performance in English language in most schools was due to the fact that the teaching was textbook- dominated. Furthermore, Asokhia stated that teachers did not have regular supply of the teaching tools and when they were available, they were inadequate and obsolete. In the South African context, teachers at the FP, both in urban and rural areas, have few resources and in some cases the resources do not even exist. The White paper 6 states that all learners should learn, provided they receive the necessary support. The paper also indicates that many students drop-out of the South African education system because they encounter difficulties due to the fact that the system does not accommodate and cater for learner diversity in the classroom (Department of Education (2001)). Therefore, Asokhia's finding makes this study relevant since it is an attempt to investigate how the teaching resources can be made available as tools through which teachers learn. The teaching resources constructed by teachers in this study were original, relevant, appropriate and current.

The American Association for the Advancement of Science, Project 2061, (1990, p. 199) states that;

Progression in learning is usually from the concrete to the abstract. Learners can learn most readily about things that are tangible and directly accessible to their senses, smelling, visual, auditory, tactile and kinaesthetic. With experience, they grow in their ability to understand abstract concepts, manipulate symbols, reason logically and generalize. These skills develop slowly, however, and the dependence of most people on concrete examples of new ideas persists throughout life.

In line with the above quote, the construction of teaching resources involved the use of materials that would appeal to the five senses, especially the visual. The FP teacher-students in this study enhanced their learning through constructing and using teaching resources using the materials which they found in their immediate environment. They constructed different teaching resources for numeracy and literacy. For example, in numeracy, they constructed abacuses, place-value cards, flash cards with numbers and number names, card games, base ten materials, charts with shapes and their names. In literacy, they also constructed story books, puppets, cars, dolls, charts with different words and blends flash card with vowels and pictures. Crawford (2001) asserts that learners apply concepts when they are engaged in hands-on problem-solving activities. For example, in mathematics, the concepts were ratios, base-ten blocks model numeric representation in decimal system, fraction bars demonstrating the meaning of simple fractions, additions and multiplication of fractions. This implies that learner-centred activities are of more valuable than teacher chalk-and-talk. Apart from submitting these teaching resources for assessment, the FP teachers as learners presented the teaching resources to their tutors and peers for comments and feedback. Such activities promoted reflection on the work, as well as learning from reflection. Masinga (2012) propounds that learning is derived more from reflection on an experience than from the experience itself. The semi-structured interviews that the students were involved in meant that they had to reflect on their experience. According to Lasley (1992, p. 24) reflection refers to “the capacity of a teacher to think creatively, imaginatively and at times, self-critically about classroom practice.” In this study, the subsequent modification of the teaching resources after class presentations, critique and reflection might have improved the teacher-students’ understanding.

A study by Maduna (2002) in South Africa investigated the impact of using teaching aids in selected Grade 3 mathematics classes. The examples of teaching aids which were used by teachers included a picture of a house, charts with number names and a board game. 278 learners and 6 teachers were involved in this study. The study is similar to my own as it looked at the impact in terms of learning from constructing and using teaching resources. However, it differs in the sense that it used both teacher and learners of Grade 3 and the impact in terms of teaching, and not teacher learning, while my study explored what and how teachers learnt through the use of teaching resources. The current study employed semi-structured focus group interviews, photographs of teaching resources and lesson observations as data instruments. While I observed Grade R to 3 lessons, Maduna observed only Grade 3 mathematics lessons. Maduna found that teachers' abilities to extract mathematical ideas out of ordinary objects and situations were far from being equal or optimal. In other words, it is the teachers' GPK that was far from being optimal. The research found that differences in the use of aids between teachers and problems encountered by individual teachers meant that further training in the use of teaching aids is essential. It also revealed that the participating schools attached significant importance to having teaching aids available for use in the classroom. The idea behind constructing teaching resources in the ACT FP is to assist the teachers, most of whom are generally from under-resourced schools. The finding that resources were insufficient is therefore explored through the investigation of how it helps the teacher-student learn.

In constructing teaching resources, the FP teachers used materials from their own environment thus, becoming active participants in their own learning. This seems to suggest that FP teacher-students might learn through construction and the use of teaching resources from their environment. The current study which explored what and how teachers learn is in line with Putnam and Borko (2000) who contend that the learning of teachers is knotted with their on-going practice, making it likely that what they learn might indeed persuade and support their teaching practice in meaningful ways. The construction of teaching resources was intended to support their teaching and add value to their knowledge and practice. In addition, making of teaching resources enabled the teachers to work simultaneously with what they were learning and how they would use the learning in their practice (ACT FP Teaching & Learning Module, 2013). Therefore, the use of teaching resources seems to have been enhancing the FP teacher-students' learning process.

Given the value of teaching resources in particular, as well as the importance of student engagement in experiential learning through practical tasks and processes such as construction of teaching resources, it becomes vital to understand what and how the teachers learn through those processes and in what ways the learning changes their classroom practices. I learnt that learners need to be given resources which they are able to use, considering that some studies indicated that some of the resources used by teachers are difficult for learners to use. This shows that the construction of teaching resources by ACT FP teachers would also become important. These teacher-students are expected to construct resources which match the level of understanding of their learners. For example, story books and flash cards with different words. The next section will focus on teacher knowledge.

2.3 Teacher Knowledge

According to Verloop, Van Driel and Meijer (2001, p. 5), “Teacher knowledge is the total knowledge that a teacher has at his or her disposal at a particular moment, which, by definition, underlies his or her actions.” Wilson and Demetriou (2007, p. 214) assert that, “Teacher knowledge can be classified into two categories: codified academic knowledge and practical knowledge.” They further state that codified knowledge is based on the idea that learning is primarily a cognitive process of the mind while practical knowledge is not easily codified but plays a vital role in school-based practices and activities. This procedural knowledge is often context- specific and depends on the local cultural knowledge. Eraut (2004) adds that this kind of knowledge is difficult to make explicit or to represent in a textual form because it is acquired informally through participation in social activities. In relation to this study, the learning process that takes place when the teacher is teaching and in this view, his or her role as a teacher comes to the fore. What happens as the teacher makes judgements based on her propositional knowledge is crucial as this informs how the teacher executes the teaching process.

American Lee Shulman was one of the first researchers to describe teacher knowledge hence; all other studies acknowledge his work as a starting point. Shulman (1987, p. 127) described seven categories of teacher knowledge: “knowledge of content; knowledge of pedagogy; knowledge of curriculum; knowledge of learners and learning; knowledge of contexts of schooling; pedagogical content knowledge and knowledge of educational philosophies, goals and

objectives.” However, Grossman (1990) summarised these seven categories into four domains of knowledge: subject matter knowledge, general pedagogical knowledge, pedagogical content knowledge and knowledge of context. This study draws on the four domains characterised by Grossman (1990). Grossman argued that these knowledge domains are essential for teachers as they inform their teaching. They are discussed in detail under conceptual and theoretical frameworks.

Welder and Simonsen (2011) studied the effects of an undergraduate mathematics content course on elementary phase teachers. Their study is relevant to the current study because it looks at kinds of knowledge in which teachers showed improvement in their learning, although it focused on mathematics content knowledge. The participants in Welder and Simonsen’s study were undergraduate elementary teachers while in this study, participants are qualified teachers. Welder and Simonsen’s (2011) study is different from my study because it was not done with foundation phase teachers but with the elementary teacher which was referred to K-8 in this context. Their study was on pre-requisite algebraic concepts that were needed by pre-service teachers. 68 Mathematics students participated and the results of the study showed that pre-service elementary teachers significantly improved both their Common Content Knowledge (CCK) and Specialized Content Knowledge (SCK) in the areas of numbers and equation/ functions after completing a one-semester undergraduate mathematics content course for teachers.

Thames & Ball, (2010, p. 223) asserted that, “Common Content Knowledge is that which allows a person to successfully solve mathematical problems in non-classroom contexts, including being able to do particular calculations, knowing the definitions of concepts or making simple presentation.” Specialized Content Knowledge is the knowledge of specific discipline or subject “that allows teachers to engage in particular teaching tasks (Hill, Ball & Schilling, 2008, p. 378).” They further state that, Specialized Content Knowledge is the mathematical knowledge “that allows teachers to engage in particular teaching tasks (Hill, Ball & Schilling, 2008, p. 378).” The results also highlighted opportunity for improvement in pre-service teachers’ CCK of elementary and middle school level mathematics content. Furthermore, the findings support the need for content courses for pre-service elementary teachers. This relates to the overall aim of the ACT FP programme which focused on upgrading teacher-students’ qualification and to

deepen subject matter knowledge, general principles and methodology in relation to teaching Grades R-3.

Still in the US, a study by Gencturk (2012) examined the relationships among student teachers' mathematical knowledge, their teaching practices, and student achievement. The study participants were 21 in-service teachers enrolled in new masters' program. The study is different from my study in that the researcher used seven semi-structured focus group interviews to gather the data and participants also wrote a test before they were interviewed. The study also focused on teachers' mathematical knowledge while my study includes the how teachers acquired the knowledge through teaching resources. Gencturk's (2012) results indicated that even teachers with strong mathematical knowledge were not able to choose mathematically rich problems. In addition, the results revealed particular strands of the complex relationship between teachers' mathematical knowledge and their instructional practices. Gencturk's study is in some way similar to my study because it sought to establish teacher knowledge.

In the study conducted by Jansen (2009) it emerged that teachers at foundation phase in South Africa lacked subject matter knowledge necessary for teaching of literacy and numeracy. On the same note, the National Education Evaluation and Development Unit (2013) add that the South African FP educators commonly had insufficient appreciation of the demands of the curriculum. Jansen's study is relevant to the current one because it focused on the foundation phase teacher knowledge to teach mathematics and literacy. This study might as well establish whether or not the gap identified by Jansen is being addressed through the use of teaching resources.

Holm and Horn (2003) contend that,

a teacher training programme should: equip teachers with knowledge and skills so that they can help students with what to know and how to know, and imbue teachers with teaching strategies which help them get used to powerful learning experiences; make them acquire and understand knowledge of their subject area; help them to comprehend the role of evaluation and to design different ways of evaluation, giving them knowledge about its application; instill in them a habit of reflection; and teach them to be in cooperation with their colleagues, families and society (p. 377).

In this regard, Putnam and Borko, (2000) argue that programmes of teacher learning should be done practically and be situated meaningfully in educators' classrooms. Teaching resources were

an important component of the ACT FP programme as highlighted in the background. The construction and use of teaching resources is an active, practice-oriented process for these teachers. On the same note, Adler and Reed, (2002) mention that the emphasis needs to produce a shift in focus from the resources per se to their use for supporting learning in context. This is in line with the purpose of this study. From the literature consulted in this chapter, it is clearly that there is limited literature on the FP teachers and more so on the FP teacher learning through making and using teaching and learning resources. This research thus seeks to contribute to knowledge on the FP teacher learning.

2.4 Conclusion

The focus of the study is to explore teacher learning from the construction and use of teaching resources. The literature presented in this chapter indicated the importance of teacher learning as an on-going process as well as the domains of knowledge. The South African studies investigated how primary school teachers particularly in FP learn through experience and during teaching practice. The process of literature review enabled me to understand the background of my study, get to know the *experts* in the field, and understand how other researchers have engaged with the research methodologies and processes and, therefore placed my research into perspective. Overall, literature helped me to understand how my study fitted into a broader context of teacher learning while giving me insights into what has been studied, the *current state of research on FP teachers* as well as areas that need further exploration. Given the value of resources in general and teaching resources in particular, as well as the importance of active student engagement in learning through practical tasks and processes such as construction of teaching resources, it becomes vital to understand what the teachers learnt and how they learnt through those processes. The next chapter will discuss the conceptual framework and theoretical framework of the study.

CHAPTER THREE

CONCEPTUAL AND THEORETICAL FRAMEWORKS

3.0 Introduction

The study focuses on teacher learning through the construction and use of teaching resources. The purpose of this chapter is to outline the conceptual and theoretical frameworks of the study. Miles and Huberman, (1994, p. 18) “defined a conceptual framework as a visual or written product, one that explains, either graphically or in narrative form, the main things to be studied, the key factors, concepts or variables and the presumed relationships among them.” The framework assists to clarify concepts and proposes relationships among the concepts in the study. According to Henning, van Rensberg and Smit (2005, p. 3) “a theoretical framework is a lens on which the researcher positions his or her study.” It assists in the origination of the assumptions of the study as well as its links with the world. In addition, it is the binoculars the researcher uses to see the world and then orient the researcher’s study. It also mirrors the stance implemented by the researcher and thus frames the work, enabling discourse between the literature and study.

This study draws from the domains of teacher knowledge (Grossman 1990) as well as on Illeris’ (2009) types of learning. The concepts from the domains of teacher knowledge and the learning theory complement each other in guiding data generation and analysis. Grossman’s domains of teacher knowledge will help answer the question on the kinds of knowledge that the teacher-students gained. Illeris’ types of learning will help in unpacking how the teacher-students learnt and in what ways the learning changed their teaching practice.

3.1 Grossman’s (1990) domains of teacher knowledge.

Drawing from Shulman (1987), Grossman argues that four domains of teacher knowledge form the corner stone of professional knowledge for teaching. These are subject matter knowledge, knowledge of context, general pedagogical knowledge, and pedagogical content knowledge. I will discuss each of the domains in the following section.

