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DEPARTMENT OF EDUCATIONAL SCIENCES AND EARLY CHILDHOOD

WORKING TOWARDS A BENEFICIAL TEACHER PROFESSIONAL DEVELOPMENT CONTINUUM: AMALGAMATION OF PRE-SERVICE TRAINING PHASES FOR SCIENCE EDUCATION STUDENT TEACHERS AT THE NATIONAL UNIVERSITY OF LESOTHO

PhD

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PATRAS, GREECE

SEPTEMBER 2017
Declaration

I ‘Maseqao Regina Mabejane declare that this thesis is my own work. It contains no material that has been submitted for any degree or examination at any university and that all resources used or quoted have been indicated and acknowledged by means of references.

Signed: ‘MASEQAO REGINA MABEJANE

Date: 6. 10. 2017
Dedication

To my beloved Mother, ‘Makoroloso Elizabeth Lekhesa,
who bravely endured the pain of illness for the ten months I was in Greece.
The time during which though bed-ridden
she strongly managed to hang onto life
to give me an opportunity to be with her for 21 days
to witness her last moments of suffering before departing from this world.

I lost you, and miss you gravely my dear,
and everything you were to me, all you did for me, and with me.
I cherish the time I shared with you and my father Ntsane William
and my brothers Koroloso Gerard and Molibeli Jerome LEKHESA.

It is OUR achievement.
Acknowledgements

Praised be the Lord, God Almighty for it all.

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Abstract

The primary target of relevant education is the development of the people, the people who are responsible for the economic growth of their country which in turn would enhance the human development thus achieving the socio-economic advancement. Lesotho is not an exception to the global trends with the aspiration for development through education, science and technology. In Lesotho and elsewhere in some parts of the world where a teacher facilitates learning, s/he becomes one of the factors considered to have a significant bearing on the success or failure of education. This could be achieved through education of quality which, to a significant extent could be influenced by well trained teachers.

A constant concern had been raised and reported that the undergraduate science student teachers trained at the National University of Lesotho reflected inadequacy in implementing the professional knowledge they acquired from on-campus training in their classroom teaching during teaching practice in schools. The insufficiency manifested itself in various areas and to varying degree, in areas such as subject content knowledge, pedagogical knowledge, pedagogical content knowledge with their entailed components and general handling of the teaching-learning environment. On that premise, it was decided to look closely into the content of the courses offered in undergraduate pre-service training science education program together with the methodologies and pedagogies employed. The intention was to further establish the correlation between the offered and acquired knowledge with the practice in schools through student teachers’ actual enactment. That was done in order to discern the probable deficit in the links within the processes of training and learning in the two phases of the pre-service stage of teacher professional development.

The study site was identified based on the model followed for teacher training at the National University of Lesotho comprising preparation on campus and practice in schools. Considering that site for investigation and the main research question, qualitative paradigm was employed in order to obtain intense, realistic and authentic information embedded therein. Through purposive sampling, 2 Year IV Curriculum Studies courses were identified and the responsible teacher educators then. For each course, 10 student teachers and their 20 teaching practice tutors were
involved in the research study. The 2 regular practicing teachers who had gone through the system were involved to verify the view that student teachers exhibited some observable shortcomings in classroom teaching during teaching practice. Those were people who had live experiences with the situation.

The general question that the research study was answering was: “What the perceptions and opinions of the teacher educators, student teachers, teaching practice tutors and regular practicing teachers were concerning the subject Curriculum Studies courses and teaching practice with regard to student teachers’ development in learning how to professionally teach in their subjects”. Their perspectival understanding of the situation was serving as the lens through which an insight into the matter could be developed. The thrust of the question was the development of the prospective teachers in learning how to teach in the subjects they would be teaching in schools. The focal concepts were teacher preparation, student teachers’ learning to teach, teacher professional knowledge, practice teaching and participants’ perspective of the whole situation; underpinned by pedagogical content knowledge, reflective practice and, theory and practice as underpinning theoretical notions.

On the basis of that general question, the research questions designed focused on five areas which guided the whole study process; the research design, tools, results presentation and discussions. The areas were: 1) training course content – what? 2) methodologies and pedagogical approaches – how? 3) student teachers’ enactment – practice, 4) theory-practice link and 5) general views – teachers’ voice. The main source of data was the one-on-one semi-structured interviews for all study subjects the audio recordings of which were transcribed. For student teachers pre- and post-teaching practice interviews were conducted. The interview results for the student teachers and their tutors were coupled with their produced text reports. The reports from the teaching practice tutors provided data from the second research method, observations of student teachers’ classroom teaching (enactment of the acquired theoretical and practical knowledge). The primary data were complemented with secondary source, the already existing, available, complete documents that contained pertinent information that could provide an insight into the problem.

The template analysis which is a particular way of thematic analysis of qualitative data following the basic steps in content analysis using hierarchical coding adaptable to the particular needs of
almost any qualitative research study was employed. The data were collected from individual events and analyzed at that level and later through cross analysis related to similar category of participants, course, and type; and in the final analysis all results were subjected to constant comparison around the five areas and consolidated to make a synthesized comprehensive picture of the whole study situation. Through the qualitative content analysis of the resultant textual material the main findings were established.

The focus was mainly the attributes of teacher knowledge, taking on board the emerging issues of relevance. The four main findings that distinctly had a perceptible bearing on the learning and practice of the student teachers which were interrelated and influencing one another to some extent were:

(1) the exclusion of assessment as a topic in the course content for training.

(2) the cross-cutting fragmentation in institutional structures, faculty/departmental operations and practices, university and practice schools partnership that markedly resulted in lack of coherence and collaboration in the training program.

(3) limited time in relation to the program, the courses and the involved teaching-learning activities, and practice teaching.

(4) teacher educators’ modeling.

The discovery made was that for teacher education to be of benefit to teachers, students and ultimately the nation, cooperation, collaboration and dialogue between stakeholders was compelling. The program courses, practices and the whole training program should be more formalized, comprehensive, intensive and purposeful to enable student teachers to successfully synthesize, integrate, and apply the acquired knowledge and skills in different situations, under varying conditions in which they handled students with diverse backgrounds. The issue of fragmentation that cut across all levels of teacher education was of utmost concern and it is therefore emphasized that it should be considered seriously. The consideration could hopefully bring to fruition the required coherence, collaboration, conditions enabling teacher educator modeling of innovative teaching, inclusion of core issues for teacher knowledge and practice, and the realistic time for teacher training. Thus, the amalgamation of issues and phases in the
pre-service teacher training should be worked out such that all stakeholders benefit from the enterprise which would definitely filter out to the whole nation to meet the nation’s aspirations.

The study was done with a hope that the geographically, economically and culturally different context in which it was conducted, also bringing in more voices of the people with varying live experiences of the situation would inform and influence practice and policy in teacher education at various levels, extending into the general field of research in education and beyond. Thus, that would be informing the wider spectrum of stakeholders in both science education and education in general; and hopefully even in areas beyond education where people and development might be issues in question.

Key words:
Teacher preparation, learning to teach, teacher knowledge, practice teaching.
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List of Acronyms

ALACT---------------------Action; Look back; Awareness of aspects for alternative action; Creating alternative action; Trial the alternative action –

BTs------------------------Beginning Teachers

CAQDAS--------------------Computer-Assisted Qualitative Data Analysis Software

CHE------------------------Council of Higher Education

CIEMST---------------------Centre for In-service Education of Mathematics and Science Teachers

CoRes----------------------Content Representations

COSC------------------------Cambridge Overseas School Certificate

CPD------------------------Continuing Professional Development

EDF------------------------Educational Foundations

EFA------------------------Education for All

FED------------------------Faculty of Education\n
FOST----------------------Faculty of Science and Technology

HOD------------------------Head of Department

IP------------------------Induction Programme

ITE------------------------Initial Teacher Education

ITT------------------------Initial Teacher Training

JC------------------------Junior Certificate

LASED----------------------Language and Social Education

LCE------------------------Lesotho College of Education

LGCSE----------------------Lesotho General Certificate of Secondary Education

MDGs----------------------Millennium Development Goals

MOET----------------------Ministry of Education and Training

MUSTER---------------------Multi Site Teacher Education Research

NTTC------------------------National Teacher Training College
NUL------------------------National University of Lesotho
PaP-eRs ------------------Pedagogical and Professional Experiences Repertoires
PRS-----------------------Poverty Reduction Strategy
PSLE---------------------Primary School Leaving Examinations
ReMoDeAp-------------------Reflect, Modify, Develop, Apply
RSA-----------------------Republic of South Africa
SCE-----------------------Science Education
STs-----------------------Student Teachers
TA------------------------Template Analysis
TE------------------------Teacher Educators
TP------------------------Teaching Practice
TTI-----------------------Teacher Training Institution
UNESCO-------------------United Nations Educational, Scientific and Cultural Organization

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Chapter 1

INTRODUCTION

This chapter gives the context in which the study was carried out, considering issues such as the background, the rationale and the purpose of the study, also highlighting the chapters of the thesis.

1.1 Background

This research study has been conducted in Lesotho officially known as The Kingdom of Lesotho, located in Southern Africa. For the five years that the researcher worked as a Teaching Practice Coordinator at the National University of Lesotho (NUL), a constant concern had been raised and reported (National University of Lesotho, 2007) that the student teachers (STs) reflected inadequacy in implementing the professional knowledge they acquired from on-campus training during teaching practice (TP) in schools which forms part of the pre-service training program. That concern led to the drawing of a link with the challenges identified by the Beginning Teachers (BTs) in their first year of teaching who attended the Induction Programme (IP) offered by the in-service unit called Centre for In-service Education of Mathematics and Science Teachers (CIEMST) of the Faculty of Education (FED) at NUL. The researcher coordinated that program also since joining the university in 2000. One would consider that the two groups of the novice teachers were in the early stages of learning to be teachers. But more or less similar inadequacies though to varying degrees were revealed in the studies conducted with the veteran teachers in the country (Kingdom of Lesotho, 2006; UNESCO 2013).

Lesotho is a small country of 30 355 km² with a population of about 2 million. Historically, Lesotho has been classified as the under/least developed and poor country. It is a cause for concern if the situation still abounds in the 50 years of its independence since 1966. One would hope that considering education as “one of the major strategies for promoting socio-economic development” (Kingdom of Lesotho, 2008:2), the educational reforms made over the years would address the country’s developmental needs. Education has been prioritized as one of the most important tools for eradicating poverty. Why then is education not helping to emancipate
Lesotho? In Lesotho and elsewhere in some parts of the world where a teacher facilitates learning, s/he becomes one of the factors considered to have a significant bearing on the success or failure of education. Echoing this view the Ministry of Education and Training (MOET) in Lesotho posits that teachers are “...the single most important human resource input in the education system” (Kingdom of Lesotho 2005:94) which could be implying the recognition of teachers’ contribution in education as Sternhouse (1975) referred to in Kirk, (1986) has talked of a teacher as a living link between societal aspirations with education.

The most abundant and readily available resource for Lesotho’s economic development is its people. With appropriate knowledge, skills and expertise they would extract the natural physical resources such as water, diamonds, sandstone and agricultural base, despite the limited arable land in the rugged Mountain Kingdom with the altitude ranging from 1 000 meters above sea level. In some way these resources are currently exploited by external forces. Even in the cases where Basotho are leading the developmental organizations, Lesotho remains entrenched in the static state leaving it in the category of the Third World countries. That does not depict the aspirations of the government as posited in the developmental policies and declarations. This is revealed where Lesotho acknowledges the many challenges she is facing among which are the “escalating unemployment” which could be taken to be a sign and/or result of poverty; and “resultant rural-urban labor force migration and the paradoxical realization of unproductive (emphasis added) nature of that workforce when it comes to urban demands of the modern day knowledge based economies” (Kingdom of Lesotho, 2008:4). Could these unproductive people be the product of the ever-reformed educational system that has been striving for relevant education?

In the Sector Strategic Plan 2005 – 2015, MOET under its broad policies states: “Reforms of the curriculum at all levels of schooling and training shall be part of quality improvement and the strengthening of developmental relevance of the education system” (Kingdom of Lesotho 2005:26). With the concern raised about the apparent shortcomings in the professional practice of novice and veteran teachers, it appeared reasonable for one as a teacher educator and education taken as a priority for development to consider the contribution of the training afforded the prospective teachers. Hence why it was decided to consider some issues around the training curriculum and practice in the initial stage of teacher professional development which in turn
should be informed by the national education policies. However, there had not been an articulated and comprehensive policy on teacher education and training until in 2016 when such a policy was developed. That lack of educational policy from MOET was suspected to have been a probable contributing factor to underperformance of NTTC now LCE (Ntoi & Lefoka, 2002).

The primary target of relevant education is the development of the people, the people who are responsible for the economic growth of their country which in turn would enhance the human development thus achieving the socio-economic advancement. Lesotho as a landlocked sovereignty completely surrounded by the developing Republic of South Africa (RSA) with strong economy, lives under RSA’s great influence driven by among other factors the advancing scientific knowledge and skills, and technology. Lesotho, therefore, is not an exception to the global trends regarding development through education, science and technology which are embodied in the global goals such as Education for All (EFA) and the Millennium Development Goals (MDGs) to which Lesotho subscribes, including those in the National Constitution, the Poverty Reduction Strategy (PRS), and Vision 2020 (Kingdom of Lesotho, 2005). That might be the reason why Lesotho is considering education with notable focus on science and technology in a belief that they have a great potential for advancing the country’s economic development.