3.1.1 General pedagogical knowledge

Grossman (1990, p. 6) asserts that, “general pedagogical knowledge has been the focus of most research on teaching. It includes a body of general knowledge, beliefs and skills related to teaching, knowledge and beliefs concerning learning and learners, as well as knowledge of the general principles of instruction.” This refers to common knowledge of academic principles of learning and teaching. This type of knowledge deals with generic skills that educators are expected to obtain to help them to deal with the general demands of the classroom. In the same vein, Borko and Putnam (1996) state that a professional’s general pedagogical knowledge includes teaching approaches that simplify the contents of a discipline. These teaching methodologies help to create conducive learning environments. Therefore the development of routines for cooperation between the practitioner and learners enhances the educator’s role as a student learning mediator with classroom management strategies. Hence, the teacher-students in this study needed to construct teaching resources to help them promote interaction with learners at the FP, thereby enhancing effectiveness of teaching and learning in their classrooms.

3.1.2 Subject matter knowledge

The second domain is explained by Schwab 1964, (cited in Grossman, 1990, p. 6) who posits that “Subject matter knowledge encompasses knowledge of the content of a subject area, as well as knowledge of the substantive and syntactic structures of the discipline.” The substantive structures are normally understood as the knowledge of concepts, and principles of the discipline that are structured to incorporate its facts and this involves questions that lead to further research in a discipline. Whereas, syntactic structures are rules of evidence, formed and confirmed in the subject and history of the discipline (Turner-Bisset, 1997). Hence, subject matter knowledge can also be called content knowledge. Grossman (1990, p. 7) states that, “content knowledge refers to the amount and organisation of knowledge per se in the mind of the teacher.” On the same note, Grossman (1990, p. 9) contends that “knowledge of content refers to knowledge of the major facts and concepts within the field. It is therefore made up of the teacher’s knowledge of, and about, the content that she or he would teach.” This implies that teacher-students need to be fully equipped with this kind of knowledge in order to effectively impart quality education to the FP learners. In addition, McDiarmid (1994) and Shulman (2004) suggest that knowledge of

content refers to the knowledge that experts have in relation to the content of a specific discipline. This knowledge does not include how to teach, rather, it focuses on the content itself. This is supported by a number of researchers (Ball, 1997; Holt-Reynolds, 1999; Ma, 1999) who emphasise that knowledge of content is a crucial component for educator effectiveness in the classroom. In the absence of adequate grounding in content, the teacher has low internal locus of control and is rather ineffective in the execution of the teaching duties. In line with addressing gaps in the foundation phase, Calderhead and Shorrock, (1997) contend that developing content knowledge does not only require the knowledge of the understanding of the content knowledge, but also an understanding of the learning theories, how children learn, their abilities and how they respond to situations and the use of teaching strategies. The teacher-students have to understand theories on child development in order for them to be able to offer appropriate mediation and be alert to possible learner learning behaviours.

The ACT FP teachers need to have practical knowledge and propositional knowledge. “Practical knowledge is situational; it includes the knowledge of a particular school, class and how particular individuals are likely to behave” (Stuart et al, 2009, p. 194). The teacher-students may acquire this knowledge through day-to-day practice in their classrooms. “The propositional knowledge looks at child development, subject matter (knowledge of literacy and mathematics), the curriculum and classroom management” (ibid, p.195).

3.1.3 Pedagogical content knowledge

Shulman (1987, cited in Bertram 2011, p. 6) described pedagogical content knowledge as the “blending of content and pedagogy into an understanding of how particular topics, problems or issues are organised, represented and adapted to the diverse interests and abilities of learners, and presented for instruction.” Other scholars claimed that the PCK is a combination of general pedagogical and specific subject matter knowledge (Cochran-Smith & Lytle 1999; Garrahy, Kulinna, & Cothran, 2005; Grossman & Thompson, 2008). This reveals that teacher-students have to acquire this kind of knowledge in order for them to improve their way of teaching. Shulman, cited in Knight (2002, p. 231) stresses that “PCK is a ...special amalgam of content and pedagogy... (teachers’) own special form of professional understanding.” This suggests that these teacher-students should have content and a variety of approaches for delivering particular

topics. Pedagogical content knowledge encompasses the educator's appreciation of learning and development of all skills necessary for impartation of knowledge. The ACT FP teacher-students are expected to understand different strategies of teaching literacy and mathematics content to the FP learners. On the other hand, Magnusson, Krajcik, & Borko (1999) explain that PCK includes various types of knowledge for teachers which can lead to transformation. This implies that teacher-students need to understand how this kind of knowledge could be employed in the classrooms. This is in line with Wilson, (2008) who contends that PCK is the way of building an understanding between educators, students and the immediate environments.

3.1.4 Knowledge of context

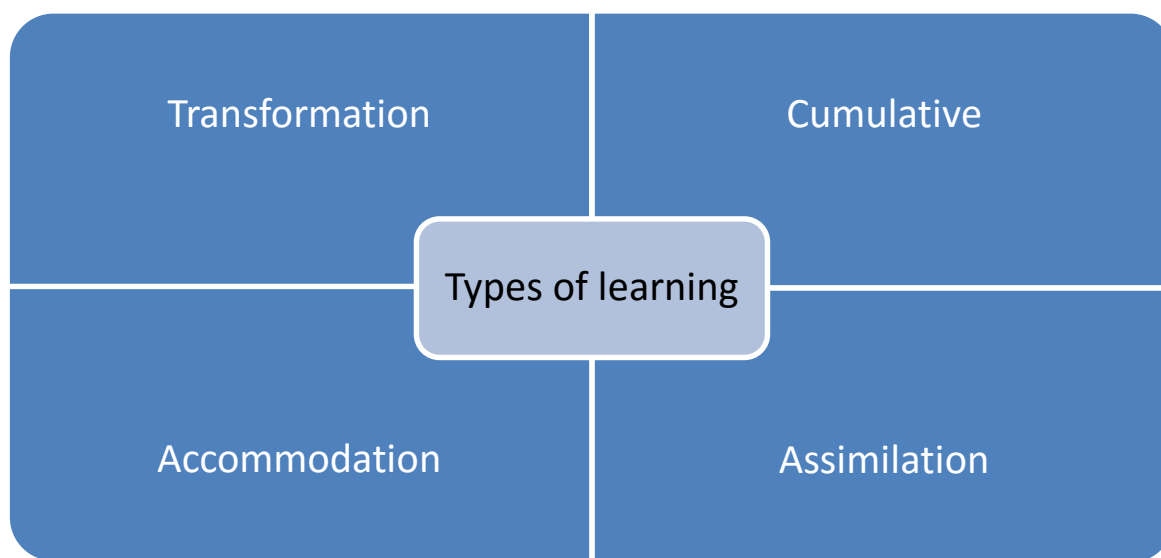
Lastly, Grossman (1990) explains knowledge of context as entailing a deep appreciation of the environment in which teachers execute their duties including an understanding of the opportunities, expectations and constraints that the teaching district imposes on the teacher. It further involves school factors that affect instruction such as settings, culture and guidelines from the department of education. Community factors also come to the fore such as learners' family backgrounds, in particular weaknesses and strengths that shape their learning. This implies that the teacher-students in this study should be well equipped to deal with learners of different cultures and abilities, particularly when grouping them. Turner-Bisset (1991) further contends that classroom performance is a function of educational contexts. The later includes school type and size, size of classes, quality and extent of beginner teacher support, the amounts of feedback received by educators on how they are performing as well as human relations in the school which encompass school principal's attitudes. In other words, knowledge of context embodies the whole school situation including every aspect that the teacher needs to be aware of for higher performance.

3.2 Illeris' (2009) theory of human learning

Illeris (2009) gives four ways in which people learn (cumulative or mechanical; assimilative; accommodative and transformative). Illeris, like Mezirow (1990), describes the human learning theory as a paradigm that involves adult learning. Illeris (2007) defined learning as any process in living organisms that brings about permanent capacity change and which is not solely, due to biological maturation or ageing. Human learning theory involves four major aspects. Firstly the

areas of knowledge and understanding which underlie development of a comprehensive and coherent theory construction (psychological, biological and social conditions involved in any learning situation). Secondly there is the learning itself which includes processes and dimensions, different learning types and learning barriers, which are the central elements of understanding of learning. Thirdly, there are specific internal conditions for example disposition, one's personal situation, age etc. and external conditions (societal influences, learning context, objective situation) which do not only influence learning but are directly involved in the learning. Finally, application of learning is also involved in the theory. Hence, in this study, the learning theory will enable the researcher to understand how the ACT teacher-students learnt, how the learning happened and in what ways the teachers' learning changed their classroom practice. The types of learning are presented in the diagram below:

Figure 2: **The basic types of learning (Illeris, 2009).**



Adapted from Illeris, (2009)

3.2.1 Cumulative learning

Illeris (2009) states that cumulative learning is characterised by mechanisation processes that are used in contexts which are mentally related to a learning situation. Thus, FP teacher-students should learn to construct and use teaching resources in their classrooms since they are already teaching. The new knowledge they acquire could be linked to their previous experiences through

the use of teaching resources. Cumulative learning relates often to isolated formation of something that is novel to what is already known. Consequently it can be attributed to the learning that takes place in the early years of life, but in later years, learning something new often takes place in special situations (Illeris, 2009). Illeris further states that cumulative learning is most important in early childhood; therefore, the use of resources in the classroom could enhance more practical activities among learners together with their teachers. This could formulate the strong base for the learners since accumulation of knowledge happens over lifetime.

3.2.2 Assimilation

Illeris (2009) explains that assimilative learning is learning that occurs by addition to the previously gained knowledge. That means the ACT FP teacher-students build up their knowledge through adding constantly to what they had previously acquired. In addition, the ACT FP teacher-students brought in some kinds of knowledge which they had already acquired through their practice as teachers before the programme. In other words, assimilation occurs when the new knowledge is linked with the previously existing schema. Kutz (1999) adds that whatever is learnt is in relation to the already existing schema of knowledge. In other words new knowledge fits into our previous beliefs and dispositions.

3.2.3 Accommodation

Illeris (2009, p. 13) states that “accommodative learning implies that one breaks down (parts of) an existing scheme and transforms it so that the new situation can be linked in.” This type of learning benefits people who base their learning on ‘hands-on’ experience. Hence, the ACT FP teacher-students were expected to learn through the hands-on construction of teaching resources. Thus, it was expected that the ACT FP teacher-students in this study learnt both individually and collaboratively in the processes of constructing and presenting teaching resources to their peers and lecturers. Illeris (2009) points out that the outcome of accommodative learning is illustrated by the fact that it can be recalled and utilized in challenging situations which are similar. Accommodation is typically experienced as having understood or got hold of something which one has really internalised. Internalisation is a process in which a person acquires knowledge initially mediated by other people or artefacts but later comes to be controlled by the person as

they adapt that learning appropriately to regulate their practical activities (Johnson & Golombek, 2003). Constructing relevant and effectively usable teaching resources takes a long time and through such prolonged engagement, the teacher-students are likely to internalise - to acquire knowledge appropriate to the learning and then regulate it as they apply it in the classroom.

3.2.4 Transformative learning

Transformative learning is defined “as the process by which we transform problematic frames of reference (mind-set, habits of mind, meaning perspectives), set of assumptions and expectation to make them more inclusive, discriminating, open, reflective and emotionally able to change” (Illeris, 2009, p. 92). This learning involves personality changes or changes in the organization of the self which are characterized by simultaneous restructuring of schemes and patterns in all of the three learning dimensions (content, incentive and environment). This brings about change in one’s practice. Mezirow and Associates (2000) further state that transformative learning is a challenging development that involves changes to core aspects such as professional identity and has deep significance for the learner. Cranton (1994) states that reflexivity is one of the underlying themes of transformative learning for adult students. Thus, through the task-oriented process of making and presenting teaching resources, ACT FP teacher-student are likely to learn from these processes and from reflection and feedback on marked objects and their presentations. The teaching resources like abacuses, balls, ropes etc, enhance the transformative learning which involves an experience of a deep structural shift in the basic premises of actions, thoughts and feelings.

Mezirow (2000) again states that educational or academic work is very important in enhancing fundamental changing to adult learner’s perspectives and this explains transformative learning. Hence, the ACT FP teacher-students in this study might learn and adopt new ways of teaching Grade R-3 learners through the construction and use of charts, flash cards and other teaching resources in this programme. This is in line with Mezirow (1997) who states that educators need to make classroom environments stimulating which enhance learner innovation as they work in groups and as individuals. The construction and use of appropriate teaching resources may allow these teacher-students to be creative and discover new things for themselves.

3.3 Conclusion

In this chapter, the conceptual framework i.e. the domains of teacher knowledge, was discussed together with the theoretical framework, Illeris' (2009) types of learning. Various scholars have been used to clarify and relate the conceptual and theoretical frameworks to the study. The following chapter details the location of the study; the methodology and research design adopted, as well as the ethical issues related to the study.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.0 Introduction

The previous two chapters gave an overview of the literature review as well as the conceptual and theoretical framework. The purpose of those chapters was to present the theoretical foundations in which the study is rooted. In that view, this chapter presents the methodological framework of the study. It is thus essential to reiterate that the main objective of the study is to explore the concept of teacher learning through the construction and use of teaching resources within an ACT FP programme. The chapter outlines the approaches to the study and the research design. It further explains the sampling procedure adopted, followed by an in-depth discussion of the methods of data generation and data analysis. The chapter closes by looking into ethical issues related to the study.