Aware of the potential of science and technology in development, in the recent reform in basic education (first ten years of schooling), the produced Curriculum and Assessment Policy document has Science and Technology as one of the five learning areas. The learning areas include: “Linguistic and Literacy; Numerical and Mathematical; Personal, Spiritual and Social; Scientific and Technological; and Creativity and Entrepreneurial” (Kingdom of Lesotho 2008:5). Science and Technology as a learning area is intended to promote:

- the acquisition and understanding of scientific and technological concepts, principles and processes for socio-economic development
- understanding of environmental phenomena in terms of physical, socio-economic and technological developments
- application of scientific and technological skills in solving everyday life challenges
- positive attitudes and values towards the use of science and technology in everyday life situation (Kingdom of Lesotho, 2008:16)
This learning area targets learner development beyond acquisition and understanding of technical knowledge, but highlights the purpose for personal and national benefit. Without doubt, the reforms at any level within the education system should be ringing a bell for teacher Training institutions (TTIs). The intentions of the Science and Technology area for the new integrated curriculum are just as fit for teacher education which would then produce a versatile teacher who would rise to the challenges of the school education and probably perform better than it has been reported. It remains a fact that in developing the functional human resource in this era of rapid advancement in science and technology there is a dire need to acquire scientific and technological knowledge and skills and probably more so for teachers as a driving force in the education enterprise.

In its vision, MOET declares: "Basotho shall be a functionally literate society with well-grounded moral and ethical values; adequate social, scientific and technical knowledge and skills by the year 2020” (Kingdom of Lesotho, 2005:26). With the visionary education policies and declarations and some improvements in the infrastructure one is inclined to think that there could be significant holistic improvements in education, particularly teacher education. The aspired literacy and functionality could certainly be achieved through meaningful education with relevant curricula the pivotal agent of which, as attested by the government of Lesotho is a teacher.

1.2 Rationale

With the apparent failure to advance Lesotho’s economy through the essential local expertise when MOET has pronounced the intent with education, one would want to critically look at how the teacher, as an important agent for the success in education (Chamoso, Cáceres & Azcávate, 2012; Isiksai, et al. 2007) performs her/his role. In this case the focal point was the initial stage of teacher professional development on the view that the very people expected to help in the development of the country have been educated mostly in the schools in Lesotho. Then one wondered where the problem lied when it could be taken that there should be a common ground on which all stand and operate. But the reported constant poor student performance in the science subjects and mathematics exhibited in the terminal examinations at both primary and secondary
levels, preceding further studies and/or engagement in the world of work, aggravated the need to establish the possible source. It was with the understanding that the academic performance and execution of one’s duties as a student, prospective and/or regular teacher, and a worker anywhere ultimately contributing to the appalling situation of the failing nation could not be the sole contributing factor.

With poor performance in science and mathematics there would be few students probably even not so well founded pursuing these subjects at tertiary level. It is from those students with the shaky science and mathematics background that prospective teacher candidates are drawn. Normally, those who achieved better grades opt for general degree in the sciences. It would be those poorly grounded students who after training as teachers are going to land back into schools to teach, the circle thus getting completed and the ball continuing rolling.

In this era of rapidly advancing science and technology, scientific and technological literacy is rightly the target for education. This could be achieved through education of quality which, to a significant extent could be influenced by well trained teachers. On that premise, this qualitative study focused on the pre-service training stage of science teachers at the National University of Lesotho, with the hope to establish the probable cause(s) of the apparent reported inadequacy of the student teachers in classroom practice during TP in schools. Although it is common to couple science and technology, for the purpose of this study, the technology aspect is not essentially looked into.

In Lesotho as observed internationally, research has been focusing on teachers’ deficient functioning mainly portrayed by poor students’ performance in external examinations (Ball & Cohen, 1999; Ben-Peretz, 2011; Kingdom of Lesotho, 2006; UNESCO, 2013). The view could partially be based on teacher’s intermediary role in which s/he is supposed to make what is learned accessible and meaningful to the students. The deficiency could not be imposed solely on the teacher, just as it could be argued for the teacher training program.

As viewed by Ben-Peretz, (2011) from the research analysis of internationally conducted studies on teacher professional knowledge as mainly from the western countries, there is none in Lesotho that considers what is entailed in the teacher training curriculum and pedagogies employed to teach the prospective teachers to teach as well as the observing and documenting of
the implementation by student teachers of the acquired knowledge exhibiting teacher knowledge. This study on teacher knowledge has been conducted in a different context and culture, in Southern Africa, rather than the West where it has been done extensively (Ben-Peretz, 2011). The aim was to investigate the science teacher training curriculum, the methodologies and pedagogies employed in the training and student teachers’ classroom practice to establish the probable shortcomings that might lead to the apparent shortfall in their classroom practice.

It was anticipated that the study would, in addition to informing the concerned institution, influence policy and practice in education at various levels in the country. In addition it was expected that it would also make a useful contribution in the field of research in teacher education and training at large. This would be possible if De Jong’s view (2007: 21) who says “...one of the biggest challenges of the near future of science education is to bridge the gap between science education research outcomes and science teaching practices in the classroom” could be heeded and the results of this study be considered for the benefit of teachers’ professional development. In the course of the study it was believed that the participants were developing insights into their role and therefore would start to put into effect some ideas deemed appropriate leading to change in the programs and practices. More so especially at the time when the Science Education Department at NUL was highly engaged with the Council of Higher Education (CHE) to improve for accreditation.

1.2.1 Science in the Lesotho education

The Lesotho’s main formal levels in the mainstream of education have always been Primary, Secondary and Tertiary. The Primary Education that a child starts at the age of six takes seven years at the end of which pupils sit for terminal national examinations, Primary School Leaving Examinations (PSLE). At this level, four of the subjects that the pupils study are considered as core and a pupil must do and pass. These are Sesotho, English, Mathematics and Science. The idea of core subjects comprising languages, Mathematics and Science is common in some parts of the world as well, such as the four other countries with Lesotho in the Multi Site Teacher Education Research project - MUSTER (Lewin, 2004). The new integrated curriculum that rolled out into all Primary schools in 2013 after piloting with a few schools involving the first three grades has extended into the first year at the secondary level in 2017. It does not only have science as a core subject but it also serves as a complementary subject in all learning areas.
The secondary education which the child is expected to start at age 13 comprises three years of junior and two of senior secondary. Still at this level the four subjects; Sesotho, English, Mathematics and Science remain compulsory, science comprising biology, chemistry and physics. At senior level, with the Cambridge Overseas School Certificate (COSC) the students were expected to do at least one science subject which would be a combined science constituting two of the three disciplines which optionally could be coupled with a pure science, (Biology or Chemistry or Physics) as a second science subject. With the phasing out of COSC replaced with Lesotho General Certificate of Secondary Education (LGCS) in 2013, the science offered is physical science comprising physics and chemistry, and biological science as another subject. At each secondary level there are external examinations, Lesotho Junior Certificate examination awarding Junior Certificate, (JC) qualification. Since the end of 2014, LGCS administered terminal examinations for the first time. At secondary level the grade obtained in science determines one’s potential in pursuing science or science-related studies. The room for and the nature of science and technology at the tertiary level is out of the scope of this study. Worthy to note is that at all levels of education in Lesotho, a teacher remains the major facilitator for meaningful and beneficial learning.

1.2.2 Teacher education in Lesotho

In Lesotho there are currently only two institutions responsible for the training of teachers, the National University of Lesotho and the Lesotho College of Education (LCE). The phasing out of the Teacher Training Colleges owned by the churches in 1975 marked the inception of the then National Teacher Training College (NTTC), now LCE. The Faculty of Education at NUL is responsible for the training of teachers mainly for senior secondary education ranging from one year to four years depending on the program and point of entry. LCE produces teachers for pre-school (Early Childhood and Care Education), primary and junior secondary education, the programs lasting for three years. However, in practice, teachers do teach at levels they are not qualified for through the undergone training. The training in both institutions is offered as full-time and part-time for some programs.

As a common focus in teacher education worldwide, the initial teacher training programs in Lesotho basically offer subject content, pedagogical studies and educational theories courses in a conventional face-to-face mode of delivery on campus and teaching practice in schools (Allen &
1.2.3 The pre-service stage in teacher professional development

With its distinct main phases, coursework training in the TTI and in-school practice, the initial stage of teacher professional development involves varying learning environments with different people coming into the picture, therefore calling for support and guidance appropriate for each phase Niemi & Jakku-Sihvonen (n.d.). Foremost is the student teacher (ST) who is the learner but at the same time projecting her/his learning into how it ought to positively affect the third person who will be the learner in the school. The ST is prepared for her/his work as a teacher by teacher educators (TEs) and lecturers from the involved sister departments/service faculties. On going for practice, the phase deemed very crucial for STs’ professional growth (National University of Lesotho, 2015); a teacher in the practice school (tutor, mentor, cooperating teaching) who is assigned to assist the ST is expected to afford him guidance and necessary support for his further practical professional learning.

It is in this stage that the STs are initiated into the art and science of teaching. Then the startling observation of teacher inadequacy in classroom practice triggered a desire to investigate the probable cause(s) of the reported deficits. Being a member in the Science Education Department at NUL, the focus site for the research study comprised the undergraduate science Curriculum Studies courses, their content and teaching, and the practice thereof.

1.2.4 Science teacher training at the National University of Lesotho

The Faculty of Education at NUL is comprised of three departments, viz: Science Education (SCE), Language and Social Education (LASED) and Educational Foundations (EDF). The EDF department offers the general educational theories and pedagogies. The pedagogies related to specific science subject to be taught at school which is also referred to as “school science knowledge” (Del Pozo, Pórlan & Rivero, 2011) are dealt with in the Curriculum Studies courses offered by SCE. The general content in science disciplines is offered by the Faculty of Science and Technology (FOST). Teaching practice (TP) for undergraduate STs in the second semester
of the last (fourth) year of training lasts for ten weeks that was increased from eight weeks since 2008. In the course of the face-to-face teaching, STs are afforded an opportunity to practice some basic skills of teaching through micro- and/or peer-teaching. Taking it that among the domains of teacher knowledge are content, pedagogical and pedagogical content knowledge, one would attest that the described training program could be equitable and fundamental to enable desirable performance in teaching by its product.

Having acquired the general science content in the first two years and some theories of teaching and learning, the ST starts on the Curriculum Studies courses (the subject methods) in her/his two teaching subjects in the third into the fourth year. It is presumed that the knowledge acquired in these courses constitutes the needed teacher knowledge to be employed in teaching. The knowledge would be enhanced and extended during actual classroom teaching in the school with the support and guidance by an experienced teacher in the same subject area together with the NUL staff.

1.2.5 The reported performance of NUL prospective science teachers in classroom practice during TP

Over the years, there has been a concern raised in weekly meetings, end-of-TP reflection workshops and TP reports (National University of Lesotho, 2007) about the inadequacy of NUL STs in classroom teaching during TP. The insufficiency manifested itself in various areas and to varying degree, in areas such as subject content knowledge, pedagogical knowledge, pedagogical content knowledge with their entailed components and general handling of the teaching-learning environment. The explanations included weaknesses such as STs’ failure to successfully facilitate the lesson using the employed teaching method/strategy so that the intended lesson objectives were achieved. That could be taken to imply that STs would not implement their own lesson plans. In some cases the intended method/strategy would not be reflected in the lesson plan at all neither being prompted by circumstances that might have cropped up then. Again, the employed method/strategies would not in themselves have a potential of leading to the achievement of the set lesson objectives. Other limitations were revealed in the inadequacy of content knowledge either showing limited knowledge of concepts or misconceptions, or content not pitched at the level of the students. The inappropriate use of the teaching approaches was in many cases coupled with lack of their variety and classroom organization and management.
The same sentiment is shared by Lewin (2004) about the student teachers on teaching practice from the Teacher Training College in Lesotho. From the study of the pre-service teacher education in Ghana, Lesotho, Malawi, Trinidad & Tobago and South Africa he attests, “...dynamic linking of College/University based learning to its application is the exception rather than the rule” (Lewin, 2004:11). This might be implying that there could be a discernible gap between what is done and learned during face-to-face training and practice in schools which has also been observed in other parts of the world as a divide between theory and practice (Aydin and Boz, 2012; Korthagen, 2001; Thomas, 2013). It has been there and it still persists even with so much research in teacher education and criticism of education failing to meet its purpose. The inadequacy in content, pedagogies, the blend of these domains of teacher knowledge and other vital elements embraced in teaching and learning has been reported in some studies with in-service teachers as well (Desimone et al, 2013; Varela, 2012; Vonk, 1984).