4.1 Research paradigm and design

This study is framed in the qualitative research design within an interpretive paradigm. According to Schwandt (2001), “an interpretive paradigm provides a deep insight into the complex world of lived experiences from the point of view of those who lived it” (p. 118). This implies that as the ACT FP teacher-students answered interview questions, they explained what they learnt and in what ways they learnt it, as well as how the learning affected their practices based on their personal lived experiences. Creswell (2010) asserts that, qualitative research studies engage in research, probing for in-depth understanding of a phenomenon rather than search for unintended relationships. He further emphasises that employing qualitative research approach gives room for respondents to elaborate their views in as much as it offers the researcher the flexibility to modify the questions when need arises. Due to this flexibility, I was able to make modifications to the instruments during data generation. Qualitative research is concerned with in-depth exploration of how participants make sense of their context. It also enables generation of subjective data from participants (Creswell, 2010). As this study explored the kinds of knowledge teachers gained through developing and using teaching resources, how

they gained that knowledge and the way the learning shaped their practice within a formal qualification, this design therefore enabled elicitation of information from the perspectives of the participants.

The study was guided by the following critical questions:

- ❖ What kinds of knowledge do the foundation phase teachers acquire through the construction and use of teaching resources in the ACT FP programme?
- ❖ How do FP teachers learn through the construction and use of teaching resources in the ACT FP programme?
- ❖ In what ways do teachers say that the construction and use of teaching resources on the ACT FP programme improves their practice?

The first and second research questions were addressed by focus group interviews and photographs of the teaching resources that were taken by the researcher. The lesson observations complimented by photographs addressed the third research question.

4.1.1 Research context

This study was part of a bigger research project which set out to explore the knowledge bases of the FP teachers enrolled for the ACT FP programme. The ACT FP was a 2-year programme. According to Ebrahim et al, (2012) the ACT FP programme was intended to provide a deep and systematic understanding of current thinking, theory, practice and methodology in the FP. This programme at UKZN was conceptualized as a mixed-mode offering using written interactive materials for self-study combined with a limited number of face-to-face tutorials that were offered at various satellite learning centres in the province. Since 2000, the Advanced Certificate in Education (ACE) had been offered to teachers as a way of deepening their subject knowledge in the subject which they already taught, or were to specialize in a new content area or phase. However, there has not been a great deal of systematic research to track exactly what teachers learn, and how they learn through this kind of formal programmes. The continuing poor numeracy and literacy achievement of Grade 3 and Grade 6 learners seems to indicate that teacher learning on formal programmes like the ACE do not necessarily impact on their learners' achievement.

In the new Minimum Requirements for Teacher education policy framework (Department of Higher Education and Training, 2011), the ACE is renamed as an Advanced Certificate of Teaching (ACT) focusing specifically on FP teachers. This is understood by the Department of Basic education (DBE) as an important way to improve teachers' competence. The ACT programme was intended to accredit the professional development of teachers with a prior qualification in Foundation Phase teaching at a lower level, or to retrain qualified teachers in a new teaching subject, namely teaching in the Foundation Phase; deepen subject matter knowledge, general principles and methodology in relation to teaching Grades R-3; develop appropriate knowledge, skills, values, attitudes and dispositions of educators within the fields of Foundation Phase curriculum, policy, and pedagogy; and enable students to develop disciplinary, pedagogical, practical and situational learning reflexive competences in teaching and learning in the Foundation Phase of schooling.

This study, based on the ACT FP programme at the University of KwaZulu-Natal. The programme offered training for teachers teaching Grade R to Grade 3 in KwaZulu-Natal province. The teacher-students who participated in this study were in the first cohort that enrolled on the ACT programme in January 2013. The study investigated 14 teacher-students who were all interviewed and among them, six were observed teaching. The details of the schools where they were teaching, together with their biographical information are provided in Table 1. For observations, I chose to have a mixture of rural, township and urban schools to obtain a picture of what happens in different settings and environments.

This section has discussed the research paradigm and design, research questions and the research context. The next section will discuss the sampling method, data collecting techniques, pilot study and data analysis.

4.2 Sampling

Sampling implies the selection of a section of the population for investigation in which the researcher is interested. A more accurate understanding of the population is understood as requiring one to study a representative sample. McMillan and Schumacher (2010) explain that sampling is a group of respondents from whom information is generated. Creswell (2010) maintains that sampling involves selecting a small portion of the population under investigation,

while the population is an aggregate or totality of the members that share some characteristics (Pilot & Hungler, 1999). In other words, population is a group of people who share some commonality.

Decisions concerning samples are made for the determination of attaining the richest possible source of data in order to answer the research questions. Onwuegbuzie and Leech (2007, p. 242) stated that, “in qualitative research, the sample size should be large enough to generate ‘thick description’ and rich data...” Qualitative research usually involves a smaller number of participants than those of quantitative research studies because researchers want to generate in-depth information (McMillan & Schumacher, 2010). Thus in my study, the small sample enabled me to generate in-depth data from the perspective of the teacher-students. The ACT FP programme had a population of 86 teacher-students who enrolled at UKZN in 2013. I sought the voluntary participation of the teacher-students who were registered for their second and final year of the programme in 2014. I employed convenience sampling. Leedy and Ormond (2010) suggest that convenience sampling makes no pretense of extracting a representative subset of the population as it takes people or units that are readily available for research purposes.

4.2.1 Convenience sampling

Cohen et al. (2011) suggest that this type of sampling is sometimes called, accidental or opportunity sampling which involves selecting the closest individuals to serve as research participants or using those who happen to be easily available and accessible at the time and continuing that process until the required number has been obtained. Participants for this study were second year students who were accessible and willing to participate in the study. Since I was a tutor on the programme, they were easily accessible. From the total population of 86 ACT teacher-students who registered for this programme in 2013, I chose a sample size of 14 participants. This is in line with qualitative research which recommends small samples in order to generate in-depth information (McMillan & Schumacher, 2010).

4.2.2 Biographical information of participants

The biographical information of the ACT FP teachers who participated in this study is presented in Table 1. Twelve out of the 14 participants in this study had a National Professional Diploma in Education (NPDE) qualification which they had acquired between 2006 and 2012. One of the participants had a Diploma in Educare and NPDE, and the fourteenth participant had an Adult Basic Education and Training (ABET) certificate plus a Junior Primary Teachers' Diploma (JPTD). Eight of the fourteen teachers were teaching in schools located in rural contexts, three were in urban areas, and three in township schools. In terms of the learning phases, three of the teachers were Grade R teachers, five were teaching Grade 1, another five were Grade 2 teachers and one was teaching a multi-grade class.

Table 1: Biographical details of ACT FP teacher-students who participated in the study.

Codes used in place of names	Grade taught	Number of years teaching	Previous qualification	Location the school
Teacher 1	2	8	NPDE	Rural area
Teacher 2	2	9	NPDE	Urban area
Teacher 3	1	8	NPDE	Rural area
Teacher 4	1	2	NPDE	Rural area
Teacher 5	2	10	NPDE	Rural area
Teacher 6	2	5	NPDE	Rural area
Teacher 7	1	2	NPDE	Rural area
Teacher 8	1	25	ABET & JPTD	Township
Teacher 9	1	3	NPDE	Rural area
Teacher 10	R	8	NPDE	Township
Teacher 11	R	12	NPDE	Urban area
Teacher 12	R	18	NPDE	Urban area
Teacher 13	2	11	NPDE	Township
Teacher 14	Multi-grade	12	Diploma in Educare & NPDE	Rural area

Key: Codes (Teacher 1, Teacher 2) were used for confidentiality.

Teachers 1-8 were interviewed while 9 -14 in bold were interviewed and observed.

4.2.3 Pilot study

A pilot study is understood as a small study to try out research protocols, data collection tools, sample selection strategies and other research techniques in preparation for a large study (Zailinawatj, Schatter & Mazza, 2006). In this study, pilot testing of the interview schedule was done by the academics carrying out the big project in which my study was only a small strand. I piloted the lesson observations through observing one participant before the major lesson observations were done. Pilot testing is important in any research as it helps to identify potential problem areas and deficiencies in the research instruments and protocol prior to the implementation during the full study (Zailinawatj, Schatter & Mazza, 2006). Piloting helped me to identify some overlapping activities which I observed and corrected. This is supported by Seidman (1998) who asserts that the pilot can inform the researcher to aspects of the methods that enhance or detract attainment of study objectives. Later, I was able to step back and reflect, discuss with my supervisor and requested for cross-checking before I eventually used the instrument in the field. This experience enabled me to revise and refine the instrument, thereby enhancing rigour.

4.3 Data collecting techniques

The focus group interviews, lesson observations and photographs of the teaching resources were used as data generation instruments for this research.

4.3.1 Focus group interviews

Gwimbi and Dirwai (2003) defined an interview as a conversation between the interviewer and the interviewee for purposes of obtaining relevant information for the research. In this study, interviews were an appropriate instrument for data generation because they suited the nature of this qualitative research which sought to understand from the ACT FP teacher-students' perspectives, what they learnt, how they learnt and the ways in which that learning influenced their classroom practices. White (2005) adds that interviews are flexible; for instance, when the respondent shows lack of understanding of the question, the researcher can rephrase and ask further questions for more detailed answers. This aspect was useful in this study. In addition, the

interviewer can ensure that respondents offer responses sequentially which then minimises mistakes when analysing the data (White, 2005).

Creswell (2005) states that “Focus groups can be used to collect shared understandings from several individuals as well as to get the views from specific people” (p. 215). Pre-planned questions that will guide the interviews contribute to the semi-structured nature of the discussion (Creswell, 2005; Lichtman, 2006). In this study, the semi-structured questions helped to get participants to clarify their views. Participants expressed themselves freely and openly in the company of their peers. The questions in Appendix 6 which were trying to answer the first and the second research questions were used in this study. Question one asked what the kinds of knowledge the FP teacher-students acquired through the construction and use of teaching resources during the programme. Thus, this research question could be well addressed through interviews as the participants were likely to express themselves through examples which made it easier to pick what exactly they had learnt. For instance; the question which was intended to lead to the answer of question 1, “What do you think is the most important thing you have learned?” Question 2 was addressed with the answers related to Illeris’ ways of learning and question 3 was about the learning from the constructing and using of teaching resources on the ACT programme whether it improved their practice. Hence, in explaining what they learnt, it was easy to identify the types of learning involved. For instance, one explained that she had learnt the *“kinaesthetic style, this was new to me.”* The fact that she mentioned that this was new suggests accommodative learning. Teacher 5 said: *“I learnt better ways of grouping children.”* This suggests that she knew about grouping learning but better ways implies assimilation which is learning by addition.

In trying to answer question 3, teachers talked about the ways they approach their teaching in their classrooms. For instance, Teacher 8 said: *“I did not pay attention to slow learners; I would just go with those who understood.”* In addition Teacher 1 said: *“...before I never allowed them to talk or use teaching resources but now I also sit there with them and demonstrate how to use the toolkits (teaching resources).”* This shows that there was kind of transformative in their practice. Furthermore, in the focus group interview, the questions such as; “Is your teaching different after enrolling on ACT programme?” also enabled participants to talk about the ways in which their practice had changed. Hence, the approach helped them to explain in detail what

kinds of knowledge they acquired from making and using teaching resources. In addition, semi-structured questions helped me as the researcher to understand how they acquired different kinds of knowledge from constructing the teaching resources and how that influenced their teaching. This is supported by Maree and Pietersen (2007) who contend that participants are likely to give detailed responses and get clarification on questions should that be required.

As part of the big project, the five team members (three lecturers and three post-graduate students) conducted a total of four focus group interviews in pairs (one student and one lecturer). The interviews were done twice, the first one when the teacher-students were in their first year of the programme in 2013, then the second interview in November 2014. I was an interviewer in the 2014 interviews. Each group had about six participants. All focus-group meetings were voice recorded and all the groups were asked the same questions following a similar sequence. Interviews took about one hour. I transcribed the audio records verbatim. To transcribe verbatim means I took the words of the participants as they were said. According to Hornby (2011, p. 1587) to transcribe is to “record thoughts, speech or data in a written form.” Hence, this enabled me to personally get engaged with the data in order to familiarise with it, which in turn also helped me to understand the emerging themes before the actual data analysis.

4.3.2 Photographs

During the interviews, I took photographs of the teaching resources (charts, balls, skipping ropes, story books and flash cards) constructed by teacher-students for the Numeracy and Literacy modules: for example, use of bright colours on charts as well as making teaching resources according to the levels of learners. The resources constructed were informative and non-informative. These photographs helped me to understand the nature of the teaching resources constructed by the participants, in as much as it helped me to appreciate what they learnt from the constructions of those teaching resources.

4.3.3 Observation

Observation entails watching and writing down in a systematic way, the elements of interest in the unit of analysis (Simpson & Tuson, 2003). Research question 3 in this study tries to explore the ways in which the teacher say that the construction and use of teaching resources on the ACT

FP programme improved their practice. During the focus group interview, teachers mentioned that they gave learners time to struggle with questions before giving them answers, they involved all learners and used resources effectively. Teacher-students also talked about helping slow learners, so observation gave me an opportunity to check on all these and some other aspects they mentioned in the interview. Thus, in this study, I used lesson observations to obtain first-hand information on how the ACT FP teacher-student taught using teaching resources as well as to understand and observe the ways in which they said the learning and use of resources had improved their practices. In addition, lesson observations also assisted me to understand how the teacher-students linked the teaching resources to the levels of their learners.