1.2.6 Statement of the problem

On the basis of the preceding context and rationale for the study in this chapter, it was believed that the training on campus that the STs were undergoing could have set a sound ground for them to do classroom teaching fairly well during TP. But observations have proved otherwise. That turned out to be a problem as to why the ST could not competently put into practice what they had learned and practiced during micro/peer teaching. Therefore, as a science teacher educator involved in both pre- and in-service teacher professional development there was that urge to investigate and understand the probable shortfall especially in the initial stage of teacher development that could be causing the espoused inadequate classroom practice which was the portrayal of professional knowledge which would ultimately inform the in-service program. That was driven by a belief that getting it right at the early stage could set a firm foundation upon which to build continuing professional development procedures and activities to ensure desired and beneficial and continuing professional practice.

The main focus has been on two aspects of science teachers’ preparation for the practicalities of teaching to combat the inadequate practice. Firstly, “what” specific subject content was treated in the Biology and Physics Curriculum Studies courses offered to the Year IV student teachers who later enacted it in classroom practice; secondly, “how” student teachers’ professional knowledge was developed during the face-to-face training on campus and during practice in schools to
ensure continuity and efficiency. That was considered still bearing in mind some research done on the impact of student teachers’ beliefs and attitudes (Fairbanks et al., 2010; Kumar & Hamer, 2013), not explicitly considered in this study. Thus, the missing units to form an amalgam of the on-campus and in-school professional activities for the prospective teacher might be identified resulting in answering the nagging question about where things were going amiss in the process.

1.2.7 The purpose and significance of the study

Noting that there could be many and varying causes of the inadequate performance of science student teachers in classroom teaching during TP, the study sought to explore where the gap might lie that led to their weakness to competently enact the professional knowledge they had acquired from coursework training in the Curriculum Studies courses. The Curriculum Studies courses in Biology and Physics became the area of interest because 1) they formed part of the current and newly introduced LGCSE curriculum in Lesotho high schools and 2) it was in them that the student teachers were oriented to the teaching of their specific teaching subjects and later assisted by an experienced science teacher in the practice school. Kirk, (1986) rightly points out that in Curriculum Studies courses, teacher knowledge is “contextualized” and the STs have the opportunity to broaden their conception of teacher’s role in the classroom. The Curriculum Studies courses thus help student teachers to develop their professional knowledge that Shulman (1986) termed pedagogical content knowledge (PCK) which is a blend of content and pedagogical knowledge.

If student teachers are taught the subject content and trained in the methods of teaching that subject matter, what causes the reported weakness to successfully put into practice what they have acquired from coursework training? Then it was appropriate to get realistic and authentic information from the directly involved people based on their experiences about the preparation that the pre-service science teachers were afforded on how to teach in specific science subjects. It further sought their experiences, views and opinions on how the student teachers exhibited that professional knowledge during their practice teaching. Thus, it was decided to look closely into the content of the pre-service training courses, methodologies and pedagogies employed in order to establish their correlation with the practice in schools to discern the probable deficit in the links within the process.
The interaction links at this level of preparation of the prospective science teacher also as a site of investigation is illustrated in Fig 1 below. The study site covers the two links that Cochran-Smith and Fries in Cochran-Smith & Zeichner (2005) consider vital, the preparation and classroom practice. The interest here does not extend to the impact of STs’ teaching on students’ learning per se during TP, rather the impact of the training they underwent that formed the basis for their practice from which taught students cannot be completely divorced.

Fig 1: Interaction links in the pre-service teacher training stage

As indicated that most research on teacher education has been conducted in the West, none could be accessed in Lesotho that had looked into the content and pedagogies involved in the science Curriculum Studies courses at NUL to establish how they were handled to prepare prospective teachers for professional classroom practice. Therefore, it was the reported inadequacy of the science student teachers trained at NUL in their enactment of what they had been taught in the preparation that formed the basis for this study. The study explored the “what’ and the “how” within the links in the depicted site in Figure 1. To a certain extent some research on teacher educational issues had been done at NTTC, now LCE (Ntoi & Lefoka, 2002; Lewin, 2004).

This study is underpinned by three notions: 1) PCK as a specialist knowledge for teachers - the effect of which has been underscored, 2) linking practice and theory - the conventional teaching is normally theoretical from which the student teachers employ what they have acquired during practice, and 3) reflective practice - a goal for teacher preparation programs (Hatton & Smith, 1995) and a vehicle for ongoing professional development through the conventional face-to-face and distance settings in the pre-service stage and throughout the teaching career.

With the findings from the interviews and analyzed documents the informed propositions will be made to inform the wider spectrum of the stakeholders in both science education and education
in general; and hopefully even in areas beyond education where people and development might be issues in question.

1.3 Overview of the thesis chapters

Chapter 1 highlights the background and the context, the rationale touching on science, teacher education and science teacher training in Lesotho. The rationale extends into a look into pre-service stage of the teacher professional development continuum. Within the rationale for the study there is the statement of the problem completing the rationale with the purpose and significance of the study. Then the outline of the thesis is given finally concluding the chapter.

Chapter 2 broadly discusses the general theoretical framework and the bibliography related to the study and the research questions. The major theories underpinning these broad areas are theory and practice, teacher knowledge, reflective practice in relation to their effect on teacher preparation in general and qualitative research paradigm, eventually focusing on their direct relationship to the situation in Lesotho regarding undergraduate science teacher preparation in the National University of Lesotho.

Chapter 3 gives an account of the general methodological procedure entailing research design, data collection methods, data analysis, reliability and validity, and ethical issues. It goes further to discuss the sampling procedure, research tools and identification of relevant documents. The research questions designed for teacher educators (TEs), student teachers (STs), teaching practice tutors (TPTs) and regular practicing teachers (RPTs) are thrashed out.

Chapter 4 presents and discusses the findings from the qualitative analysis of the transcripts of RPTs, TEs and STs’ pre-and post-TP interviews. In chapter 5 the findings from the existing and study participants’ produced documents are presented and discussed followed by consolidation and discussion of the findings from the two preceding chapters in chapters 6.

Finally, chapter 7 presents and discusses the whole study, highlighting the findings in response to the research questions and the relevant literature. It goes further to give the implications of the findings for improved teacher learning and classroom practice and probable avenues for further research. The limitations of the study are stipulated followed by the concluding remarks.
1.4 Conclusion

Being such a small country with a relatively small population, but well articulated and visionary educational policies and declarations, one would assume that improving the quality of teacher education has a potential of meeting the education and national aspirations. With the depicted links in the research site, the major purpose of which are for the professional development of the prospective teacher, the expectation was that the student teacher could be well prepared for her/his professional work. But observations made during teaching practice have presented a different image which urged investigation into the situation to elicit the probable shortfall in the process. The next chapter discusses the literature around the issues to do with teacher education and teacher training for effective professional practice.
Chapter 2

THEORETICAL FRAMEWORK

2.1 Introduction

This study sought to explore where the shortfall might lie that led to science student teachers’ observed limitations in their classroom teaching as reported in relation to their employment of what they had been taught in the teacher preparation Curriculum Studies courses at the National University of Lesotho (NUL). The intention was to get the perceptions and opinions of teacher educators (TEs), student teachers (STs), teaching practice tutors’ (TPTs) and Regular Practicing Teachers (RPTs) based on their experiences about the preparation that the science pre-service teachers were afforded in learning to teach in specific science subject areas, and how the student teachers exhibited that professional knowledge during practice teaching. The perceptions and opinions sought served as a window through which the researcher could better understand how STs were assisted to develop the essential knowledge for a teacher and how they in turn put that knowledge into practice in their teaching. The focal concepts were teacher preparation, STs’ learning to teach, domains of teacher professional knowledge and their components, teaching practice and participants’ perspective of the whole situation. Basically, the focus was on two major aspects of science teachers’ preparation in the practicalities of teaching. Firstly, the content offered in the identified Curriculum Studies courses that STs later drew from and used in their classroom practice. Secondly, the methodologies and pedagogies employed in order to develop STs’ professional knowledge during face-to-face coursework training on campus and during practice in schools.

In this chapter, the concepts borne in the research question and the sub-questions, and the purpose of the study in relation to the related literature are discussed. Having introduced the chapter, the general theoretical framework is discussed followed by that of the related bibliography, both embracing the concepts and theories underpinning the study. Then the research questions are discussed in relation to the selected theoretical frameworks, completing the chapter with the conclusion that consolidates the discussed issues.
2.2 General Theoretical Discussion

The framework of this study was premised on the belief that the cornerstones of teacher’s work were one’s declarative and procedural knowledge (Gess-Newsome, 1999) comprising mainly of the subject matter/content knowledge (CK), general and specific pedagogical knowledge (PK) backed with educational theories, the blend of which manifests itself in actual classroom teaching. The blend of subject content and pedagogical knowledge is termed pedagogical content knowledge – PCK, (Shulman, 1986). It is the form of knowledge that Shulman rightly considers the special knowledge specific to teachers.

This view was acknowledged taking it that without knowledge of blending the major domains, content and pedagogical knowledge one might not execute teaching with informed mind for the effective learning of the students that are taught. The espoused limitations with NUL science student teachers’ classroom teaching during teaching practice had some indicators of the aspects of the three major domains of teacher knowledge, (CK, PK and PCK). It was our conviction that the fundamental nature of the work of a teacher was to help students understand and appreciate the subject matter being taught. We maintained that, it was through pedagogical content knowledge that a teacher could achieve the aims of teaching and learning hence why it had been identified as a main theory that underpinned this study.

The assumption was that with the content and pedagogies offered in the teacher training courses of a program, STs could be able, to a considerable level of competency, enact those knowledge domains. In the context of this study, since PCK blends the basic knowledge domains required by a teacher, in this case excluding the general school environment and teacher’s role therein, both teacher knowledge and teacher professional knowledge were taken to subsume PCK.

We further concurred with the view of educators that the acquired theoretical teacher knowledge could best be manifested in practice where theory and practice joined forces. In other words, what had been learned in a conventional setting where one was told the facts, principles, theories, practices and about them; the understanding and interpretation of all forms of knowledge could show up in the mode of practice and the reasoning underlying the decisions made for enacting in a certain manner. The belief was that if practice and theory could be dialectic (Kirk, 1986), that is, informing each other, the two should benefit the prospective teachers for their effective
performance as teachers. That being the case, practice and theory became yet another crucial theory for this study. The message from those facets of teacher learning could be understood better and utilized beneficially if reflected upon which could subsequently result in ongoing improvement of one’s practices and knowledge. Reflective practice therefore became a third theory in this study.

The epistemological stance was that the information about the actual content and pedagogies in the training courses and the STs’ enactment of the acquired knowledge and skills could best be obtained through direct interaction with the involved people and relevant documents. The gathered information through the study participants’ perceptions, their “perspectival understanding” (Lee & Schallert, 2016) was believed to have a potential of helping with the establishment of the shortfall in the initial stage of teacher professional development that caused the reported deficit in STs’ classroom practice during TP.

The identified research site depicted in Figure 1 presented in Chapter 1 set the context for the NUL science teachers’ training program, in that way drawing a case for the study. According to Cohen, Manion & Morrison, (2011) the context determines causes and effects and therefore the basis for the conviction that the case study approach might make it possible to determine the probable cause(s) of the apparent limitations reported with STs’ classroom practice. The qualitative approach was deemed appropriate for getting into and understanding the root cause(s) that may have resulted in the concern that triggered the desire to explore the situation.

The observed pervasive inadequacy with both pre-service and in-service teachers in classroom teaching still abounds despite the various efforts made in many countries to improve teacher education and teacher preparation programs (Ball, 2000; Darling-Hammond, 2000; Zeichner, 2010). It has thus been a concern over the years why teachers fail to connect the learned theory with their practice hence portraying the “perennial” gap as expressed by Korthagen (2010). In this section the literature related to the concepts of teacher education and teaching, teacher preparation, learning to teach, teacher knowledge, teaching practice and the theories underpinning this study are discussed.
2.2.1 Teacher Education and Teaching

At the heart of teacher education is the learners and their successful, beneficial and meaningful learning. The prospective teacher’s successful learning would reflect itself in their teaching, which we believe should start with the effective and meaningful learning for the teacher herself/himself. Teacher education sets a ground for the process of teacher professional development that starts with the initial teacher education (ITE), pre-service stage, followed by the induction stage (early years of teaching) and continuing professional development (CPD) throughout the career. Teacher professional development is ideally guided by policies and procedures designed and run to serve the specific needs of individual countries. But at the heart of teacher professional development are teaching and learning for both pre- and in-service teachers for the benefit of the students they teach. For teacher education to be of benefit to teachers, students and ultimately the nation, the continuum approach that ensures cooperation and dialogue between stakeholders (Caena, 2014) seems relevant.

With the growing research in teacher education, the analysis of a large number of articles from international teacher education journals, for example Teaching and Teacher Education in which the analysis of the journal articles for ten years 2000 to 2010 had the main focal issues as “teachers learning, learning how to learn, and transforming their knowledge into practice for the benefit of their students’ growth” (Avalos, 2011:10). However, most of the research had been done in the United States of America (USA). We took those research issues to be basically about a teacher as a learner and her/his work of teaching. The breaking down of the issues within teacher education for research might be driven by the complexity of the involved processes. In this study the focus was on the initial stage of teacher professional development, pre-service.

Teaching is a complex, multitasking and multidimensional process that deals with a varied intertwined factors that requires deep knowledge and understanding in a wide range of areas (Ball & Cohen, 1999; Ball & Forzani, 2009; Donovan, Bransford, & Pellegrino, 1999; Göran, 2009; Hollins 2011; Kirk, 1986; McCarthy & Quinn, 2010; Shultz, 2002). The complexity of teacher education is not only with ITE, but traverses all levels (Morine-Dershimer & Kent, 1999; Perrot, 1982; Pollard, 2002; Sandra & Boohan, 2002). This certainly calls for a sound foundation in the training of prospective teachers, looking into various aspects that would produce a teacher with aspired essential abilities and qualities. It requires one to be able to synthesise, integrate,
and apply the acquired knowledge and skills in different situations, under varying conditions handling learners of diverse backgrounds (Hollins, 2011). It therefore becomes inevitable that such a process requires ongoing reflection on one’s knowledge and practices for one to develop competency and ultimately growing into an expert. The section that follows discusses what researchers say about how teachers are prepared for the seemingly challenging work of teaching.

2.2.2 Teacher Training/Preparation

In this study, the preparation of prospective teachers is mainly referred to as training stemming from it being done by teacher training institutions (TTIs) but the core reason being the complexities entailed in the whole process. We therefore agree with Ball and Forzani, (2009) that the view that the term denotes deficiency of the enterprise is indeed “a pale under interpretation of the term” (p 498) when teaching of student teachers to learn to teach in order to later do it with students is so intricate. The initial stage on teacher professional development continuum, pre-service training, usually has a conventional face-to-face component executed on campus complimented with teaching practice in schools (Allen & Turner, 2007; Lewin, 2004; Mtika, Robson, & Fitzpatrick, 2014; Nilsson & Van Driel, 2010; Ozdemir & Yildrim, 2012; Shuls & Ritter, 2013). This mode of teacher training according to the perspectives discussed by Kirk (1986:158) is “traditionalist perspective which sees teacher education primarily as a process of professional socialization and induction...” which to a significant extent holds because teaching is a social interaction but that targets specific goals. For the novice teacher to achieve those goals, s/he needs guidance from the veterans with the appropriate expertise in the field hence the need for training to become a teacher.

The on-campus training phase is basically theory laden with some practice in the form of micro- and/or peer-teaching that gets trainees ready for actual practice in the school setting. With some countries such as Australia (Allen & Peach, 2007), Finland (Kaasila and Lauriala, 2012), Germany (Kleickmann et al. 2013), and Israel (Ben-Peretz & Rumney, 1991); even though STs do practice teaching in schools for a relatively prolonged period of time towards the end of training, the practice referred to as field or professional experience, the STs are exposed to the school situations and classroom observations and short practices throughout the years of training, providing repeated opportunities for practice in context (Ball & Forzani, 2009). In Germany, the training extends into the first year of teaching.
In Korthagen and Kessels, (1999), Goodlad is said to have expressed dissatisfaction with teacher preparation programs for their failure to prepare prospective teachers for the realities of the classroom. The situation that is attested might be the one that has led to some countries such as the United Kingdom (UK) to embark on teacher preparation in schools by the schools. That gesture by UK could be taken to also imply the necessity for and the anticipated positive effect of actual practice in the classroom for teachers’ professional development. The same sentiment is shared by Ball (2000) who asserts that preparation of teachers in content should be grounded in practice. That could therefore require the teacher training programs to create opportunities that afford the STs to learn teaching in the “meaningful and supportive contexts” (Magnusson, Krajcik & Borko, 1999:124) in which they are exposed to actual situations and provided the essential guidance and assistance.

Despite the concern about teacher inefficiency and other criticisms (Grossman, 2008), some researchers find teacher training programs still important and acknowledge that there is a dire need to improve them such that the content offered and the pedagogies employed and taught are aligned with classroom practice (Brandsford, Brown & Cocking, 2000; Thomas 2013) thus providing “close-to-practice programs” (Vonk, 1982). Furthermore, there are those other researchers who re-enkindle the hope that teacher training programs impact positively on prospective teachers’ professional knowledge and practice (Darling-Hammond, 2000; Wilson, Floden & Ferrini-Mundy, 2001).

On the basis of these views, we maintained that teacher training was important and of course also concurred with the view that it needs to be improved hence this investigation. One of the possible and probably most viable means of improvement is through different forms of research (Darling-Hammond, 2000, De Jong 2007, Niemi & Jakku-Sihvonen, 2006)). Some countries such as Finland (Kaasila & Lauriala, 2012; Niemi & Nevgi, 2014) and Turkey (Tosun, 2014) have teacher training oriented towards research also referred to as evidence-based practice (Pollard, 2002). This could be taken as a shift from a view that teachers are mere practitioners or implementers of what they are furnished, the view that is seen to perpetuate the gulf between theory and practice in education (Gordon, 2009). The USA mainly bases teacher education reforms and teacher preparation models on research findings (van Ingen & Ariew, 2015), probably meeting the “rationalist” perspective (Kirk, 1986:158-159) that stresses the importance
of basing educational activities on scientific research findings. One would imagine that in the cases where there was so much research, reported inadequacies with teacher education would have been demolished; unless there is disregard of researchers’ efforts by teacher practitioners (De Jong, 2007).

In echoing the need for research as an anchoring pillar and reference point in education, Connelly, Clandinin, & He, (1997:665) assert that “It is not enough to teach students and it is not enough to teach teachers. There must, as well, be a research and inquiry tradition accompanying educational practices” which has been taken heed of by some teacher training programs in some countries as already indicated. However, Kirk (ibid) contends that consideration of scientific research findings should not boil down to thinking, as rationalist assumption goes that, “it is possible to learn more about teaching in a rigorous, systematic, and objective fashion and apply this knowledge in a beneficial way to the process of teacher education”. He asserts that teaching involves human minds and therefore could not be equated to dealing with innate entities. The unpredictable nature of the teaching-learning situation (Ball & Cohen, 1999) also might render the feasibility of this perspective to a certain degree. Both traditionalist and rationalist views do have a ground in teacher education calling for the necessary effort in teacher training programs for them to serve their purpose. The next section looks into what the training program affords prospective teachers to learn to teach.

2.2.3 Learning to Teach

Despite the longstanding criticisms that teacher education does not seem to serve its purpose in producing effective teachers, research has shown that “fully prepared and certified teachers are better and effective” (Darling-Hammond, 2000) in comparison to those prepared through alternative routes that have been tried in the USA. However, Lee and Schallert, (2016:72) point out that, “models focusing on preservice teachers’ learning to teach seem few”. The scarcity of research on student teachers’ learning to teach could probably among other factors be due to the fact pointed out by Kirk (1986) who argues that teaching and learning are made complex because they involve human interactions which are influenced by what goes on in the mind which is different with the cases where innate phenomena are dealt with as in objective quantitative research common in areas such as engineering and medicine. On the same note Lee and Schallert
(2016) highlight the four attributes involved in learning to teach; thinking, knowing, feeling and enacting, proposed by Feiman-Nemser (2008). These involved factors make learning to teach a process in itself which could contribute in causing it to be slow and uncertain (Borko, 2004).

Wideen, Mayer-Smith and Moon (1998) cited in Lee & Schallert (2016:74) present three traditions in teacher education each tradition bringing a different view of learning to teach process. These are: 1) positivist tradition in which teacher education provides teachers with pre-determined knowledge about teaching and learning; 2) progressive tradition in which student teachers’ learning starts from their prior knowledge gradually changing through the process of teacher education; and 3) social critique tradition in which student teachers’ preparation includes consideration of a wider spectrum of social issues. We believe that there are no impervious boundaries between the traditions which could prevent the blend of their aspects as might be necessary in any one case of teacher education program.

For instance, guiding a teacher training course with pre-determined knowledge as might be borne in a standard course content could still build on student teachers’ pre-existing knowledge in relation to the form of knowledge identified as essential for teacher knowledge base which could be extended to the related issues in the community which would thus contextualize the knowledge which could make learning more meaningful and beneficial to the learner. Especially because the STs have been exposed to teaching and learning before engaging in teacher education and also being part of the communities in which and for which they would be working. A lot of research has been done on student teachers’ prior beliefs about and experiences with teaching and learning which influence their acquisition and interpretation of what they learn in teacher training courses (Kagan, 1992; Miller & Shifflet, 2016). Lee & Schallet, (2016:78) express this influence in these words, “as they learn to teach, preservice teachers take their past learning experiences into the present and use these as a reflective mirror for evaluating their current learning.”

There is a strong feeling that what prospective teachers ought to know and be able to do is crucial in enabling them to be able to act as professionals in their teaching (Ball, Thames & Phelps, 2008; Bransford, Brown & Cocking 2000; Darling-Hammond & Bransford, 2005; Hunt, 2009). Valid as the view might be, it might also be worth noting the problems facing teacher education programs in offering STs what is suitable for them to learn for teaching. Ball
In talking of these problems, attests, “The first problem concerns identifying the content knowledge that matters for teaching, the second regards understanding how such knowledge needs to be held, and the third centers on what it takes to learn to use such knowledge in practice”. In other words, it is not just a matter for teachers knowing what to teach as may be given in course synopsis (for TE) or the school syllabus (for ST) and how to teach it, but it should be teaching what should be taught and how to beneficially handle that very knowledge in learning and in practice. If the problems mentioned could be considered, then the content knowledge, teaching skills and educational theories acquired and developed during training might form a solid knowledge base which teachers could resort to and work out what they require to create a suitable amalgam for good and effective teaching. That therefore, calls for a potent training program/course.

With discussed issues pointing out to the complexity of learning to teach (Wilson, Floden, & Ferrini-Mundy, 2001), it might be taken to suffice to study the attributes of teacher education and teaching piecemeal and progressively in order to have a manageable piece of work that could contribute to the ongoing research work in teacher education. This study considered the learning of the prospective teachers in the initial stage of professional development who in the process of their learning act as learners and teachers in the making. Their learning in that dual status, according to Caena, (2014:2) is “an intensive experience that requires STs to be both learners and teachers simultaneously”. Furthermore, the content they learn is in itself also complex in that it comprises theoretical and practical knowledge that needs to be thought about, learned to be known and understood for personal benefit and that of the students they would be teaching thereafter. In their teaching, making reference to that knowledge should give such a teacher some satisfaction and a feeling that they are performing as a teacher and therefore are a teacher. The cornerstone of teacher learning is the acquisition of the knowledge required for teaching that becomes the subject of discussion in the sub-section that follows.

2.2.4. Teacher Knowledge

Although there is relatively a long history of research on teaching, that on teacher knowledge became apparent in the 1980s and 1990s (Connelly, et al. 1997). The main content domains of the knowledge required by the teacher have been identified as subject content knowledge (CK),
pedagogical knowledge (PK) and their blend, pedagogical content knowledge (PCK) with its components which constitute the basic factors in the teaching-learning scenario. The general and specific subject content knowledge base acts as a pillar (Ball, Thames & Phelps 2008; Garbett, 2011; Loughran, Berry & Mulhall, 2012; McConnell, Parker & Eberhardt, 2013; Shuls & Ritter, 2013) and a driving force around which the other knowledge domains are developed. The pedagogical knowledge embodies issues of classroom organization and management, instructional models and strategies, classroom communication and discourse (Morine-Dershimer, 1999), lesson planning, student assessment, addressing students’ differences (Youngs & Qian, 2013), and principles and theories of instruction and collaborative group work (Shuls & Ritter 2013).

Although the basic work of a teacher is teaching, there are more facets to it since it is a social undertaking hence involving personal and social aspects as well as the environmental factors all creating the context. The context in which teaching takes place determines the “what” to teach and the “how” to teach it hence influencing the kind of knowledge required for such teachers for their effective performance. This study focuses mainly on the knowledge required for classroom teaching. But being an exploration research study, it leaves room for any relevant emergent issues in the other areas. That avoids the view of undermining the impact they could be having on the work of a teacher. In essence, this knowledge comprises three main domains; subject matter (content), pedagogies (methods) and their blend, PCK which cannot be divorced from each other in teaching due to their intricate, interrelated and entangled nature. Therefore, in the context of this study, they are all taken as teacher knowledge.

Basically, for the STs, the content knowledge they require comprises subject matter which they would teach to students and the pedagogies to teach those subjects coupled with practice in order to have a feel and experience of teaching such subjects before the normal full-time teaching. The practice element of the initial teacher training stage is the subject of the ensuing sub-section.

2.2.5 Practice Teaching

Taking it that the gist of teacher knowledge is in practice (Allen & Peach, 2007; Ball, 2000; Shuls & Ritter, 2013; Lewis, 2004; Mtika, Robson & Fitzpatrick, 2014; Van Driel & Berry, 2012), teacher training programs afford STs the opportunities to have this practice in different
ways and at different times in the course of training with varying duration as might be necessary and feasible. It is believed that STs’ knowledge and understanding of what has been learned should be reflected in their practice. That is why in the process of learning, practice comes in both theoretically mainly in the general methods courses and also in subject specific Curriculum Studies courses and practically in micro/peer teaching later followed by prolonged classroom practice in schools. The need for and importance of practice teaching as part of teacher education programs has been emphasized in literature (Allen & Peach, 2007; Ball, 2000; Ben-Peretz & Rumney, 1991; Gürsoy, 2013; Kapesi, 2013; Kourieos, 2012; Lampert, M. 2010). It is then taken that the programs are affording the necessities for the ST to learn to become a professional teacher despite the shortcomings that might be observed. However, practice teaching has been proved to have challenges to do with STs’ enactment of the acquired knowledge and the procedures involved (Bradbury & Koballa Jr., 2008; Graham, 1997; Ozdemir & Yildrim, 2012; Sariçoğan, 2010).