Cohen et al. (2011) indicate that semi-structured observations are carried out with special variables in mind of what the researcher wants to measure and can remain unsystematic and less predetermined. ‘Structured’ in this instance means that the researcher does not need to observe anything in particular, but will observe that which he or she decides to observe in advance (Westover, 2002). In that regard, the semi-structured observations were non-participant. Non-participant observation is a relatively inconspicuous research approach for gathering data directly from the field about some phenomenon without intermingling with the participants (Ostrower, 1998). The author further states that when using this method, researchers should be careful not to influence the environment they observe. I used a semi-structured observation guide so as to get a better appreciation of how the educators used the teaching resources in their teaching environments. While the Hawthorne effect may not be ruled out, the semi-structured observation guide helped me to particularly focus on the predetermined aspects (Diaper, 1990).

4.4 Data analysis

“Data analysis in qualitative studies refers to the process of breaking up or segmenting the data into parts and reassembling the parts into coherent whole” (Boeije 2010, p.76). In this case, I processed data from the interviews, lesson observations and photographs together. I read the transcribed interviews many times and paid attention to audio tapes repeatedly to understand what the participants said. Transcribing interviews verbatim enabled me to imbibe in the data and identify recurring themes. I picked up some phrases/themes/indicators that indicated learning in a particular domain of knowledge. I then send both transcriptions of the identified themes and

indicators to my supervisors as “critical friends” to identify any errors or omissions to enhance dependability. The identification of themes was in line with Braun & Clarke (2006) who argued that thematic analysis is a way of recognizing, scrutinizing and recording trends (themes) within data. For the question about what knowledge teachers acquired, I used Grossman’s (1990) domains of knowledge. For the question about teacher learning, I used Illeris’ (2009) types of learning. These sets of categories will be discussed in detail in Chapter 5.

I then highlighted the phrases/themes/indicators answering the different research questions with different colours. Thereafter, I went through the data again to count the participants who had made reference to the particular research questions, again using different colours for different questions. I then put the indicators for the different questions in tables and created other tables for the number of participants who referred to the kind of knowledge, types of learning and the ways in which they changed their practice. I then went back to find appropriate quotes for the different research questions that I would use as examples in presenting findings.

In relation to lesson observations, I read the lesson observation notes in order to find the link between what the participants said in the interviews and what I observed and repeated the process of highlighting indicators for different questions. I also selected the appropriate photographs of teaching resources which I took during the lesson observations.

I discuss ways of enhancing rigour that were adopted in the following section.

4.4.1 Trustworthiness of the study

Lietz and Zayas (2010) suggest that qualitative studies should not focus on validity but should achieve ‘trustworthiness’, which means that a study embodies the views of the research participants as accurately as possible in the findings. The researcher should avoid researcher bias by ensuring no personal influences. A study is trustworthy if steps are taken in the research procedures to ensure that the perspectives of the participants are authentically gathered and accurately represented in the findings. Lietz and Zayas (2010) stated four concepts that work together to achieve trustworthiness: auditability, credibility, and confirmability and transferability.

4.4.2 Credibility

“Credibility refers to the degree to which a study’s findings represent the meaning of the research participants” (Lietz & Zayas, 2010, p. 191). Drisko (1997, p. 191) suggests that qualitative “interpretations must be authentic and accurate to the descriptions of the primary participants.” This is in line with Padgett (2008) who explains that to credibility could be achieved by reducing risk of bias and research reactivity. Research reactivity refers to the likelihood of the researcher or the study procedures to exerting an influence on the respondents, thereby impacting research findings (Lietz & Zayas, 2010). As qualitative researchers seek to achieve credibility, researchers may try to make their data generating efforts less intrusive and conspicuous without deceiving the participants. This means that when using instruments such as the audio-recorder for data generation, it should not interfere with participants’ attention or make them say things to impress the researcher. In this study, the interviews were audio-recorded, and the audio recorder was a small gadget which was placed on the table in such a way that it captured all voices without attracting any attention. In addition, qualitative researchers reduce the risk of researcher bias in order to attain credibility by engaging in reflexivity (Drisko, 1997).

4.4.3 Transferability

Transferability generally means the degree to which findings can be applicable or useful to theory, practice and future research (Lietz & Zayas, 2010). Devers (1999) also suggests that, findings can achieve transferability, if the context is similar. Therefore, it is the role of the researcher to identify major aspects of the context from which the findings emerge and the degree to which they may be applicable to other contexts. Thick description was considered as one way of enhancing transferability for this study. The thick descriptions in the data presentation and discussion of findings helped to take the reader to the context of the study and the processes involved so that they could decide whether or not to transfer the findings to their own context or situation. Creswell and Miller (2000) explain that “the purpose of thick description is that it creates verisimilitude, statements that produce for the readers the feelings that they have experienced, or could experience, the events being described in a study, thus credibility is established through the lens of the readers who read a narrative account, and are transported into a setting or situation” (p. 128-129).

4.4.4 Auditability

Padgett (cited in Lietz and Zayas, 2010, p. 195) defines “auditability as the degree to which research procedures are documented, allowing someone outside the project to follow and critique the research process.” The methods employed to raise the level of auditability in this study were keeping an audit trail and meeting for briefing one another on progress. An audit trail is a written explanation of the research procedure that contains a report of what happened all the way through the research project along with a demonstration of reflexivity. In addition peer debriefing implies consulting with researchers experienced in qualitative methodology (Padgett, 2008 cited in Lietz & Zayas, (2010). The quality of the project can be enhanced through discussions of research decisions and processes (Shenton, 2004). Peer debriefing can help to encourage self-reflection which helps researchers become aware of the impact of their world view. In this study, I constantly presented my work to my year group peers and research lecturers at different stages of the study. Each time I got valuable feedback which helped me to reflect on my work. I also continually discussed and received guidance from my supervisor. This enhanced the research process by creating new ideas and recognizing potential weaknesses of the methodology.

4.4.5 Confirmability

Confirmability refers to the ability of others to approve or validate the research findings (Lietz & Zayas, 2010). In the same vein, Shenton (2004) contends that, measures must be taken to ensure that the research findings are the result of the experiences and ideas of the participants, rather than researcher characteristics and preferences. I demonstrated that the findings and data of this study were clearly from the participants by taking quotations of what the participants said and inserting them in the presentation of findings. Given that, the next section will focus on ethical issues.

4.5 Ethical issues

Cohen et al. (2007, p. 58) defined “ethics as a matter of principled sensitivity to the rights of others, and that, while truth is good, respect for human dignity is better.” In this study, the rights of the individuals were maintained and upheld. Permission was granted by participants before

data collection through a consent form that they signed. This is seconded by McMillan and Schumacher (2006) who propounded that when conducting a research in an institution like a university, consent for conducting the investigation should be acquired from the institution as well as the human subjects. This study was a strand of a big project that endeavoured to realise the knowledge bases of the FP teacher-students. As such, ethical clearance was granted by the UKZN Higher Degrees Research and Ethics Committee in 2013.

4.6 Role of the researcher/ Limitations of the study

During the data gathering process the first problem I encountered was that I was a tutor to some of the teacher-students. This required me to shift my role from being a tutor to become a researcher, which created new power relations. As this study was limited to the foundation phase teachers (Grade R to 3) who were enrolled for the ACT FP programme at UKZN, I explained the nature of the study to the participants as well as the aims of the study in order to be taken seriously and be respected for my role as a researcher. Again, being a part-time tutor in the ACT FP programme may have impacted on the findings, but to minimise this and enhance rigour, I tried to be very objective through lesson observations following the observation schedule and paying particular attention to those aspects I had intended to observe in advance and taking photographs. During the interviews, I also tried to probe and follow up on the participants' responses and adopted an open mind.

Methodologically, findings will not be generalised because sampling was by convenience and the sample size was small. However, findings can be applicable to similar contexts. In addition, in reporting findings, I provided thick descriptions to enable readers to decide on applicability of findings to their own contexts.

4.7 Conclusion

In this chapter, the methodology of the study was discussed. The qualitative research within an interpretive paradigm which framed and guided the study and the research design were explained. The aspects of enhancing rigour in the study as well as the ethical issues have been elaborated. In chapter five, the analysis and presentation of the generated data will be discussed as the research findings.

CHAPTER FIVE

FINDINGS

5.0 Introduction

The focus of my study was to explore teacher learning through the construction and use of teaching resources within an Advanced Certificate in Teaching (ACT) programme. Chapter four looked at the methodology which informed this study. This chapter is a presentation of the findings from the interviews, lesson observations and photographs of teaching resources. The study was guided by the following key questions:

What kinds of knowledge do the foundation phase teachers acquire through the construction and use of teaching resources in the ACT FP programme?

How do foundation phase teachers learn through the construction and use of teaching resources in the ACT FP programme?

In what ways do teachers say that the construction and use of teaching resources on the ACT FP programme improve their practice?

5.2 Findings

The data generated through focus group interviews with the teacher-students, lesson observations, and photographs of teaching resources are presented together in order to avoid repetition and overlaps. Of the 14 teachers who were interviewed, only six teachers were observed after they completed their programme to confirm if what they were doing was in line with what they said in the focus group interviews. I observed each teacher once for the duration of 40 minutes per lesson. Teachers number nine to fourteen (9 to 14) in bold in Table 3 were both interviewed and observed, while teachers one to eight (1 to 8) were only interviewed. In presenting the data, the same codes used in the Table 2 for example “Teacher 1 said...” are used.

Table 2 below provides some of the indicators which assisted in identifying the kinds of knowledge and types of learning mentioned in the teachers’ statements during the interviews.

Table 2: Indicators of how the kinds of knowledge were identified.

Knowledge domain (from Grossman, 1990)	Indicators	Example from interview
General Pedagogical Knowledge	Statements that alluded to general teaching methods like group work, lesson planning and classroom management	<i>In ACT 1 I learnt to manage time in the classroom</i>
Pedagogical content knowledge	Statements that suggested knowledge of how to interpret specific content in light of what they know about their learners; structuring lessons to accommodate weak learners and strong learners, selecting suitable teaching resources for the level of the learners, organizing content to suit all learners, using strategies that are particular to the teaching of literacy or numeracy;	<i>I learnt how to prepare and organise content for teaching learners who are performing at different levels.</i>
Subject Matter Knowledge	Statements that reflected knowledge of facts and concepts linked to numeracy, literacy or child development theories. Knowing the content to be taught, concepts learnt and their application	<i>I learnt eight principles of phonemic awareness, for example; isolation, identification, categorisation, blending etc.</i>
Knowledge of Context	Statements that revealed the understanding of specific context, for example, identification of learner problems, backgrounds, families, interests; knowledge of the school organisation.	<i>I became aware of learner backgrounds and diagnosing learner problems.</i>

5.3 Domains of knowledge

Table 3 below shows what participants said during the interviews. A tick (✓) represents at least two comments which a teacher made in the interview. The tick (✓) indicates that the participants talked about that particular knowledge domain and where there is blank it shows that they were silent about it. The silence implies that teachers did not mention this knowledge in the interview although they may have gained it. Generally, from the teachers' comments during the interviews, the knowledge that was mostly mentioned was general pedagogic knowledge as indicated in the

Table 3 below. However, a significant number of teachers (six of the fourteen) talked about knowledge of content as also reflected in this Table.

Table 3: Teachers talked about different kinds of knowledge they acquired from construction and use of teaching resources.

	General pedagogical knowledge	Pedagogical content knowledge	Subject matter knowledge	Knowledge of context
Teacher 1	✓		✓	
Teacher 2	✓		✓	✓
Teacher 3	✓	✓	✓	
Teacher 4	✓	✓		
Teacher 5	✓		✓	
Teacher 6	✓	✓		
Teacher 7	✓	✓		✓
Teacher 8	✓	✓	✓	✓
Teacher 9	✓	✓		
Teacher 10	✓		✓	
Teacher 11	✓	✓		✓
Teacher 12	✓			✓
Teacher 13	✓	✓		✓
Teacher 14	✓		✓	
Total no of teachers	14	8	7	6

Judging from the table above, General Pedagogical Knowledge was topping the list followed by the Pedagogical Content Knowledge and the Subject Matter Knowledge. Knowledge of context had the least reference during the interviews. This could be because participants may not have found this type of knowledge as crucial given that the topic focused on construction and use of teaching resources. It may also be because the participants are experienced teachers who might already have had knowledge of their teaching context.

5.3.1. General Pedagogical Knowledge (GPK)

Teachers' comments suggest that they gained mainly GPK and PCK as reflected in Table 3. All fourteen (14) teachers made comments which suggested that they had gained GPK from the ACT programme through construction and use of teaching resources. In the interviews, some teachers mentioned gaining knowledge related to "Writing styles". This was evident in the classrooms of the teachers observed, where charts were clearly written in black, blue, green and red for phonics or blends. The handwriting was clear enough to be seen by anyone from any position even from the back of the classroom. These writing styles were also evident from the charts which were photographed during the interviews. Teacher 4 pointed this out in the interview:

Must not be in bright colours e.g. pink charts and use of orange colour on the chalkboard.

The charts which were displayed on the classroom walls that I observed were neither orange nor pink, while white chalk was used to write on the chalkboard. Again, this suggests that the teachers had acquired the knowledge around GPK and the knowledge of 'how to'. Eraut (1994, p. 15) "calls this type of knowledge 'practical know-how' that is knowledge about which is present in the action of teaching itself." He further states that, "...it is a combination of what one knows, does and learns from doing." It was noted that these teachers also viewed the making of teaching resources that they would use for their teaching as having given rise to some cost saving dimension. This was evident when Teacher 5 said that:

Now I know how to prepare aids. I don't have to buy teaching resources. I know how to make my own resources.