Since practice with professional teacher knowledge is done in schools, it is inevitable that there are interactions between a TTI and such practice schools. That partnership has both benefits and challenges (Avalos, 2011; Cochran-Smith & Zeichner, 2005; Day & Smethen 2010; Villers & Mackisack, 2011, Zeichner, 2010). Teacher trainees out in schools have special needs and requirements that could be met if there could be some evident and strong support and supervisory systems which keep the trainees and trainers close together even at the distance through the use of some support systems (Borko, Jacobs, Eiteljorg & Pittman, 2008; Nonyongo & Ngengebule, 1998). The mechanisms of the support range from print material to the use of advanced technologies. With the support systems in place there could be a possibility to avoid a situation described by Lewin (2004:13) where he says, “Often, however, trainees are faced with many confusing situations which they do not know how to deal with, and they have access to very limited support to help them solve problems”. The interventions to support and guide STs during practice in schools have proved to be effective in helping them to learn to teach through the use of various instruments. PCK, theory and practice, and reflective practice are taken as the theories that form the core of this study and their discussion follows in the subsequent section.
2.2.6 Underpinning Theories

This study is underpinned by three notions: 1) PCK as specialist knowledge for teachers (Shulman, 1986) - the effect of which has been underscored. 2) practice and theory - the associated features of teaching and learning, the disparity between which has afflicted teacher training programs over the years; and 3) reflective practice - a goal for teacher preparation programs (Hatton & Smith, 1995) and a vehicle for ongoing professional development (Zeichner & Liston, 1997) through the two phases within the initial teacher professional stage.

2.2.6.1 Pedagogical Content Knowledge (PCK)

Pedagogical content knowledge (PCK) is a construct and model introduced by Shulman in 1986. He defines it as:

…that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding …. Pedagogical content knowledge… identifies the distinctive bodies of knowledge. It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to diverse interests and abilities of learners, and presented for instruction. (Shulman, 1987, p.8)

From this definition, the cornerstones of this specialized knowledge are content and pedagogy the blend of which puts the student at the centre of the endeavor. The manipulation of these main domains through PCK becomes special in that a teacher has to consider the inherent factors in the process and their interrelatedness and impact on one another. The factors hinted in the definition include particularity of content and its representation to meet the needs and interests of the students. One would say that with all effort directed to students calls for knowing them and their characteristics which in turn should guide the decision on the best means to transform and present the matter such that they achieve what was intended for and required by them. This exhibits the complexity of teaching which requires decisive thinking about what to teach and how to teach it. Therefore, in addition to knowledge, teaching requires one to posses the essential attitudes about their work and themselves in relation to that work.

At the peak of teacher’s work is meaningful enactment and exhibition of the understanding of the acquired knowledge, skills and attitudes. Then if coupled with knowing students one might perceive what is being taught from the stance of those taught (Berry & Van Driel, 2013, Darling-
Hammond, 2000) hence adapting the PCK to meet the specific teaching-learning requirements at that point. PCK is a teacher knowledge domain crucial for teacher professional development (Abell, 2008; Aydin & Boz, 2012; Magnusson et al. 1999; Van Driel & Berry, 2012) the development of which is embedded in classroom practice. One takes it that what teachers know, both the “what and how” of teaching is demonstrated mainly in action. 

It had been our belief that teacher’s ability to align content with the method(s) in order to meet students’ learning needs in the prevailing circumstances (PCK) would mark a professional practice. But the development of PCK has proved to be a complex process, highly specific to content, situation and an individual (Abell, 2008; Ball, Thames & Phelps, 2008; Loughran, Berry & Mulhall, 2008; Magnusson et al. 1999; Shulman, 1986/1987; Van Driel & Berry, 2012) probably the reason for researchers considering its components in parts at a time. In their analysis of the literature on teachers’ use of PCK in Turkey, Aydin & Boz, (2012), among their findings found that both pre-service and in-service teachers have inadequacies in relation to the domains of teacher knowledge. Probably signaling to the obscured nature of PCK leading to what might be a contrived mystique about it.

Even though there are expressed doubts about the concrete benefits of PCK making it more of an “artifact” Settlage (2013), but it has been acknowledged that the notion has opened avenues for understanding teaching better. There are promising efforts being made to unravel PCK. For instance, Van Driel & Berry, 2012 discuss the means to create opportunities for its enactment and reflection on the enactment. Also, the development of the Resource Folios using Content Representations (CoRes) - “an overview of the particular content taught when teaching a topic” and Pedagogical and Professional Experiences Repertoires (PaP-eRs) - “accounts of practice intended to illuminate aspects of the CoRe in a particular classroom context” by Mulhall, Berry & Loughran, (2003) sheds more light for developing insight into PCK. Their use of CoRes and PaP-eRs in learning about and assessing PCK used further by other educators such as Bertram & Loughran, (2012) gives hope that it is an entity that can gradually be made understandable and accessible to those involved in education and the research into it. Moreover, the introduction and use of CoRes stimulated their use in developing teachers’ PCK (Williams, 2012) in various areas in teacher education. Furthermore, researching into the components of PCK (Abell, 2007; Aydin
and Boz, 2012, Jang, Guan, & Hsieh, 2009; Mansor, Halin, & Osman, 2010) renders venturing into this notion still worthy.

The components of PCK adapted for this study are those discussed by Magnusson et al. (1999) but not specifically considering the beliefs which they couple every component with. It is taken that the components in themselves construct part of the context for teaching. The basic components considered are: 1) students’ understanding – their diverse interests and abilities considering their preconceptions; 2) teaching strategies – representations to meet the needs of the learners; 3) curriculum – goals and objectives, and specific curricular programs and materials involved; 4) Assessment – what and how to assess students’ learning; 5) orientations toward science - the purposes and goals for teaching science at a particular grade level employing the instructional approaches believed to have a potential to help with attainment of the goals.

Two basic domains, CK and PK inevitably form part of the list of the elements of teacher knowledge in this study. CK is not merely knowing the subject and its topics but the interpretation and understanding that a teacher develops of that content. PK entails quite a number of issues that have been alluded to earlier and portrayed in Figure 2 below among which is planning that could be considered the most crucial cognitive and practical skill acting as the starting point of the blending of the factors involved in teaching. Planning for teaching is in itself a reflective task. It challenges thinking, knowing and feeling in preparation for action which are the elements involved in learning to teach. The factors required in teaching-learning situation are so intricate and intertwined that it is not easy to discuss any one in isolation. One could then ponder how challenging it might be when they are to be merged to make teaching effective.

The interconnectedness of teacher knowledge domains and the components of PCK are discussed based on the depiction in Figure 2. The assumed relationships may validate the possible reason for their being part of the observations reported in STs’ limitations in teaching. The boundaries drawn around the domains and the thickness of the lines and arrows don’t bear specific meaning more that representing the connection between them. However the arrows designate the reciprocity of the knowledge domains. Magnusson et al. (1999:97) define orientations towards teaching science (of course its disciplines) as a “general way of viewing or conceptualizing science teaching”. This maps one’s personal and professional landscape of her/his teaching. The subject content to be taught as part of the curriculum is geared to develop the student knowledge
and understanding at a certain level of learning. Those students have their distinct innate and acquired characteristics as individuals and groups which inevitably influence the manner in which they would view and assimilate what they learn. That which they learn exists within a broader setting, but intimate to their learning at that point in time is guided by some kind of a curriculum. In countries such as Lesotho where the syllabus is a guiding tool (with its stipulated goals, aims, objectives, learning outcomes and the content), it serves as the main curriculum component on the basis of which a teacher decides on the appropriate instructional strategies with the use of the available and appropriate resources to meet its demands.

Figure 2: The overview of teacher knowledge domains and the components of PCK
The science syllabus such as the one that is used for JC, in its Mission Statement specifies the purpose for its teaching as to “enhance permanent and functional literacy and numeracy for continuous learning and effective participation in social issues and activities” (The Kingdom of Lesotho, 2002:1). The Lesotho General Certificate of Secondary Education piloted in 2012 builds on the foundation set in the junior level. That indicates the country’s intention with the use of such syllabuses. The syllabus demands are thus eventually the intended outcomes of education decreed for national needs. The work of a teacher faces a wide terrain to cover hence a need to brace oneself for it. That therefore necessitates a sound foundation in learning to teach in which a student teacher is enabled to critically think about teaching and learning. PCK blends theoretical knowledge a teacher acquires and practices through its use in teaching. The issue of theory and practice is discussed in the next sub-section.

2.2.6.2 Theory and Practice

Student teachers’ weakness with the application of the learned concepts and employment of the acquired teaching skills in actual classroom situation has been reported in other places in the world as well (Korthagen, 2005; Thomas, 2013; Aydin & Boz, 2012). This enduring disparity between theory and practice has been alluded to as far back as early 1900s. The chasm seems to have been there and it still persists even with so much research in teacher education and reforms (Avalos, 2011) hence regarded as perennial Korthagen, (2010). If teacher trainees show deficiencies in practice while still in the making, it might be equitable to anticipate chances of continuing incompetence especially in the case where there are no support structures for beginning teachers and continuing professional development programs for regular teachers. The inadequacy in content, pedagogies, the blend of these domains of teacher knowledge and other vital elements pertaining to teaching and learning has been reported in some studies with teachers beyond pre-service stage (Desimone et al., 2013; Lesotho Ministry of Education and Training, 2006; UNESCO, 2013; Varela, 2012; Vonk, 1984;).

Korthagen and Kessels (1999), point out that the traditional mode of training prospective teachers by teaching them the theories that are hoped to be transformed and incorporated effectively in classroom teaching, what Theissen (2000) considers as linking propositional knowledge with practice does, not help to connect practice and theory the probable drive for researching into the cause(s) and designing the intervention means to overcome the enduring chasm. Several studies suggest that teaching experience needs to be coupled with thoughtful reflection on instructional practice (Gelfuso & Dennis,
2.2.6.3 Reflective Practice

Reflection in teacher education is considered a key element for ongoing professional growth (Harford, & MacRuaric, 2008; Korthagen & Vasalos, 2005; Zeichner & Liston, 1997) and improved teaching and learning. Its inclusion in teacher professional development programs helps to enhance the quality of classroom teaching and learning leading to the development of alternative pedagogical practices and abilities in order to react accordingly to unexpected occurrences (Collier, 1999; Leavy & Hourigan, 2016). The Handbook guiding NUL student teachers’ practice in schools advocates learning from experience (National University of Lesotho, 2015). In the development of the models for teacher reflection in teaching, writers such as Schön (1983) and Kolb (1984) cited in Körkko et al. (2016) base theirs on Dewey’s model. The notable fact about reflection is that it is a process that occurs in stages and different forms. Korthagen & Vasalos, 2005 explain reflection as embracing external and internal orientation. Externally oriented reflection focuses on other people and their actions while in internally oriented reflection one focuses on oneself. Considering some models of reflection one would say the one highlighted in the NUL Handbook might be equated to the “broad reflection” (Korthagen & Kessels, 2001) in which a teacher reflects about him/herself and others in relation to teaching and learning. Unlike in the cases where the reflection activity is guided by clear checklist as in the study by Körkko, Kyrö-Ämmälä, & Turunen (2016) in which each practicum had a specific curriculum focusing on definite issues; with NUL, the checklist for reflection expected at the end of each taught lesson simply lists probable issues that the ST can consider (National University of Lesotho, 2015). Another form of reflection in the case of NUL is the self-report at the end of TP the guidelines of which might still not be explicit enough, are provided for such a report. One would also argue that if clear guidelines are provided and the issues to report on have been part of training probably that could enhance authenticity. Blömeke et al. (2016:35) argue that “self-reported data is still the most common approach in teacher education.
although their reliability flaws are widely known” while Kissling (2014) considers the narratives the closest representations to one’s lived experiences, so that it could be a matter of their inclusion in coursework training (Pulvermacher & Lefstein, 2016).

In the whole teaching/learning scenario, the elements of PCK are involved and teachers should be aware of how they impinge on the undertaking for them to make appropriate decisions for effective teaching. This would be possible if teachers reflect on their teaching. By reflecting, teachers would be able to identify how their teaching succeeds or fails to achieve the intent of their lessons. In this manner they would be learning what might be suitable to teach, in what manner and when, to differing groups and levels of students. In the process of teaching which is a learning platform for a teacher as well we envisage a situation where s/he ought to reflect on all that takes place in teaching and modify the identified thoughts, actions taken, students’ learning and teaching environmental factors accordingly, developing alternative versions of identified aspects which would then be applied either there and then or in an ensuing undertaking as might be appropriate resulting in a ReMoDeAp model cycle. This model bears the elements of ALACT developed by Korthagen, (1999) which has the action, looking back on the action, awareness of essential aspects upon which alternative action would be created and then trialed. The relatedness of the two models is illustrated in Figure 3 below.
2.2.7 Summary

Although different countries have some specific orientations and ways of handling teacher education to meet the needs pertaining to them as stipulated in their education policies, the baseline is that for teachers to perform effectively for the benefit of the learners, teachers require sound, organized and directed preparation. The preparation programs essentially afford prospective teachers the opportunities for the acquisition and development of the required content knowledge, pedagogical knowledge and pedagogical content knowledge with their components, all constituting teacher professional knowledge. In their learning to teach, practice with the theoretical knowledge is deemed a crucial ingredient in order for one to develop into a professional teacher. The success of the practice has been proved to be the continuing reflection. In the section that follows, the discussion of research is aligned closer to this study still considering the identified concepts and underlying theories.
2.3 Review of Related Bibliography

In this section the concepts and theories underpinning the study framework are discussed in relation to relevant literature. The study focuses on the initial teacher training stage (pre-service) for undergraduate science teachers at NUL. To set the ground for the ensuing discussions, the model of science teacher training obtaining at NUL as the institution of study is depicted in Figure 3. That is followed by a look into the main theories that underpin the concepts discussed in the preceding sections.

2.3.1 Pre-service Undergraduate Science Teacher Training Program at NUL

At NUL, teacher training is the responsibility of the Faculty of Education (FED) which comprises three departments; Science Education (SCE), Language and Social Education (LASED) and Educational Foundations (EDF). The EDF department basically offers the general educational theories and pedagogies for the two sister departments. The general content in Science is offered by the Faculty of Science and Technology (FOST). The pedagogies related to specific science subject content to be taught in schools are dealt with in the Curriculum Studies courses offered by the Science Education (SCE) Department. Teaching practice (TP) that lasts for ten weeks completes the training in the final year.

It can be seen from the figure that the subject matter (content) and the general pedagogical knowledge in this case are offered by the departments which belong to different faculties. The academic science courses offered to the education students are those done also by the students following the general science degree. One could assume that what is being offered there is not necessarily what the STs would be actually teaching thereafter. The general pedagogies too do not essentially consider the specific needs of the science disciplines. To bring the content and pedagogies to the context of science teacher learning and teaching, the contextualization of knowledge from these departments, SCE offers the Curriculum Studies courses (methods courses). In the last semester of the whole training comes ten week teaching practice (TP) in schools. The model that represents the traditional perspective and the one found to be the most common worldwide.
The depicted picture in Figure 4 illustrating the training model for prospective science teachers confirms the view expressed by Ball, 2000:242 attesting: “… teacher education throughout the 20th century has consistently been structured across a persistent divide between subject matter and pedagogy”. Other examples of such divide given include those in institutional structures, universities and schools, domains of knowledge in teacher education curriculum, and academic disciplines corresponding to school subjects that would be taught after training. In this case there seems to be a divide at all mentioned levels. She further points out that the already existing chasms are complemented by fragmented practice experiences which in themselves fragment teaching. We do consider micro/peer teaching and teaching practice in schools as fragments of practice experience especially when the practice done on and with peers during on-campus training does not resemble the practicalities of actual school situation.

As a common procedure in teacher education programs worldwide, the teacher training program at NUL offers content, pedagogies and educational theories courses in a conventional face-to-face mode
of delivery on campus and teaching practice in schools (Lewin, 2004). The content courses are intended to ground student teachers in the knowledge of the concepts in the subjects they would be teaching in schools. The educational foundations/professional studies knowledge considers general aspects of philosophy, history and sociology of education and educational psychology, the knowledge underpinning the processes of teaching and learning. The pedagogies are to enable student teachers to teach the subject matter for students to understand and appreciate what is being learned.

In the course of face-to-face phase teaching, STs are afforded an opportunity to practice some basic skills of teaching through micro/peer teaching. In particular they do peer-teaching in the Curriculum Studies courses. The evidence of the impact of micro-teaching in preparing prospective teachers in the art of teaching, developing their teaching capabilities and confidence is revealed in the work by several researchers through the views of TEs, STs and researchers’ observations (Fernández, (2010; Ghanaguru, Nair, & Yong, 2013; Lederman & Guess-Newsome, 1999).

During practice in schools STs are supported and guided by TPTs who are expected to act as professional guides and educators due to their assumed experience and expertise. Stones and Morris cited in Kirk (1986:16) however characterize this approach as “sitting with Nellie”. The meaning as quoted by Kirk being: “Nellie is a factory worker who has been doing the job for years to whom new recruits are attached while they learn the job”. Kirk attests that “sitting with Nellie” has proved to be “an extremely inefficient and wasteful method of training, haphazard, and lacking the capacity for the systematic development of teaching skills”. It could only be taken as part of or the probable cause for the discernable gap between what might have been learned and the practice observed with the science student teachers at NUL after it had been found from the concerned parties. Since no form of research on the impact of “Nellie” could be accessed in Lesotho, it was decided that it might be worthwhile to find out about the situation in connection with the TPTs and STs’ learning to teach during TP. Student teacher and TPT in their practice are both supposed to be supported and guided by the Handbook designed by FED. The teacher educators offer their support through the visits to STs in their practice schools to observe them in action so as to assist them on the ground also as a way of extending the training and enhancing their professional development, and for assessment. The next section discusses the main theory upon which the study is based, PCK.
2.3.2 Pedagogical Content Knowledge (PCK) in relation to the study concepts

PCK is the main theory underpinning this study as a domain of teacher knowledge that is crucial for teacher professional development. It was considered how it was dealt with including its components in teaching STs to teach and their application of it in practice. It was not necessarily studying how it developed with STs’ learning, one reason being that they were likely to handle a range of topics as the schools decided during TP. That was due to the view that PCK development has been said to be topic specific (Shulman, 1986, 1987). Since PCK embodies CK and PK in action all taken as teacher knowledge, PCK is specifically mentioned where teacher knowledge is enacted.

PCK is undoubtedly a form of teacher knowledge that has been proved to have a significant impact on effective teaching and it is deemed an important goal for teacher professional development programs (Van Driel & Berry, 2012). However, the study on this concept in Lesotho is still insignificant. Since no research has critically investigated the relationship between the training methodologies on student teachers’ performance during teaching practice it was hoped that the findings of this study could reveal the actual aspects of teacher knowledge domains and components that STs’ find helpful/not helpful; and as a result employ/not employ in their classroom teaching during TP. No studies undertaken on PCK in relation to NUL teacher training programs and trainers’ perceptions and practices of it could be accessed too. With the LCE and the Colleges in the countries involved in Multi Site Teacher Education Research (MUSTER) project, it has been found from the reviewed curriculum materials that some of the key dimensions of PCK are missing (Lewin, 2004).

PCK could be taken to happen in two stages, starting with lesson planning which portrays a theoretical or hypothetical version. This is said because in the planning one considers all relevant factors associated with teaching and learning which again we consider to constitute a teaching context. As early as when a teacher plans for her/his teaching, a lot of cognitive teacher knowledge comes in. It gets manipulated (conceptualized, organized and transformed) influenced by personal attributes, beliefs, attitudes, conception of teaching and learning, experiences etc. on the basis of which a teacher makes decisions for the particular lesson being planned. The importance and effect of lesson planning has been researched, and the lesson plan has been used as a tool for the professional development of teachers and assessment of PCK; Prescott, Bausch & Bruder, 2013; Valk & Brockman, 1999). Problematic as the lesson plan has proved to be (Gafoor & Farooque, 2010; Liyaanage & Barlett,
it remains a crucial tool for a teacher. Lesson planning in itself is a difficult skill that student teachers take time to grasp, drawing and implementing. But the importance of the lesson plan in guiding and directing teaching cannot be underestimated.

We take it that for teachers to be able to formulate and organize the subject content to be taught, they should be having a good understanding of that content borne in the curriculum and the curriculum itself. They should know the demands of their subject curriculum especially the syllabus in those countries where national curricula are used. The syllabus in its goals, aims, objectives and learning outcomes stipulates why a particular subject/topic should be taught, all targeting to benefit the student. This knowledge a teacher would then convert into a teaching curriculum, which one may equate to what Del Pozo, Pórlan & Rivero (2011) call “school knowledge”. The content in the syllabus does not stipulate among other things how the topic concepts should be ordered and treated for students’ learning. Neither does it give specific activities, explanations, analogies, examples (representations) and so on, matching them with the stipulated aspired benefits for students. This is the work of a teacher which is quite challenging.

The lesson plan format that the STs get trained on at NUL looks into issues such as, level of learners, subject to be taught and time - bearing duration, lesson objectives, students’ prior/assumed knowledge, classroom organization/setting, materials/teaching aids, method(s), content, teacher and students’ activities, assessment, reflection on the lesson and the means to improve all of which in our opinion build a context of teaching. These components of the lesson plan are entailed in PCK stated by Shulman and other proponents of the notion (Abell, 2007; Gess-Newsome & Lederman, 1999; Johnston & Ahtee, 2006; Magnusson, Krajcik & Borko, 1999). Since PCK brings together the theoretical knowledge and practice, the section that follows looks into the issue of practice and theory.

2.3.3 Practice and Theory in relation to the study concepts
As did Allen, Ambrossetti & Turner (2013), it was decided to follow Zeichner (2010) in using the term “theory” as representing the broad range of concepts and skills associated with the declarative and procedural knowledge taught to student teachers on campus during coursework training; and “practice” referring to the classroom pedagogy and activities of the teacher during teaching practice also referred to as field experience or practicum in some parts of the world.
In Lesotho as it seems a common observation elsewhere, science teachers do not perform as expected. As a result, there is a need to help pre-service teachers learn to teach effectively (Grossman, 1990; Magnusson, Borko & Krajcik, 1999). The observation made by Ben-Peretz (2011) from the analysis of studies made on PCK that it had been mainly on the western context and culture justifies the concern raised by Lewin (2004) that the educational ideas and materials used in the countries he is working with in Africa are usually derived from the West, hence detached from the context and culture of the African teachers and teacher educators. Thus, the teacher base knowledge gets more trivial for student teachers and probably not even fully understood by the teacher educators. It is therefore worthwhile to study PCK in different contexts and cultures. Ben-Peretz goes further to indicate that in those studies, there had not been a look into what exactly is taught in teacher preparation courses that prepare prospective teachers’ development of their PCK, the situation that applies in Lesotho. Neither was there any that had studied teacher knowledge in relation to NUL teacher educators’ perceptions and practices thereof.

Teacher trainees out in schools have special needs and requirements that could be met if there could be some evident and strong support and supervisory systems which keep the trainees and trainers close together even at the distance. With the support systems in place there could be a possibility to avoid the situation described by Lewin (2004) in which STs have limited support. This view further triggered the desire to explore the situation in teacher training at NUL because literature reveals that there are those countries such as Finland (Lanas & Kelchermans, 2015:22) which has “the most successful education systems in the world” including teacher training/preparation programs the impact of which is manifested by successful student performance which is the aspect of students’ learning easily accessed and desired by the public.

Teaching practice/practicum has been proved to have challenges (Hoffman et al., 2015; McNamara, 1995; Ozdemir & Yildrim, 2012; Sariçoğan, 2010) and in establishing what may be leading to STs’ inability to successfully implement what they have been taught makes this phase a relevant part of this study site. It is therefore inevitable that there are interactions between TTIs and practice schools, the partnership that has both benefits and challenges (Avalos, 2011; Cochran-Smith & Zeichner, 2005; Day & Smethen, 2010; Hoffman et al. 2015; Zeichner, 1992). This link is being explored in this study to establish its influence in enabling the prospective teachers to develop the ability to construct well
thought out and planned logical practices as it is part of learning to teach, hence developing STs’ PCK.

The UNESCO study conducted in 2013 with science and mathematics teachers at both primary and secondary level in Lesotho, to establish the challenges they encountered in their teaching revealed that even the teachers who had been in the field for a number of years, still had problems similar to those of the STs. Of the challenges that came out significantly were teachers’ not being able to interpret the syllabus as part of the curriculum and guiding tool for their teaching, inability to effectively correlate content with employed pedagogies, also mentioning some topics that gave them a problem to teach because they themselves did not quite understand some concepts embodied in them. They failed to vary teaching strategies to make learning meaningful for students. That confirmed the findings of the previously conducted needs analysis study for improvement of teaching in core subjects; viz. Mathematics, Science, English and Sesotho (Kingdom of Lesotho, 2006). Could that be saying that there are times when even experience fails to be a better teacher? On the contrary, research by Boyd et al. in Shuls and Ritter (2013) indicates that teachers do improve fast in their practice especially in the first three years of teaching. It is felt that teaching practice should be marking the beginning of that stage of accelerated teacher professional improvement, the induction stage. In Germany in its 5 year program, the first year of teaching forms part of the formal pre-service stage.