In the lesson observation of Teacher 9, a Grade one teacher in a rural school, this was confirmed as she used dice with numbers that she wrote on their sides which she had constructed instead of dots which are commercial. The teacher was able to use the dice with slow learners, showing them the numbers on the dice she constructed and using lollipop sticks which the learners picked from their environment as counters to match the numbers and solve the problems. The fast learners were given numbers and they used counters to solve the problems without first matching them. For example sharing 8 equally, the learners were to count 4 lollipop sticks and put them aside and the other 4 aside without their teacher's help (*IIII and IIII then I IIIIII = I III + I II I*)

thus $8 = 4 + 4$. In other words, learner learning diversity was accommodated and handled well by Teacher 9. For the teacher, having identified the value of using the dice as part of the teaching resource, she then adapted from the usual dots to numbers which the fast learners could utilise. The whole process was then being done using appropriate technology of ‘home-made’ teaching resource instead of purchasing ready-made dice.

*I learnt the kinaesthetic style... that some learners learn more by touching
(Teacher 8).*

Evidence of this was in Teacher 13’s Grade 2 classroom where learners used bottle tops, dots, numbers and number lines. This illustrates an attempt at various strategies of resources which would appeal to all learners’ cognitive levels. So, clearly in order to move up to abstraction requires an understanding of concrete details which was what Teacher 13 of Grade 2 in a township school in this study attempted.

The interview data revealed that all fourteen Teachers learnt that child grouping is of importance. This was illustrated by Teacher 1 who stated that, *“I learnt the importance of child grouping.”* Teacher 2 also mentioned that, *“I learnt to group learners according to their abilities.”* In the lesson observations, Teacher 9 teaching Grade one in a rural school was also observed to have arranged her learners in groups according to ability. She gave each group some lollipop sticks (teaching resources) from her toolkit to use for the task. The task was on sharing counters equally (doubling). The groups were given different numbers divisible by 2. Thereafter, the teacher moved around checking their answers without commenting on their findings. These groups were given ample time to report back on the numbers that were assigned to them; for example 12, 8, 14, 10, 18, 20 and the teacher wrote the answers on the chalkboard. These were some of the answers she wrote; $12 = 6 + 6$, $8 = 4 + 4$ etc. The learners were therefore given a division task to do instead of being spoon fed or rather being treated as *tabula rasa*. The learners were counting the lollipop sticks together within their groups and agreeing on their answers.

Five of the six teachers were observed engaging their learners in group work activities and scaffolding their learning during the lesson observations. Scaffolding is defined as a support that helps children achieve success on tasks that would be too difficult for them to achieve by themselves (Wood, Bruner & Ross, 1976). Scaffolding confirmed the teachers’ comments during

the interviews about what they had said they learnt regarding handling of group work, handling diversity and allowing learners to learn through play.

However, the lesson observations also showed that the teacher did not only believe in learners working in groups, but also in giving one-on-one attention. After Teacher 9 wrote the answers for each group on the chalkboard, she then moved to the learners and assisted those who were struggling, showing them how to share 4 counters equally. For example she said, “*One for you and one for your mom*”, until all counters were finished.

Scaffolding also refers to assisting learners to verbalise their thoughts and their learning, encouraging them to think (reflect) and encouraging them to explore through explaining, demonstrating or questioning. In Figure 3 below, scaffolding is evident as the teacher used the dots to assist learners to write their names.



Figure 3: Teacher using dots to assist learners’ to write their names.

On the other hand, it is important for a teacher to understand how to handle learners who are learning at different levels. In the interviews, Teacher 4 stated that: “*I learnt new ways of teaching. Now I know diversity and how to differentiate children who have different abilities.*” This suggests that the teachers learnt how to handle learners with mixed ability.

This was also confirmed by Teacher 11 who stated that:

I learnt that I must start with what learners know. We must not bring knowledge to learners but it should come from learners. I learnt how to drive learners to the right goal that I am aiming at, allowing them to struggle on their own first not just give them answers or asking them questions so that they get to the correct answer.

During a lesson observation, Teacher 14 teaching multi-grade in a rural area gave the learners the teaching resources that she had prepared in the form of worksheets to measure different items like height of the learner and distance between objects. The teacher stood in a vantage position where she could see how each learner was doing because the number of learners was very small. She gave rulers to her learners and also asked other learners to clap hands for those who gave correct answers. The following photograph is an example of a worksheet she gave to her learners so that they can measure the lines on each object.

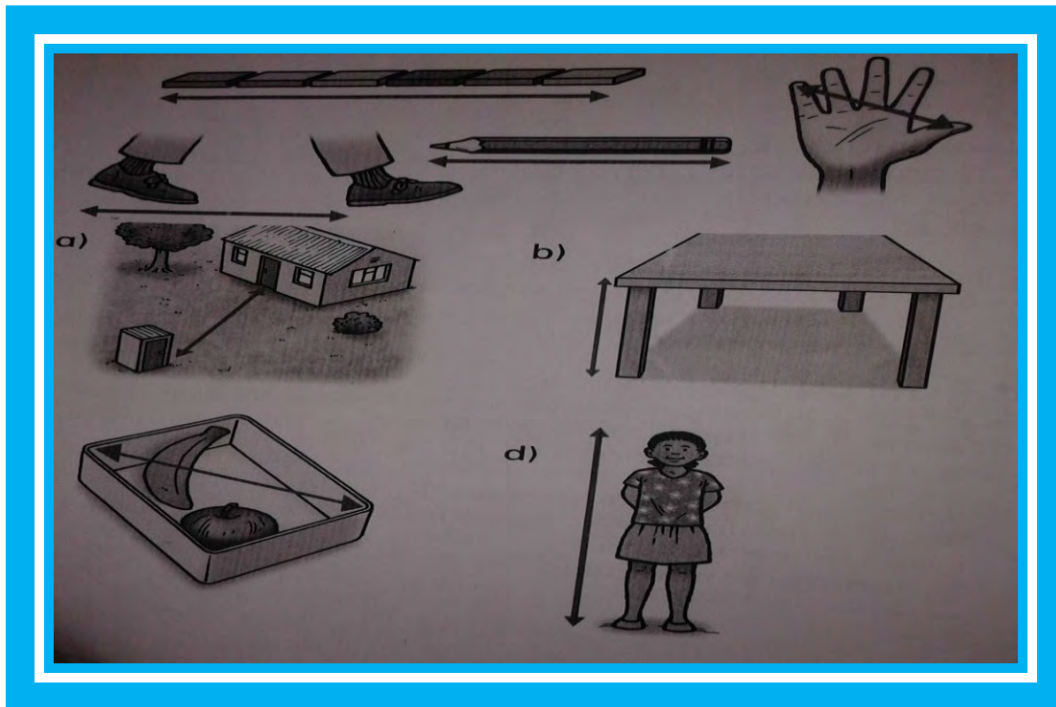


Figure 4: Worksheet used by learners in a multi-grade class.

Teacher 14 did not assist learners or tell them the answers but she left them to try and measure the lines, allowing them to struggle on their own first. During observation, I noticed that some learners were placing the rulers starting from 2cm, others started from 1cm and some from 0cm. The learners reported back their findings while their teacher wrote the answers on the chalkboard. These were examples of answers given by learners; (a) 2cm, 4cm, 3cm and for (d) 5cm, 7cm etc. However, it was not clear from the teacher's explanation why there were such different responses yet she had demonstrated at the beginning that measuring should start at 0cm. One of the learners said "it is 7 centimetres." Teacher 14 also insisted on using the units of measurements. Lastly, the teacher went to correct those learners who were confused and were not clear about where to start or how to measure using a ruler. The finding shows that Teacher 14 understood that learners should not be given answers at first, but they definitely need to be shown if their answer is incorrect and why. This encourages discovery learning which ensures clearer understanding on the part of learners. Discovery learning encompasses an instructional model and strategies that focus on active, hands-on learning opportunities for learners (Piaget, 1973).

The ACT FP teachers also learnt how to motivate their learners. Teacher 8 stated that:

I learnt new teaching styles that motivate children to come to school.

Teacher 7 also added:

I learnt how to use Piaget's style of motivating learners by giving them challenging work in a rich environment and letting them experience new ways of learning. (Teacher7).

'Piaget's style' which was referred to by the ACT teachers was that of cognitive development. Piaget (1973) also talks about conducive learning environment where children should be exposed to challenges so that they can get motivated to think.

From the interviews, the teachers also indicated that they were able to motivate their learners by praising them using words like; "very good, well done my girl and clapping hands for those who did well." The above discussions suggest that teachers learnt from using teaching resources in their classrooms. They also mentioned the need for good handwriting on charts and chalkboard,

the use of black, blue and green markers when writing on charts and white chalk on the chalkboard. The ACT FP teachers also learnt how to decorate charts before they write on them. Good handwriting motivates learners to read the charts and if they are able to read, they do the reading, but if they cannot read that handwriting they may easily get frustrated and abandon the reading.

Observations showed that teaching resources were used in the teaching and learning of numeracy and literacy. The teachers also learnt how to teach in order for the learners to move from known to unknown, where they started with the resources which learners know. This was revealed in the lessons observed, where for example, some teachers used counters and home-made dice which they had constructed. This helped them to enhance the teaching and learning of numeracy and literacy. Furthermore, these participants learnt that learners also learn better in groups than individually as they can get new ideas from others. However, some things could also be learnt individually. Thus, teachers also learnt how to assist individual learners.

5.3.2 Pedagogical Content Knowledge

Pedagogical content knowledge refers to the teachers' knowledge of the most useful ways of presenting topics related to the subject, in a way that makes the topic understandable to learners (Shulman 1987). In Table 3 above, eight ACT FP teachers made comments which suggest that they learnt how to deliver concepts to learners at their suitable levels through the use of teaching resources which they had constructed during the programme. This is illustrated in the extract below:

I learnt how to teach learners who are performing at different levels. For example, when I am teaching number names and number symbols I take 4 objects and the number 4 then show the weak learners. I will tell them that this is number 4. The weak learners count 4 objects and match with the number 4. The strong learners can write the number and match with the picture (Teacher 5).

While only a few teachers clearly made comments that suggested PCK, those who clearly talked about PCK showed that resources could enhance teaching and learning in the classroom as they were able to select content and appropriately match it with learner capabilities. For example,

Teacher 12's Grade R lesson on weather, she had a weather chart, a picture of the sun on the chalkboard and she added the grapheme 'S' under the picture of the sun. She asked some leading questions like, "*What is the day today?*" and the learners answered "*Thursday.*" *How is the weather today?* "*Sunny.*" Then the learners sang, "*Good morning Mr. Sun I want to see your smiling face.*" From my observation, the rhyming made learners understand the weather of that day and to sound the phonic 'S' because it was present in the song. Leikin and Zazkis (2010) describe PCK as the ability to match the teaching of subject content to a particular classroom and to students' ability levels, affective needs and motivation. Thus, this example is in line with Leikin and Zazkis' definition.

This was also illustrated in the lesson observation of Teacher 13 in the township school where I saw her using bottle tops. She stuck them on the chalkboard in twos then the learners were asked to count them. "*How many twos of bottle tops can you see on the chalkboard?*" Thereafter, she put the numbers $2 + 2 + 2 + 2 + 2 = 10$ and she drew two dots under each number as representatives of these two bottle tops. Finally, she wrote $2 \times 5 = 10$ and then drew a number line to illustrate how they count in twos. Here, the teacher used concrete objects (representatives) to explain repeated addition and multiplication to her Grade 2 learners. From my observation, this showed that Teacher 13 knows how to apply PCK. This was also alluded by Teacher 3 who noted that:

I learnt the concrete representational and abstracts.

"The concrete representational abstract is a three-part instructional strategy where the teacher uses concrete material (manipulatives) to model a concept to be learned, then uses representational terms (pictures), and finally uses abstract, symbolic terms (numbers, math symbols)" (Steadly, Dragoo, Arafah & Luke, 2008, p. 10). I understand concrete representational and abstract as a method used by teachers to deliver difficult concepts to learners through the use of teaching resources. In this study, the 'concrete' were the teaching resources which the ACT FP teachers constructed during the programme and these included abacuses, base-ten blocks, the representational were pictures while the abstract were numbers and mathematical symbols. Evidence of subject matter learnt was also mentioned in the interviews where teachers talked about the new concepts that they learnt and which helped them to improve their teaching of numeracy and literacy at this phase. Their understanding of some of the concepts like concrete

representative and abstract was present in the numeracy lesson of Teacher 13. She started from using teaching resources, then went on to draw symbols to represent a number and finally, the number itself to illustrate the concepts being taught. For example, using bottle tops then oo + oo = oooo, and finally $2+2=4$.

Figure 5 below is an example of teaching resources which were constructed by the ACT foundation phase teachers during the course.



Figure 5: Different teaching resources made by teachers.



Figure 6: Laminated teaching resources constructed by teachers during the course.

From Figure 5 above, the teaching resources which were constructed to help in delivering content of Numeracy, for example, abacus and flash cards with number names. In Figure 6, the teacher could use these pictures to teach prepositions and name colours. This develops language fluency during different activities which might be engaged with while using these resources. Figure 5 and 6 relate to the CRA method that teachers highlighted in the interviews as part of the content that they learnt. During the interviews, when the photographs were taken, participants indicated that using these resources helped them to improve their teaching. It seemed as though these resources also helped them to structure the content activities and methods to suit the levels of their learners.

What emerged from the discussion above is that most teachers argued that they acquired GPK, which is the knowledge of general principles of classroom instruction and management. Therefore, the findings under PCK revealed that the teachers learnt how to construct teaching

resources according to the levels of learners' understanding. They talked about how to use these teaching resources with slow learners, average learners and strong learners. This shows that ACT FP teachers learnt how to match content and teaching resources with the level of learners. From this study, it appears that most participants acquired GPK and PCK through the construction and use of teaching resources which probably enhanced the teaching and learning of the Grade R-3 learners.

5.3.3 Subject Matter Knowledge

“Subject matter knowledge includes knowledge of the content of a subject area as well as knowledge of the substantive and syntactic structures of the discipline” (Schwab, cited in Grossman, 1990, p. 6). For example, in Mathematics Education for the Foundation Phase module, teachers had to learn patterns, functions and algebra where they learnt rules to find different patterns from linear to quadratic and to cubic functions. The substantive structures are generally understood as the knowledge of concepts, while principles of the discipline are organised to incorporate its facts and this includes questions that guide further research in a discipline. Whereas, syntactic structures are rules of evidence, generated and validated in the subject, proofs, and history of the discipline (Turner-Bisset, 1991). These kinds of knowledge have an implication on what teachers choose to teach and how they teach. Six teachers indicated having gained some knowledge of the content of child development as well as the phonemic awareness. Some of the aspects they had learnt were assimilation, accommodation, equilibration, theories, child development stages, scaffolding, concrete representatives and abstracts, just to mention a few. Thus, Shulman (1987) contends that subject matter knowledge is the teacher's knowledge of, and about the content that she or he will teach. In this vein, Teacher 5 commented that:

I learnt about physical development, emotional development and intellectual development.

Teacher 5 alluded that:

I learnt eight principles of phonemic awareness.

Rauth and Stuart (2008) view phonemic awareness as an understanding of and attention to spoken language. It also refers to the ability to recognise and work with the speech sounds. Rauth and Stuart (2008) pointed out the eight phonemic awareness includes: isolation, identification, categorisation, blending, segmentation, deletion, addition and substitution. Hence, some of the ACT FP teachers understood that they have to acquire content knowledge of numeracy and literacy in order to be effective classroom practitioners. The ACT teachers mostly learnt content related to educational psychology and child development. These ACT FP teachers also learnt to teach starting from concrete to representative, then finally, to abstract as well as the understanding of eight principles of phonemics in this programme. The teachers mentioned that they learnt new concepts which helped them to understand child development.

5.3.4 Knowledge of context

“Knowledge of context includes knowing about the background of learners, including their families, strengths, weaknesses and interests, and knowing the organisational culture of the school” (Grossman, 1990, p. 9). It also encompasses knowledge of learners’ backgrounds which might cause learners to miss school as well as other contextual factors and learner performance, including any change of organisational practices like adopting new systems of doing things. In the interviews, teachers did not allude much to learning knowledge of context. Furthermore, Zimmermann, Lorenz and Reinhard 2007 (cited in Mukeredzi 2013, p 12) found that “knowledge of context implies information of circumstances that characterise situations, activities and dynamics in schools and classrooms that influence learning.” It seemed as if some of the teachers had knowledge of their contexts but what they might have learnt is how to deal with these contextual issues. This is illustrated below:

I was demotivated when I came to Zeep School (Pseudonym) because children don't like to come to school, but after attending this Teaching and Learning module I now know how to motivate them, give positive comments so that they learn (Teacher 11).

Most participants indicated that their schools appreciated what they brought to school. This evidence also revealed that Teacher 1 was capable of sharing knowledge gained from the programme with colleagues. For example, Teacher 13 commented that, “... colleagues at my

school asked me about how I make my teaching resources.” Given this strength (sharing knowledge), it can be argued that if these teachers were to continue to work collaboratively, then this could positively impact on their practices and eventually help their learners. Some comments made in the interviews also indicated that ACT foundation phase teachers also gained knowledge related to understanding and handling learners’ contextual issues. Teacher 4 explained:

I realised that children don’t like to come to school.

Having practical knowledge would help the teacher to attend to individual learners, thereby enhancing learning and performance. Practical knowledge is the knowledge of knowing how to handle different situations within the environment. Knight (2002) states that practical knowledge is primarily learning to do something and making sense of it. Therefore, the knowledge of context becomes important in day-to-day activities of teachers, as teachers act in *loco-parentis* - they need to stand in the gap by moulding the learners’ behaviour, comforting them where necessary. This, hopefully, would improve the teacher-learner relationship which is very important at the FP level. Although already indicated in relation to motivation above, the fact that teachers were then able to give positive comments that encouraged students to come to school was a result of knowledge of the learners and their home backgrounds, which is the knowledge of context. The next section discusses how the teachers learnt.

5.4 How the teachers learnt

Table 4: Indicators of how types of learning were identified.

Types of learning (adapted from Illeris, 2009)	Indicators	Example from the interview
Cumulative	Statements that indicated copying from learning guide without mastering the content	<i>The activities were too many, because now we are doing the activities under pressure just to finish without learning</i>
Assimilation	Statements that showed improvement of knowledge and new knowledge added on to what teachers already knew, like appropriate teaching resources, considering capabilities of learners	<i>I was just grouping learners before but now I learnt to group learners according to their abilities.</i>
Accommodation	Statements that revealed new ways of teaching, like categorising teaching resources, handwriting for the FP.	<i>We were taught about writing styles. I learnt different writing styles, I didn't know these</i>
Transformation	Statements that showed change in teaching practices, like allowing learners to talk more in class, doing teacher demonstrations, giving learners time to struggle before providing them with the answer	<i>Now I can differentiate children, I now give them time to try on their own before I give them answers and I now know how to differentiate children</i>

Generally, most of the teachers' comments seemed to indicate accommodative learning. "Accommodative type of learning implies that one breaks down (parts of) an existing scheme and transforms it so that the new knowledge can be linked in" (Illeris, 2009, p. 13). In other words, there is a mental shift due to new knowledge that is gained.

This was not surprising because the aim of the programme was to deepen subject matter knowledge, general principles and methodology in relation to teaching Grade R-3, and to develop appropriate knowledge, skills, values, attitudes and dispositions of educators within the field of the Foundation Phase curriculum, policy and pedagogy. On the same note, the ACT aimed at enabling students to develop disciplinary, pedagogical, practical and situational learning reflexive competences in teaching and learning in the foundation Phase of schooling (ACT FP Programme Template, 2012).

Assimilation or learning by addition also emerged as another type of learning through which teachers gained knowledge. “Assimilation means that the new knowledge is linked to a scheme or pattern that is already established” (Illeris, 2009, p. 13) or in existence. Thus, by constructing teaching resources, the ACT FP teachers added to their prior knowledge and practices. Comments indicated that teachers also learnt a lot through assimilation, particularly in Module 2: Teaching and learning in the Foundation Phase. This module aimed to “develop disciplinary, pedagogical, practical and situational learning, reflexive competences in teaching and learning in the Foundation Phase of schooling (ACT FP Programme Template, 2012, p. 2).” This means that the ACT FP teachers in this study knew other ways of teaching before they registered for ACT programme. However, they also learnt a number of different strategies which enabled them to identify and address problems of learners who come from different backgrounds. Furthermore, the construction and use of teaching resources seemingly stimulated their practices and enabled them to handle different levels of learners.

Illeris, (2009) points out that cumulative learning is characterised by mechanisation processes that are applied in situations which are mentally related to a learning context. While Illeris talks about cumulative learning as one of the four types of learning, from the teachers’ comments, there was not much reference to this type of mechanised learning. Reference to cumulative learning made by six of the participants was around too many workbook activities which sometimes result in them having to copy material from the course guide. For example, Teacher 8 pointed out that “*The activities were too many... we ended up copying the guide without learning anything.*” Hence in the following section that discusses and presents findings on how participants learnt, this type of learning is left out.

The fourth type of learning experienced was related to transformation. Mezirow and Associates (1990) assert that transformative learning has to do with the mind-set, habits of mind and meaning perspective. Thus, transformation implies throwing away or leaving the old and replacing it with the new. In the context of this study, it implies throwing away old teacher practices and adopting new ones as a result of learning on ACT FP programme.

Table 5: Number of times where teachers' comments suggested the different types of learning (as highlighted in **Table 3**, a tick represents at least two times that the teacher made reference to the type of learning during the interviews).

	Cumulative	Assimilation	Accommodation	Transformation
Teacher 1			✓	✓
Teacher 2		✓	✓	✓
Teacher 3	✓		✓	✓
Teacher 4		✓	✓	✓
Teacher 5	✓	✓	✓	✓
Teacher 6		✓		✓
Teacher 7		✓	✓	✓
Teacher 8	✓			✓
Teacher 9			✓	✓
Teacher 10	✓	✓		✓
Teacher 11			✓	✓
Teacher 12		✓	✓	✓
Teacher 13	✓		✓	✓
Teacher 14	✓	✓	✓	✓
Total number of teachers	6	8	11	14

5.4.1 Assimilation

Six teachers talked about learning through assimilation. It seemed that these teachers added new knowledge to what they had before. In NPDE they also learnt about child development. However, it seemed as if they did not acquire detailed information. From the ACT FP programme, the teachers also learnt about child development and how children grow at different stages. This was exemplified when Teacher 5 stated that:

NPDE was a general teaching course, it was not specific to the young children whereas child development module was straight forward and it focused on the young children.

Furthermore, Teacher 8 put it this way:

I also got more information on how to arrange the class and what toolkits to use in teaching and how to prepare learning programmes as well as how to handle the young ones, we had done it before but it was now more (Teacher 8).

...In second year modules, I also increased my knowledge because it is all about what we are doing at school and then that addition developed us on what and how we are going to teach the children, but it was generally what we have been doing in class (Teacher 9).

This finding suggests that the ACT foundation phase teachers acquired general pedagogical knowledge through assimilation. For example, Teacher 3 said:

I was lacking more knowledge on how to manage time of teaching, so ACT 1 module helped me how to manage my time in the classroom and also how to teach and treat children.

My lesson observation of Teacher 11 revealed that she acquired some ways of handling her Grade R learners. Teacher 11 moved from group to group after every five minutes to check on their progress. She was very alert and tried to help every learner who called for help. When she got to Orange group I heard “*Uhuu very good you coloured correctly.*” This showed that she motivates her learners to do well. The groups had names of fruits. This was evident when she assigned activities for each group during lesson observation. For instance, Apple group was sorting blocks according to their colours, Orange group was colouring shapes, Grape group was playing with dominoes and the Mango group was making the puzzles. This was done for 20 to 25 minutes and the groups rotated. After group activities, all the learners were called to the mat where they sang the rhyme “*seven little numbers on my phone, what are they?*” Teacher 11 was teaching numbers to her learners through the rhyme. The learners were very clear and loud that I could hear all the numbers well.

Six ACT FP teachers indicated that they learnt through assimilation. This was revealed in the interviews where they mentioned their previous experience in NPDE programme. It showed that they acquired more knowledge and understanding on how children develop and learn in the

current programme. Some were also lacking time management skills and they improved on this aspect as it was revealed in the interviews and confirmed in the lessons observed. Again, during the interviews, the teachers talked about knowledge development on how, when and what to teach in their classroom. This was evident in the lessons observed as they were able to use the teaching resources they constructed during the course. They also managed to control group work activities as well as the activities for the entire class.

5.4.2 Accommodation

From Table 5 above, eleven teachers suggested having acquired new information, which implied that they experienced accommodative learning. In other words, participants experienced a shift or an increase in understanding due to new knowledge. The evidence above shows that 11 participants mentioned incidents where they learnt through accommodation. Accommodative learning seems to have been related to PCK where resources were to be made according to the levels of understanding of learners at the foundation phase. Eleven teachers said that they learnt how to use teaching resources in teaching numeracy and literacy through creative play. These teaching resources stimulated the teaching and learning process.

For example, Teacher 10 pointed out that:

I learnt a lot from Creative play and Professional practice. I also learnt how to plan for a play activity for my learners and why we should have objectives for that play because it helps to identify learners' problems as well as their progress (Teacher 10).

I learnt that teaching resources and activities should suit grade level and developmental stage, and should accommodate all learners. Fast learners are to be given more activities (Teacher 6).

There are lots of new things I learnt. Especially ACT 1, I learnt how to categorise books according to levels of understanding of learners and to improvise my own equipment (teaching resources) (Teacher 2).

During the lesson observations, the teachers who were observed (9 to 14) used teaching resources according to the learning levels of their learners. This suggested that the new knowledge gained accommodatively was now being put into practice. Figure 7 and 8 below illustrates some examples of what the ACT Foundation Phase teachers in this study constructed for their learners. Figure 7 is an example of the teaching resource which was made considering the level of learners.



Figure 7: Teaching resources constructed according to learners' levels of understanding.

Teacher 8 states that:

Level one is the starters. Level two is the main course and level 3 is the dessert. You have to construct books that are suitable for each level and their colours need to be different so that learners will be able to distinguish them. The books for starters may have one sentence and a picture, main course might have two sentences plus a picture and the desserts ones may have five sentences plus a picture.

This exemplifies how the ACT FP teachers illustrated how they constructed the teaching resources, considering the levels of understanding of their learners. Thus, some form of accommodation where the information learnt in the ACT FP programme was then being fully utilised in the classroom.



Figure 8: Flash cards with different phonics and pictures of different things.

The teaching resources in figure 7 and 8 were very attractive and colourful. The use of colourful pictures draws the learners' attention and encourages them to touch and explore. For example, Teacher 4 highlighted that:

I did not know that you need to decorate the chart before you write on it.

Teacher 9 also added that:

The toolkit was useful to us, because we were just writing, having no idea that being the foundation phase teachers, we have the different styles to write with and

we must not write within bold and capital letters. We also learnt that when colouring in, you must make it bright so that learners could see.