Support and supervision in the initial stage are crucial throughout the process of teacher development (Donovan, Brandsford & Pellegrino, 1999; McCarthy & Quinn, 2010). With the TPT in place, TP Handbook and the visits by NUL supervisors, one would argue that there are support structures in place. TPT as the experienced practitioner is expected to provide regular essential support and supervision to the student teacher. According to the expectations expressed in the section on the roles of TPT in the TP Handbook (National University of Lesotho, 2015:13) they are supposed to observe STS’ classroom teaching after which they are to fill the record of their discussions in the Observation Record sheet (the sample on p. 19). Those forms were to be included as part of ST’s TP file. But if, even with training and the support mechanisms provided the STs still showed the apparent deficits, probably guidance and support ought to be the ‘ongoing must attributes’ of the pre-service stage of teacher professional development. That could be confirming that the support mechanisms are not in themselves the required content and processes. And as Martin, Snow & Torrez, (2011) point out, the
support structures could be enhanced by constructing rich supportive contexts with transformative settings that enable teacher learning. That might probably help to enhance the development of PCK in and from practice (Ball and Cohen, 1999) despite the complexity and unpredictability of classroom practice.

Those observations triggered a desire to look closely into pre-service training course content and methodologies used, to establish their correlation with the practice by STs and TPTs in schools. With the reported inadequacy in STs’ classroom practice could it suffice to say that the three major sins identified by Varela (2012: 17) with the in-service training of teachers: “(1) a one-size-its [sic]-all mentality ; (2) in-service isolated from daily classroom practices; and (3) a lack of follow-up” hold for pre-service training? This study was hoped to help find out if some elements of these questions hold for pre-service teacher training of science teachers at NUL.

This marks the importance of not conceptually bringing together theory and practice, but actually enabling prospective teachers to professionally and purposefully match the content and pedagogies in their classroom practice. There is therefore a paradigm shift from theory to practice notion to what one might term “give and take” as a way of marking the dialectic feature desired balance. In other words it could be practicalising theory and theorizing practice therefore leaving no room for theory and practice as separate entities. What is being practiced is actually a blend of the learned subject matter and the pedagogies of meaningfully conveying concepts to the students. That professional practice displays teacher knowledge. Connecting learned theory to practice does not necessarily mean theory to practice as observed in the traditional model of teacher training. It is therefore worthwhile to take a critical look into each one of these facets, their connections and the impact of one on the other to be able to foster their reciprocity. That could be achieved through ongoing reflection which is then discussed in the next section.

2.3.4 Reflection in Teaching and Learning in relation to the study concepts
Reflective practice is regarded a crucial aspect in teacher development programs to enhance the quality of classroom teaching and student and teacher learning leading to the development of alternative pedagogical practices and abilities in order to react accordingly to unexpected occurrences (Darling-Hammond, 2005; Zeichner & Liston, 1996). The Handbook guiding NUL STs’ practice in
schools advocates learning from experience (National University of Lesotho, 2015) following the general notion that reflection is one of the driving forces of professional development.

Taking action on the basis of the results of their reflection, STs would be practicing a variety of ways to choose and organize subject matter, transforming it to suit a specific context and at any specific time. That practice leads to improvement of CK, PK and PCK resulting in professional development as well as building more on one’s repertoire of experiences and expertise with teaching (Darling-Hammond & Bransford, 2005; Zeichner & Liston, 1996). Reflection thus becomes a crucial attribute of effective teaching and learning which the STs need to be prepared for and guided on throughout their training (Collier, 1999; Freese, 2006; Korthagen, 2001; Korthagen, 2004; Korthagen & Vasalos, 2005; Loughran & Corrigan, 1995; Marland, 1993; Orland-Barak & Yinon, 2007; Pollard, 2002; Ross & Bruce 2007; Sarivan, 2011; 2005; Yost, Sentner & Forlenza-Bailey, 2000).

For student teachers’ reflection, varying means have been expressed, designed and used and have proved to be effective, including tools such as journal entries (Loughran & Berry, 2005) (portfolios (Groom & Maunonen-Eskelinen, 2006; Kaasila & Lauriala, 2013, Stuart, & Thurlow, 2000), video analysis (Santagata & Angelici, 2010, Pellegrino & Gerber, (n.d.); Kleinknecht & Gröschner, 2016), lesson plan (Majzub, 2012; Ward & McCotter, 2004) With the various models of reflection and the seemingly broad reflection with teacher training program at NUL, the outcome of the research would indicate the modes and stages/levels reached by those student STs. “Reflecting on practice is a complex task requiring observation and reflective skills” (Leavy & Hourigan, 2016:162). Being observant and conscious to all aspects of teaching and learning would form a ground for reflecting on the identified issues upon which a teacher would work out the alternative means for better performance and outcomes. Any form of skill is better developed through regular, organized, guided and comprehensive practice as the use of intervention tool for reflection and designing the means to improve as proved beneficial to STs’ professional development (Watts & Lawson, 2008).

2.3.5 Summary
The concepts and theories of interest in this study do feature in the pre-service training of science student teachers at NUL and those discussed in literature. Since the intent of this study was to investigate the situation as it prevailed, the preceding discussions informed the choice and
implementation of the research methodologies which are discussed in the section that follows.

2.4 Research Methodologies
In this section the methodological considerations and choices made in this study which had to be decided such that they could make possible the collection of appropriate and relevant data guided by some ideas from literature are discussed. Considering student teachers’ acquisition and application of teacher knowledge to determine where the shortfall might lie in the process of pre-service training that manifested itself in science STs’ inadequate implementation of what they had learned bore a notion of cause and effect. Cochran-Smith & Fries (2005) in Cochran-Smith and Zeichnner (eds) give a caution about studying causes and effects in teacher preparation saying:

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\text{it is very important to emphasize that the causal research about teacher preparation has steep and thorny research challenges. It requires at least two causal links – the first linking teacher preparation with the knowledge, skills, and dispositions teacher candidates learn during the preparation period; and the second linking that repertoire of knowledge, skills, and dispositions – as enacted in classroom practice – with pupils’ learning or other outcomes. Either link by itself is complex. (Cochran-Smith and Fries, 2005:51)}
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In this study, the site of investigation covered the two links denoted, the preparation and classroom practice the effect of which was going to be revealed through the perceptions of the involved participants. The focus in the first link was on what the student teachers were taught and the methodologies employed. That called for a look into the training curriculum, and its transformation for instruction to prepare STs to teach in their subjects. In the second link during which the STs put into practice what they had learned as they continued learning, the focus was on how they exhibited their ability to merge the pedagogies with the subject content taught for students’ effective learning, their pedagogical content knowledge. The qualitative approach which seemed to be the most appropriate for this study is discussed with its elements comprising the case study, sampling, research methods (interviews with inherent ethical issues), document analysis and qualitative content analysis in the sections that ensue.

2.4.1 The Qualitative Paradigm
This study sought to explore where the gap might lie that led to science STs’ inability to
professionally employ in their classroom practice what they had been taught in the undergraduate teacher preparation courses at NUL. The mainly involved participants were teacher educators (TEs), student teachers (STs) and teaching practice tutors (TPTs). Their perceptions and opinions based on their experiences about the preparation that the science pre-service teachers were afforded regarding how to teach in specific science subjects, and how the STs demonstrated that professional knowledge during their practice teaching were thought to have a potential to enable eliciting what could be missing in the training that led to the apparent inadequacy. We were, however, aware and acknowledged that it was not easy to unravel the complex teaching/learning scenario which has led to limited understanding of how teacher training programs affect the development of teacher knowledge (Cochran-Smith & Zeichner, 2005). But the contribution was hoped to contribute to the attempt to understand and improve teacher education. In particular, the identification of the pitfall(s) might enable the proposal, design and implementation of the means to improve the training program for undergraduate science teachers at NUL and elsewhere in the world in relation to the concepts considered.

Qualitative research paradigm was identified as the most suitable for this study because the interest was in the meaning that the participants gave to their experiences in their work/learning lives with the training and practice of science student teachers. It enables intimate interactions between the researcher and the participants, lending itself to a variety of methods of collecting and analyzing data (Kreuger & Neuman, 2006). De Vos, Strydom, Fouchè & Delport, (2011) attest that qualitative research approach enables in-depth interactions thus getting insiders perspectives of their own situation, echoed by Mouton, (2011) and Yin, (2009) cited in Cohen, Manion & Morrison, 2011). Therefore, the requirements of quantitative paradigm such as formulation of hypotheses that are tested through the use of specialized standard analysis techniques (Kreuger & Neuman, 2006) might not serve the needs of a spelt out situation in this study.

Getting participants’ perspective in this case reacts to Korthagen, Loughran, & Russel (2006) quoted in Allen and Peach (2007:24) who in criticism of the research conducted in teacher education say, “ironically, all over the world, candidates’ voices are rarely used to ascertain whether their teacher education program achieves its goals”. Allen and Peach in response to that criticism, in their study of
the connection between on-campus and in-field components and their impact on student teachers’ learning how to teach, sought student teachers’ views and opinions as a way of getting their voice, so did Martin and Dismuke (2015) who sought STs’ perceptions of their learning and engagement in a writing Methods Course. In this study we take it further to include more of the directly concerned stakeholders in the two phases of the initial stage of teacher professional development in addition to the STs, thus getting even more voices. The identified site of study determined the case for this study, the issue discussed next.

2.4.2 Case Study
Talking about case study, Creswell cited in De Vos et al. (2011) says it enables the researcher “… to obtain an intimate familiarity with their social worlds and to look for patterns in the research participants’ lives, words and actions in the context of the case as a whole.” The participants in this study would be giving their lived experiences with the pre-service training as they perceive and feel about it being part of it in some way. The primary information they would provide both explicitly and implicitly would be very close to what obtains although there could still be chances for misrepresentation of information where sometimes the participants might want to please the researcher or hide some information or even give false information (Mouton, 2001). Within the case there would be specific subjects identified which then constitute a sample, or sets of samples in a case of a multiple case. Sampling is discussed in the next section.

2.4.3 Sampling
The involved people in the research site constitute the population of probable participants from which a sample could be drawn. The STs as the focus of the teacher training program were drawn from the identified Year IV Biology and Physics Curriculum Studies courses coupled with the concerned teacher educators at the time of research for on-campus training phase. The estimated number of STs was ten per course intended to have gender balanced samples as might be possible since that depended on the numbers and mix at that point in time. The teacher educators are the implementers of the training courses and student teachers are the recipients of their training hence their inclusion.

In the practice phase in schools where the same STs were still the centre of the enterprise, they were coupled with experienced teachers who in the context of NUL are referred to as teaching practice
tutors (TPTs), while in other settings elsewhere are called mentors/practice teachers/cooperating teachers etc., act as professional guides. All those parties had a role to play in the professional development of teachers and their reflection on the impact of pre-service training and practice might assist in resolving the concern. Their participation was deemed vital with a belief that their contribution could enlighten the research on the probable gap between what the prospective teachers learned in training and their classroom practice in which they seemed to have some enduring shortcomings.

The study site had in a way set boundaries of a collective case that in turn led to purposive sampling, with a choice of who to work with in order to get rich information that would best inform the study (Cohen, Manion & Morrison, 2007). That choice ultimately led to other aspects of the sample such as training courses, year of study and the number and categories of participants all creating a multiple data source therefore enabling triangulation (Cohen, Manion, & Morrison, 2007; Denzin & Lincoln, 2005). To obtain the required information, the researcher ought to employ the means to gather it and the next section looks into the methods of collecting data in this qualitative case study.

2.4.4 Research Methods
The various ways of collecting, organizing, analyzing and interpreting data through the use of a case study bear the basic attributes of qualitative research. The associated research tools in a qualitative study include those such as observation, interview, survey, and document analysis (Bogdan & Biklen, 2007 cited in de Vos et al., 2011; Mouton, 2001; Ying, 2009 cited in Cohen et al, 2011). In this study, we employed the use of interviews and document analysis with which the researcher was directly involved. Some documents for analysis had been identified from an array of documents on the basis of the relevance of the information borne in them to address the research question, their availability and accessibility (Mouton, 2001). The focal groups for interviews were the three directly involved groups in the pre-service training of science student teachers at NUL; the student teachers, teacher educators and teaching practice tutors. Although the interview questions sought student teachers’ expectations of how what they had acquired from the Curriculum Studies courses would help them teach during TP, the actual display of teacher knowledge in teaching would be observed by TPTs. Thus, the researcher would be indirectly involved in classroom observations, instead would get the information from STs and TPTs.
2.4.4.1 Interviews

Interviews provide in-depth, authentic and much information from the people who are directly involved in the situation with real experiences, conceptions, perceptions, beliefs, and opinions. That renders a possibility for exploration and description of the issues at the heart of a research study (Cohen et al., 2011; De Vos et al., 2011; Miles & Huberman, 1994; Patton, 1990). In this study the correlations of content and pedagogy in the face-to-face training lessons and in student teachers’ practice teaching were to be investigated. With the coursework training the focus would be on two aspects: 1) the specific subject content treated in the Curriculum Studies courses, (Biology and Physics) that student teachers acquire knowledge from for use in their classroom practice later; and 2) the pedagogies that teacher educators employed for developing student teachers’ professional knowledge of teaching in the subjects as well as learning about the pedagogies they would need for teaching the students in schools.