Teacher 3 further illustrated that:

...because I know that you must not write in small letters and use small size of writing, so when writing for Grade R I have learnt that you must use big styles of writing so that they can see. When colouring you must use colours which learners are used to see and like, it is useful and it adds to what they already know.

This suggested that most teachers in this study learnt how to construct teaching resources. They showed that this process improved their handwriting and creativity. Thus, learners also learn the sounds using the items they know, for example, the phonic ‘a’ for apple. This draws learners to the real world where they manipulate these things while making it easier for the teacher to deliver content to their learners. Such content is likely to be stored in the learner’s long term memory since sends them ‘back home’.

5.5 How teachers changed their practice from constructing and using teaching resources.

5.5.1 Transformation

The ACT foundation phase teachers’ comments suggested that they had to some extent, improved the way they carried out their teaching duties in their classrooms. The construction and use of teaching resources also helped them with the teaching of creative play as evident from Teacher 12’s lesson that I observed where learners had time to build a farm and they were talking to each other during the play; for instance “*Can you help me? Where can we put the robots for the gate?*” The learners were able to appreciate and assist each other. From lesson observations, it appears that most teachers may have transformed their ways of teaching in their classrooms. The following photograph was taken during Teacher 12’s lesson observation.



Figure 9: A farm constructed by learners during play time.

Figure 9 is an example of what resources teachers can collect and use in their teaching and learning processes. These resources enabled teachers to interact with their learners. On the other hand, this enhanced creativity and language development as the learners talked about what they constructed with these objects. Hence, the Grade R learners said that they built a farm and their teacher asked, “*What are these red things?*” to which they answered “*They are red apples in the tree, they are now ready to be eaten.*” Teacher 12 wanted the learners to learn how to help each other, being creative and to improve their literacy as they talked to each other. This suggests that these participants learnt how to improve teaching and learning processes in their classrooms through the construction and use of the teaching resources.

In an interview, Teacher 1 pointed out:

I never allowed learners to play and did not have a play pod corner in my classroom. This year was my first time to allow learners to play, because of the knowledge I gained from the University. Now I will continue with this practice because some learners have barriers but when they play they learn from each other.

Teacher 2 also added that:

...I am the one who always said, "Shut up, be quiet and put your finger on your mouth!" So now I know that a talkative class is very effective because most of learners are afraid to talk one by one, but when they are in a group they share ideas.

The extracts above showed that the teachers have changed their strategies of teaching. It also shows that the teachers now understand that learners also learn a lot through play. This implies that at the foundation phase, teaching resources are of essence to enhance cognitive development. Figure 9 above shows the farm made by learners during playing time, which the teacher did not consider important before she enrolled for the ACT programme as confirmed in the comments.

I never allowed or gave my learners time to think. Now I allow them time to struggle with a problem as a group using the toolkits or aids that I give them. I also sit there with them and demonstrate how to use the toolkits (teaching resources). Before, I was just giving them answers without allowing them time to work it out on their own. Before, I just helped them (Teacher 1).

The above comment implies a shift and change (transformation) in teacher practice. She saw children as participants in their learning rather than receivers of learning. From figure 9 above, it shows that learners, as they built the farm, they also learnt and imagined things which are found at the farm.

This was also evident from the observation of Teacher 13's lesson where she allowed her learners to play in groups and talk about their rights. The other learner said, *"I have a right to have healthy food."* Then the teacher finally took her teaching resources with different pictures and lists of rights which matched the pictures for reinforcement. Therefore, teaching resources are very important in enhancing playing activities at the foundation phase.

From the discussion above, it appears that most teachers said that they changed their teaching practices as a result of the learning through the construction and use of teaching resources in the ACT FP programme.

5.6 Conclusion

This chapter detailed the findings of the study. The data were analysed using Grossman (1990)'s four domains of knowledge and Illeris's (2009) model of teacher learning. In terms of the kinds of knowledge that the teachers acquired through the use of teaching resources, the findings indicated the presence of GPK, PCK, SMK and Knowledge of context. They also learnt content knowledge of psychology and diagnosing learners' problems.

From the data analysis, it appeared as if most of the participants learnt General Pedagogical Knowledge. I understand general pedagogical knowledge as the use of different teaching strategies with clear/simple instructions which learners could follow. This does not however imply that this was the only kind of knowledge that they gained, but it may have been easier for them to explain the 'how to' than to explain other types of knowledge. Evidence of other teaching strategies noted during the observations included the whole class, group work, teacher-learner interaction and scaffolding. Comments made by participants also suggested that they had changed their teaching practices from the learning and through the use of particular teaching resources. However, it is not possible to confirm this, as teachers were only observed after completing the ACT programme.

With reference to how the foundation phase teachers learnt through the construction and use of teaching resources in the ACT FP programme, from the lesson observations, it emerged that they learnt how to prepare teaching resources appropriate for the level of understanding of the learners in numeracy, literacy and in play activities. In other words, the types of learning that emerged were assimilative, cumulative and accommodative. Assimilation was amply illustrated by the reference made to experiences in the earlier programmes and previous classroom activities. Accommodative learning was also revealed by the photographs of teaching resources that they constructed during the programme and cumulative learning was only mentioned in relation to workbook activities.

Lastly, concerning how the learning from constructing and using teaching resources influenced their practice, the interviews indicated that there was a significant shift in their practice: the classes contained teaching resources that the teachers had constructed on the programme and lesson observations confirmed the new ways adopted in classroom practice. This amply suggests

that some teachers changed their classroom practice although this cannot be wholly attributed to the learning through the construction and use of teaching resources.

The main findings of the study therefore answered the three research questions. In other words, teachers learnt to appreciate the value of teaching resources in their teaching, then they expressed how they learnt to use teaching resources in the classroom and finally, how the teaching resources assisted in coming up with appropriate teaching strategies. In the next Chapter, findings, conclusions and recommendations of the study are discussed.

CHAPTER SIX

DISCUSSION AND CONCLUSIONS

6.0 Introduction

Chapter five presented the findings from the data generated from the focus group interviews, lesson observations and photographs of teaching resources. The findings were linked to relevant literature, conceptual and theoretical frameworks of the study. The aim of the study was to explore teacher learning through the construction and use of teaching resources at the FP. This chapter focuses on the discussions, conclusions of the study and recommendations based on the findings. The recommendations and conclusions also included areas of future research on how the foundation phase teachers learn through the construction of teaching resources. This chapter will be divided into answers to the three research questions which guided this study.

Literature review demonstrated that various studies have been done on teacher learning and teaching resources, but there is limited research from international, national and in the South African context that has examined the construction and use of teaching resources at the foundation phase. Thus, this study has contributed to this gap by researching on learning through the construction and use of teaching resources from Grade R to 3.

6.1 Discussions of the study

In answering the main question of exploring teacher learning through construction and use of teaching resources in ACT FP programme at UKZN, the major findings were discussed in sections following the three research questions. The research questions that guided the study were as follows;

What kinds of knowledge do the foundation phase teachers acquire through the construction and use of teaching resources in the ACT FP programme?

How do foundation phase teachers learn through the construction and use of teaching resources in the ACT FP programme?

In what ways do teachers say that the construction and use of teaching resources on the ACT FP programme improves their practice?

Firstly, this section aims to answer what kinds of knowledge which the teachers acquired during the ACT programme. The manner in which teachers responded to the interview questions leads to the conclusion that they mainly acquired GPK through the construction and use of teaching resources. All of the 14 participants talked about GPK. However, this does not mean that they did not gain the other three kinds of knowledge. It may be that the ‘how part’ seemed to be easier for them to explain. Most of the teachers were teaching in rural areas where the resources are scarce. Findings indicated that most teachers in this study improved their handwriting from the ACT programme. They learnt that there is a specific handwriting for Grade R-3 (Foundation Phase). The results also showed that prior to joining the programme, these teachers were not considering learners with learning difficulties. They moved through the lesson with those who understood. After completing the ACT FP programme, many teachers said that they were then able to handle learners with mixed abilities through the use of the different teaching resources that they constructed during the course. Learners with mixed abilities include slow learners, average learners and strong learners.

Machaba (2013, p. 1) recommends that “teachers use a variety of teaching methods in order to accommodate all children and also encourage learners to use concrete objects.” In contrast, research in the Western Cape indicated that “learners’ opportunities to grasp the symbolic system of mathematics are inhibited by classroom practices that privilege concrete modes of representation, which restrict access to more abstract ways of working with numbers, and by the inefficient use of classroom time” (Ensor, Hoadley, Jacklin, Kuhne, Schmitt, Lambard and van den Heuvel-Panhuizen 2009, p. 8). Thus, it is vital that the use of concrete objects does not block learners’ ability to think in more abstract ways. This notwithstanding, the positive side of using teaching resources is noteworthy. It was confirmed that the teachers managed to construct teaching resources to use in their classrooms while considering levels of their learners. For example, in the interview, teachers talked about constructing story books, considering learners’ levels. This was also confirmed in the photographs taken during the interviews. Therefore, the use of teaching resources at the foundation phase is important. According to Piaget (1926), children develop in different stages which are sensori-motor, pre-operational, concrete and

formal. Piaget noted that in the first three stages, children needed concrete, direct experience in order to learn and the formal stage where children can learn abstractly. Thus, the research by Hagger, et al. (2008) highlighted the importance of considering individual learners' agenda about what and how they should learn. This implies that teachers in this study developed themselves through the construction of teaching resources which would help address the issue of dealing with individual learners.

The study also found that teachers learnt to employ different teaching strategies like scaffolding, grouping, one-on-one attention, as well as the whole class teaching. For example, Teacher 1 stated that: *"I learnt the importance of child grouping"* and the photograph of the teacher assisting learners through the scaffolding was presented in chapter 5. The findings showed that the grouping strategy was one of the strategies which allowed learners to learn from each other by sharing new ideas. Dewey (1997) described learning as action where knowledge and ideas emerge as learners interact with each other in a classroom and build their knowledge by applying conclusions from past experience that had meaning and importance. Thus, the teachers who allowed their learners to work in groups might improve learner to learner interaction and discovering new ideas as they talk to each other.

Furthermore, the study found that these teachers learnt to save money for themselves and the school as they were constructing their own teaching resources. Teachers also learnt to probe, asking leading questions to stimulate learning. I also found that they learnt to give learners time to struggle and not to tell them answers. This finding is in line with what Piaget (1973) who argued that children are not "empty vessels" to be filled with knowledge, but they are active builders of knowledge.

The ACT FP teachers also noted that they gained SMK. The responses from the interviews revealed that they learnt new content knowledge about phonemic awareness. The results showed that they gained more content about child development which is the content of educational psychology. Grossman (1990, p. 9) asserted that "knowledge of content refers to the understanding of knowledge of major facts and concepts within the field." As in educational psychology, teachers in this study also learnt content of literacy from the ACT programme which they used to improve their teaching.

I found that the teachers also learnt to understand the learners' backgrounds and to give them love and support. This finding illustrates knowledge of context. For instance, Teacher 4 explained: *"I became aware of learner backgrounds and diagnosing learner problems."* It can be deduced that motivational skills were also acquired from the ACT programme. It was revealed in the lessons observed where the teachers gave their learners time to struggle, then applauded them as well showering them with positive comments.

Teachers in this study also gained pedagogic content knowledge (PCK). During the lessons observed, it was found that through the use of teaching resources, teachers were able to explain concepts in a simpler way. Lesson observations of the ACT FP teachers thus showed that they did not only learn how to teach, but learnt how to bring content and methods together to make learners understand. In this study, I found that in numeracy, teachers learnt three-parts of instruction which are: concrete-representational-abstract (CRA). This is supported by Murriss and Verbeek (2014) who argue that focusing on the subject content and pedagogic content knowledge in teacher education is absolutely essential. From the lessons observed, I found that the teacher- students were able to construct and use teaching resources that matched content and level of learners during the programme.

Secondly, this section will address how teachers learnt during the ACT programme. The study revealed that some teachers learnt by accommodation. All of the 14 teachers learnt how to construct and use the teaching resources in numeracy and literacy. The photographs of teaching resources were evidence of what teachers constructed during the ACT programme. The findings showed that teachers improved their handwriting, which would lead to learners' concentration and willingness to read on the charts.

In terms of the need for collaboration and the gains in GPK and PCK, Mukeredzi (2014) discovered that teachers developed GPK and PCK from sharing ideas with peers, individual reflections and from engagement in classroom practice and preparation of teaching resources. The interviews indicated evidence that FP teachers improved their ways of teaching as well as their teaching resources through peer and lecturer assessment, as well as using constructed resources in their classrooms.

The assimilation type of learning focuses on adding new knowledge to one's previous knowledge. Hence, in this study, it was found that teachers added new knowledge of child development and understanding on how children learn, to the knowledge that they already had. It was also found that teachers might have gained GPK through assimilation. This was evident in the lessons observed, in which the teachers were able to handle group work activities as well as the entire class.

Thirdly and lastly, the teachers talked about how they transformed their practices from constructing and using teaching resources in their classrooms. The findings revealed that the use of teaching resources enhanced teacher-learner interaction. The teachers showed that they understand time management; they can also link levels of learners to appropriate resources and are now able to cater for all learners in their classrooms. This was reflected by the teachers in this study as they shifted or transformed from their old practices and replaced them with the new ones which they acquired from the ACT programme. Furthermore, it was revealed that teaching resources also enhanced playing activities which the teachers saw as another method of teaching learners. Lesson observations showed that the teachers tried to implement new strategies of teaching which they learnt from the ACT programme in their classrooms. In this context, formal learning means that learners are not allowed to play or talk loudly but to just follow the teachers' instructions in everything they do. The teacher-students thus say they transformed their learning from formal teachers who did not allow play in their classrooms to more flexible teachers who allowed the learners to become a 'head taller than themselves', a process which may enhance pupil attainment.

6.2 Limitations of the study

The study involved a small conveniently selected sample of teachers enrolled at the UKZN in the ACT programme. So findings cannot be generalized, but can only be transferrable to other similar contexts. The researcher's position as a part-time tutor in the ACT programme might have impacted on the participants to be uncomfortable to discuss other (especially negative) issues about teaching resources. I explained my role as a researcher in order for them to take me in some rather neutral light. I also tried to enhance objectivity through lesson observations and taking photographs to improve rigour and rather triangulate the interview findings.

6.3 Recommendations

Based on the findings of the study, I recommend that programmes focusing on the Foundation Phase teacher learning should be implemented in order to build a strong foundation for South African learners. I further suggest that teachers should prepare activities that involve different levels of learner in their classroom as well as using of appropriate teaching resources at the FP. FP teachers should also give learners time to solve problems on their own and use different teaching strategies which involve all learners in the classrooms. Furthermore, foundation phase teachers need to get training in the use of teaching resources so as to improve the teacher-learner interaction. The teachers in this study said they become strong in SMK and PCK as well as delivery where concrete details are utilised. Further studies and researches can be done to understand more on this area and to inform the debates raised in this study.

6.4 Conclusion

I therefore conclude that “exploring teacher learning from the construction and use of teaching resources at the foundation phase” helped me to understand the needs of teachers at this level. This study showed that the ACT FP programme plays an important role in the teaching and learning of numeracy and literacy at the FP level. The use of appropriate teaching resources according to learners’ levels of understanding can help to improve teaching and learning in the classrooms. The study highlighted the kinds of knowledge which teachers gained during the programme as well as how they used that learning in their classrooms. It is important that teachers understand learners’ background in order to assist them effectively. It can also be concluded that the ACT FP teachers said that they acquired a lot of GPK, PCK, and SMK from the programme. The participants acquired knowledge through assimilation, and accommodation. The study revealed that most of the participants benefitted from this ACT programme. The participants showed that they had developed through engaging in this programme. The following quote by Teacher 1 shows that she improved her practice through her learning on the programme:

I never allowed or gave my learners time to think. Now I allow them time to struggle with a problem as a group using the toolkits or aids that I give them. I also sit there with them and demonstrate how to use the toolkits (teaching

resources). Before, I was just giving them answers without allowing them time to work it out on their own. Before, I just helped them.

While the observations helped me to see whether what the teachers had said about their teaching in the focus group interview was actually happening in their classes, I cannot say they had transformed their practice because the observation came after the programme and not earlier. While the above comment suggests that some teachers had improved their practice and were now imparting knowledge using new teaching strategies which they acquired from this programme, one cannot conclusively say they had transformed.

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APPENDICES

APPENDIX 1: ETHICAL CLEARANCE CERTIFICATE



14 December 2012

Dr Tabitha Mukeredzi 14743
School of Education
Pietermaritzburg Campus

Dear Dr Mukeredzi

Protocol reference number: HSS/1327/012M

Project title: Exploring knowledge and learning of the Advanced Certificate in Teaching (ACT) Foundation Phase (FP) students

EXPEDITED APPROVAL

I wish to inform you that your application has been granted Full Approval through an expedited review process.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Professor Steven Collings (Chair)

/pm

cc Supervisor/Project Leader: Dr Carol Bertram
cc Academic Leader: DR MN Davids
cc School Admin.: Mrs S Naicker

Professor S Collings (Chair)
Humanities & Social Sc Research Ethics Committee
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban, 4000, South Africa
Telephone: +27 (0)31 260 3587/8350 Facsimile: +27 (0)31 260 4609 Email: ximbap@ukzn.ac.za / snymanm@ukzn.ac.za
Founding Campuses: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville



INSPIRING GREATNESS

APPENDIX 2: CLEARANCE LETTER FROM THE DEPARTMENT OF EDUCATION



education

Department:
Education
PROVINCE OF KWAZULU-NATAL

Enquiries: Nomangisi Ngubane

Tel: 033 392 1004

Ref.:2/4/8/425

Mrs V Makwara
118 Haynes Road
Richmond Crest, Bisley
PIETERMARITZBURG
3201

Dear Mrs Makwara

PERMISSION TO CONDUCT RESEARCH IN THE KZN DoE INSTITUTIONS

Your application to conduct research entitled: **“EXPLORING TEACHER LEARNING THROUGH CONSTRUCTION OF TOOLKITS IN AN ADVANCED CERTIFICATE IN TEACHING (ACT) PROGRAMME AT UNIVERSITY OF KWAZULU-NATAL”**, in the KwaZulu-Natal Department of Education Institutions has been approved. The conditions of the approval are as follows:

1. The researcher will make all the arrangements concerning the research and interviews.
2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools and Institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals and Heads of Institutions where the intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from 24 May 2015 to 31 July 2016.
7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials and Learners are under no obligation to participate or assist you in your investigation.
8. Should you wish to extend the period of your survey at the school(s), please contact Miss Connie Kehologile at the contact numbers below.
9. Upon completion of the research, a brief summary of the findings, recommendations or a full report / dissertation / thesis must be submitted to the research office of the Department. Please address it to The Office of the HOD, Private Bag X9137, Pietermaritzburg, 3200.
10. Please note that your research and interviews will be limited to schools and institutions in KwaZulu-Natal Department of Education.

(See List Attached)

Nkosinathi S.P. Sishi, PhD
Head of Department: Education
Date: 23 May 2015

KWAZULU-NATAL DEPARTMENT OF EDUCATION

POSTAL: Private Bag X9137, Pietermaritzburg, 3200, KwaZulu-Natal, Republic of South Africa
PHYSICAL: 247 Burger Street, Anton Lembede House, Pietermaritzburg, 3201. Tel. 033 392 1004
EMAIL ADDRESS: kehologile.connie@kzndoe.gov.za / Nomangisi.Ngubane@kzndoe.gov.za
CALL CENTRE: 0860 596 363; Fax: 033 392 1203 WEBSITE: www.kzndoe.gov.za

APPENDIX 3: TURNITIN CERTIFICATE

Turnitin Originality Report

Violet Makwara full thesis by violet makwara

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APPENDIX 4: INFORMED CONSENT FOR TEACHERS

118 Haynes Road, Bisley Pietermaritzburg
3201

PARTICIPANT INFORMED CONSENT FORM

My name is Violet Makwara, a student at the University of KwaZulu-Natal and currently pursuing Masters' Degree-Teacher Development Studies. I humbly request permission to conduct an educational study at four schools I your district. The focus of the study is **to explore teacher learning from the construction of teaching resources on the Advanced Certificate in Teaching (ACT) Foundation Phase programme**. In this study, I am trying to understand how ACT foundation phase teachers acquired different kinds of knowledge through the construction of toolkits during their course.

Your participation in this study is voluntary and you may withdraw without any disadvantage to you, if it becomes difficult for you to continue to participate. The participation will take the form of individual observation during the numeracy or literacy lesson. The dates and times for observation will be negotiated with you. I will make pseudonyms and no other identifying information about you will be written so that you remain anonymous.

You may contact me for clarity or additional comments during participation and at any time after the study is complete or my supervisor.

Dr T. G. Mukeredzi

Faculty of Education

University of KwaZulu-Natal

Private Bag X03

Ashwood 3065

KwaZulu-Natal, South Africa

Cell **0762995974**

I thank you in advance for your assistance.

Yours Sincerely

.....

Violet Makwara (071 809 2055)

To be completed by The Participant

I.....hereby confirm that I understand the contents of this document and nature of the research and I give consent to participate in this research. I understand that participation is voluntary and I am at liberty to withdraw from the study at any stage, should I desire.

Signature of Participant

Date

APPENDIX 5: CONSENT FORM FOR SCHOOL PRINCIPALS

118 Haynes Road, Bisley

Pietermaritzburg

3201

Cell: 071 809 2055

The Principal

.....

Dear Sir / Madam

REQUEST FOR AUTHORITY AND CONSENT TO RESEARCH ON TEACHERS IN YOUR SCHOOL

My name is Violet Makwara, a student at the University of KwaZulu-Natal and currently pursuing Masters' Degree-Teacher Development Studies. I humbly request permission to conduct an educational study at four schools I your district. The focus of the study is **to explore teacher learning from the construction of teaching resources on the Advanced Certificate in Teaching (ACT) Foundation Phase programme.**In this study, I am trying to understand how ACT foundation phase teachers acquired different kinds of knowledge through the construction of toolkits during their course.

Their participation in this study is voluntary and you may withdraw without any disadvantage to you, if it becomes impossible for you to continue to participate. The participation will take the form of individual observation during the numeracy or literacy lesson. The dates and times for observation will be negotiated with them.

You may contact me for clarity or additional comments during participation and at any time after the study is complete or my supervisor.

Dr T. G. Mukeredzi

Faculty of Education

University of KwaZulu-Natal

Private Bag X03

Ashwood 3065

KwaZulu-Natal

South Africa

Cell **0762995974**

I thank you in advance for your assistance.

Yours Sincerely

Violet Makwara (071 809 2055)


To be completed by The School Principal

I.....hereby confirm that I understand the contents of this document and nature of the research, and I give authority and consent for teachers to participate in this research. I understand that participation is voluntary and they are at liberty to withdraw from the study at any stage, should they desire.

Signature of School principal

Date & School Stamp

**APPENDIX 6: INTERVIEW SCHEDULE FOR ACT FOUNDATION
PHASE PARTICIPANTS.**

QUESTION	MOTIVATION
<p>1. How do you feel now, after completing the course?</p>	<p>Icebreaker</p>
<p>2. In which ways has the course affected your confidence as a foundation phase teacher?</p>	<p>Confidence</p>
<p>3. What do you think is the most important thing you have learned?</p>	<p>Self-evaluation of knowledge/learning</p>
<p>What did you learn from the assignments you did?</p>	<p>Follow-up question</p>
<p>4. You made a teaching resource, can you show us? Tell us about it. Which one of these do you think is most important? Why do you say so? How would you use it in the classroom?</p>	<p>To obtain narratives from the teachers, see which specialized terminology they use, and get a sense of how they have linked any learning to their practice</p>
<p>How would you go about improving learners' numeracy or literacy?</p>	<p>Follow-up questions to get better sense of narratives, practice, learning</p>
<p>Has it changed because of the course? If yes, how?</p>	
<p>Would you use the items from your teaching resource differently with very weak learners? Very strong learners?</p>	
<p>5. [Market place drawing] Here is a picture which could perhaps be used as a learning resource in your classroom.</p>	<p>Narrative, knowledge</p>
	
<p>6. What are some ways you could use it in a lesson?</p>	

<p>Would you use the picture with very weak learners? Very strong learners?</p> <p>If a learner can add using symbols or count in 2s or 5s, do they still have to count?</p> <p>If a learner can recognize a word by sight, do they still have to spell it out?</p> <p>7. [Number talk video] Here's a video clip of a teacher teaching. What do you think of how the teacher and the learners interacted around the content?</p> <p>What do you think about what was taught (content)? Did you notice anything about learner thinking?</p> <p>How would you perhaps improve the teaching?</p> <p>Why do you think the teacher does what s/he does?</p> <p>8. a) Assume you had to introduce the learners to fractions using the notion of 'a half'.</p> <p>What would you want the learners to know at the end of the lesson?</p> <p>How would you start the lesson?</p> <p>What would you do in the lesson?</p> <p>How much time would you spend on the lesson?</p> <p>b) Assume you had to introduce the learners to digraphs and you want to start with 'kh' (for IsiZulu) or 'br' (for English).</p> <p>What would you want the learners to know at the end of the lesson?</p> <p>How would you do in the lesson?</p> <p>What would you do in the lesson?</p> <p>How much time would you spend on the lesson?</p>	<p>Follow-up questions</p> <p>Beliefs, knowledge of stages of numeracy learning</p> <p>Follow-up questions</p> <p>Beliefs and knowledge about teaching numeracy in particular</p> <p>Beliefs and knowledge about teaching literacy in particular</p>
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APPENDIX 7: LESSON OBSERVATION GRID

GRADE :

SUBJECT :

TOPIC :

DATE :

DURATION :

ACTIVITY/ ITEMS	DESCRIPTION
<p>Are there any teaching resources at all in the classroom?</p> <p>Charts are displayed on the classroom walls</p> <p>How are teaching resources used during the lesson?</p>	
<p>Charts are written with large letters.</p>	
<p>How are charts/ toolkits written in bright colours?</p> <p>In which activities are the teaching resources or charts used?</p>	
<p>Are the learners given time to use teaching resources to try out different ways of solving problems on their own?</p>	
<p>Is scaffolding being utilized during the lesson? For example:</p> <ul style="list-style-type: none"> • Is clear instructions given to learners for instance; writing numbers tracing the dots or reading new words in the story. • How does the teacher assist the learner who is struggling to write numbers? • Is the teacher demonstrating on how to use the teaching resources? 	

How does the teacher approach group work?	
Are the learners given times to play at the play pod?	
Is the teacher helping the slow learners?	
Is the teacher confident in using the teaching resources with different a) strong learners b) weak learners?	
Is the teacher using different strategies in teaching Numeracy or Literacy e.g counting or reading	