Lee and Schallet (2016:74) in their framework of perceptual instruction assume that “human cognition always reflects a perspective, and constructing a viewpoint is necessary in learning”. In teacher education, both a teacher and a learner are co-learners, and their perspectives on the exercise would be providing their interpretation and understanding of their lived experiences which could be real or close to reality. This study on teacher knowledge would be contributing to this research area. Looking at it involving teacher educators to understand their perception of their work is in line with the view expressed by Connelly, Clandinin & He (1997:666) in saying it “is part of a revolution in how educators think about classroom practice”.

The semi-structured nature of the interview questions were designed so as to give room to elaborative responses providing informative data, maintaining the focus of the main research question. Tips on how to conduct interviews and the common errors had to do with ethical issues such as rights of the participants, the issue termed ‘costs/benefits ratio’ (Cohen, Manion & Morrison, 2007), subjectivity/bias, respect and participants’ security (Cohen et al., 2007; De Vos et al.; 2011; Mouton, 2001; Derry, 2007), and procedural issues including technical state and use of the devices (Garcez, Duarte & Eisenberg, 2011; Morgan & Krueger, 1998).

With a series of interviews for different groups of the subjects of this study, it had been unavoidable to
keep a diary of events referred to as “internal audit” (De Vos et al, 2011:407) as it helped to keep an account of the various steps taken in the research process. The keeping of records according to Mouton, (2001) is a way of ensuring quality as this bears the history of the whole process that would then enable readers to follow and make their judgment of the credibility of the research and replicating it should they find it worthy.

The interview schedules were designed such that they were geared to suit each category of participants, keeping the essence of the research question. From their perspective, they would be asked to describe their views and opinions regarding student teachers’ professional learning/training and performance indicating the part they themselves played in the process. For STs there was a pre-interview before they went for teaching practice and a post-interview after they had completed. For both TEs and TPTs one interview was designed. The interview for RPTs was to add to the evidence for the observed inadequacy with STs during TP since they had gone through the same process. Those interviews of different sets of participants would end up in a significant number of transcriptions and field notes (Cohen et al., 2011; De Vos et al., 2011; Mayring, 2003; Miles & Huberman, 1994; Patton, 1990); STs – 40, TEs – 2, RPTs - 2 and TPTs – 20 all in all resulting in 64 transcriptions to analyze.

The flow of interviewing participants would not only collect the descriptions of their situations and experiences, but at the same time offering an opportunity for them to reflect on their situation and experiences therein (De Vos et al, 2011). The reciprocal nature of the exercise draws information from both parties in some way contributing to the collection of collective ideas and solutions for improvement (Fullan, 1992). It was hoped that from both explicit and implicit information from those parties, the researcher would be able to observe relationships and contradictions that might lead to interpretations giving a cue to the probable gaps that lead to the reported and observed shortcomings in STs’ teaching.

Connecting the themes: content, pedagogies, enactment coupled with learning and the link between theoretical and practical learning through perceptions of the involved parties was thought to be capable of shedding light for better understanding of what was involved in STs’ learning to teach that would in turn enable identification of the shortfall(s) in the training process that ultimately surface during practice teaching. The next section discusses the document analysis as yet another feasible
means of collecting data in this study.

2.4.4.2 Document Analysis
In the process of establishing where the cause of student teachers' failure to competently apply the acquired teacher knowledge in their practical classroom teaching might lie, a number of apparently pertinent documents besides the transcriptions of interviews of TEs, STs, TPTs and RPTs were identified, studied and analyzed. The choice of the documents for this study among the array of educational documents was mostly driven by the question that the study intended to address. That step in itself marked the beginning of the analysis process. Each document was then to be systematically analyzed on its own merits, still focusing on the question of concern with a hope that the information in those documents would enable the researcher to interpret the meaning borne in them. The focus of the meaning was basically the attributes of teacher knowledge, still leaving room for emergent issues that might seem to have a bearing on the issue being explored.

The documents included subject Curriculum Studies course synopses which stipulated what topics to teach; TEs' course outlines which represented their teaching curriculum derived from the synopses; TP Handbook that formed an aspect of the mechanism of linking the coursework and practice training phases, STs' lesson plans and TP reports which furnished information as perceived by the directly involved and core factor in the undertaking; and TPTs’ reports on ST on practice under their guidance. However, Blömeke et al. (2016:35) contend the self-reported data which is still common in teacher research saying: “…their reliability flaws are widely known”. But that does not reject outright the authenticity of such information source and the method itself since they nonetheless provide lived experiences of the participants. Those documents served as complementary source (Holsti, 1969 cited in Stemler & Bebell, 1998) enhancing the reliability and validity of the research methods and results as that would be a form of triangulation with the multiple sources of evidence and methods of collecting it.

2.5 Qualitative Content Analysis
authors basically include the identification of material to be analyzed which after reading one identifies the features of the material which inform determination of codes and categories to work with. The coding and categorization are determined by the concepts borne in the text and they bear pertinent issues to the research question(s). The researcher then looks for patterns and the relationships of the issues in order to interpret the meaning of the results arrived at. Each step taken in turn has a number of process issues to be considered.

Analysis in the qualitative research study starts right from the design and planning throughout the whole process to when the research product is developed which according to Hatch (2002), quoted in Leech and Onwuegbuzie (2007:564) defines analysis in research saying:

…analysis means organizing and interrogating data in ways that allow researchers to see patterns, identify themes, discover relationships, develop explanations, make interpretations, mount critiques, or generate theories. It often involves synthesis, evaluation, interpretation, categorization, hypothesizing, comparison, and pattern finding. (Hall, 2007)

Whatever means is used to collect the data, one ought to approach their analysis systematically in order to get what is being sought. As denoted in Hatch’s definition with what goes into the process of analysis, one gets it that analysis calls for a lot of critical thinking and informed action and reaction. With the interviews as the main means of collecting data one would have to follow the current practice by many researchers in which audio recordings are transcribed into a written text so that it could be analyzed as it is done with analysis of any written material. To avoid chances of losing some important information or getting it distorted through the writing of expressions and words as was observed with the study commissioned by UNESCO in 2013, in which the researcher was involved, one would have to edit the transcriptions to curb the situation and also to load one’s memory (Esterberg, 2002) with the data. To reconcile the transcriptions with the recordings, one would have to listen to the audio recording several times and indeed the process consumes a lot of time (Goldman, et al., 2007; Mayring, 2000).

Before embarking on the core of content analysis, categorization and coding (Cohen et al., 2011; De Vos et al., 2011; Mouton, 2001), having familiarized oneself with the transcriptions referring also to the research questions would enable the identification of the units within the texts that would be
analyzed. In that case the whole transcript would be considered as the unit of analysis (Downe- Wanboldt, 1992). The unit of analysis varies with the intent and context of the study. It might be the classroom interaction or the whole interview according to Downe-Wanboldt, 1998 cited in Graneheim & Lundman; 2004). A number of authors say that the unit can range from words, sentences, paragraphs (Cohen et al. 2011; Graneheim & Lundman, 2004). Graneheim & Lundman use the term ‘meaning unit’ where words, sentences, or paragraphs bear aspects that relate through their content, semantic relationship (Rapley, 2008) and context conveying same central meaning. Other authors referred to use yet other different expressions such as code unit (Baxter, 1991), idea unit (Korach, 1991), a keyword and phrase (Lichstein & Young, 1996), theme (Polit & Hungler, 1991), and textual unit by Krippendorff, 1980),

Although content analysis in research has historically been seen as a strategy for quantitative analysis (Mayring, 2000, it has proved to be just as relevant in qualitative analysis. Qualitative content analysis, abides by some classical steps embodied in quantitative analysis (Kreuger & Neuman, 2006 referred to in De Vos et al, 2011) that include identification of patterns, similarities and differences in the comparison of data units and categories. Also, in both cases, the conclusions drawn from the evidence are the result of inference throughout the entire process to avoid errors.

Even though qualitative content analysis maintains some classical features of quantitative content analysis it also complies with the characteristic attributes of qualitative research (Mayring, 2000) with its flexibility to reach out to the root of a matter. Kreuger and Neuman (ibid) go further to spell out the differences between the two modes among which are that in quantitative analysis specialized standard techniques are used to test hypotheses with variable constructs while in qualitative analysis less specialized strategies are used with a wide variety of research approaches and data analysis in the creation of new concepts and theory, blending empirical evidence and abstract concepts.

The quantitative analysis is criticized by Ritsert, 1972 cited in Kohlbacher, (2006) as failing to appropriately account for the context of text components in being distinctive to a case with some hidden sense and those issues that are not revealed in the text itself. As qualitative research puts a lot of recognition on participants' voice, it thus becomes more subjective, unlike the quantitative objective nature. Being subject-oriented it values participants' experiences and their views of their specific
situations which ought to be collected and recorded in totality.

Although qualitative content analysis is less driven by very specific hypothesis and categorical frameworks (Cassell and Symon, 1994) which could be applicable to anybody in any type of situation, it is still guided by pre-determined set of rules or categories of analysis together with those emerging from the data collected. The underlying influence being the research question(s), the analysis becomes prone to inductive approach. Even with no strict reliance on theory, the fact that what is being addressed by the research questions lies within a certain theoretical framework; it is possible to bring some pre-determined categories.

The open nature of qualitative research lends the opportunity to expansion and modification in order to accommodate the emerging categories from the analysis units. As the study is guided by the research questions, reference to the sub-questions specific to every stage in the process safeguards the focus of the analysis of data, hence why different authors encourage reference to research questions a crucial starting point for analysis (Barron & Engle, 2007; Kvale, 1996; Miles & Huberman, 1994).

This analytical stage is a time-consuming but crucial one, following a step by step procedure guided by the underlying theoretical frameworks, research questions and the methodologies set by the researcher (Goldman et al, 2007; Mayring, 2000). Expressed to varying degree and clarity, the analysis of content at its centre bears the categorization and coding of content in the text as a way of reducing data as one filters the relevant information. Having identified the themes, patterns, relationships and trends, the researcher would have to relate the results and findings to the theoretical framework guiding the study as a way of interpreting the data (Mouton, 2001).

The constant comparison analysis (Miles & Huberman, 1994) strategy is the most commonly used in which units of analysis, categories and codes from different sources are compared for merger or uniqueness as my emerge from the process of analysis. Domain analysis resembles thematic analysis employed in template analysis introduced by King, (2004). It is the strategy that helps the researcher to understand semantic relationships among concepts in the unit of analysis. In the case where one fails to access and use Computer-Assisted Qualitative Data Analysis Software (CAQDAS), template analysis - TA (King, 2004) would be the best and convenient choice.
That mode of analyzing qualitative data has been successfully used by MacDowall & Saunders (2010) and Brooks & King (2012) in their fields of work other than science education. As already mentioned, template analysis (TA) with some resemblance of domain, taxonomic and componential analysis strategies (Leech and Onwuegbuzie, 2007) some procedures associated with them might be employed in the process of content analysis in this study as may be necessary.

Template analysis proves to be very user friendly, using hierarchical coding adaptable to the particular needs of any qualitative research study. It is flexible with the format and style which suggest no coding sequence and number of levels. However, template analysis encourages extensive development of themes allowing room for both a priori and emerging codes. As described by Brooks and King, (2012), it enables the researcher to put the themes in the text in order and enables analysis of large sets of qualitative data. And considering the sets of transcriptions that this study was likely to end up with, the template analysis technique stood out to be the best.

Qualitative research data collection methods ultimately result in a collection of written documentary material. The information borne therein conveys the practices, perceptions and opinions of the participants revealing their interpretations of their life situations as they experience them. Therefore, the resulting data require careful, well informed and strategic handling in processing, analyzing and interpreting.

2.6 Summary
The purpose of the study determines the research methodologies, guiding the methods that would best elicit the necessary information. With the available literature on the focal concepts targeted in this study, there has been a reference point for guiding information and challenging paradigms that helped in critical look into some issues in teacher education. The interrogation of one’s own line of thinking called for refining of the interrelationships of the issues of concern in the study. That might ultimately lead to honed methodologies and the rest of the thesis resulting in a credible product thereof which hopefully would contribute to the research efforts made to improve teacher education. With the preceding information setting the mind of the researcher the section that follows discusses the research questions for this study.
2.7 The Research Questions

The criticism of teacher education as failing to meet its purpose among other indicators by Giroux (1981) and Barrow (1984) both cited in Kirk, (1986:155) is its failure to “produce teachers who have a critical insight into their role and function as teachers in schools...” With clear understanding of what a teacher, teaching and learning are about it might result in a different observation from the one expressed. But the expressed view sounds echoing the concern driving this study. Literature has shown that teacher education plays a significant role in developing effective teachers despite the enduring challenges. With ongoing research into different aspects of teacher education it is hoped to eventually overcome the apparent weaknesses and this study is expected to contribute to those endeavors.

The study set out to explore the content and pedagogies in the training of prospective science teachers, the area not explicitly explored as Ben-Peretz (2011) posits. That was done to learn of what was considered in the training of the undergraduate science teachers at NUL that was perceived to be of benefit for their learning to teach in their specific teaching subjects and how the learning was done and directed in the identified Curriculum Studies courses. That was to be done through seeking the perceptions of the directly involved people in that stage of training, trainers and trainees. The thrust of the investigation was the domains of teacher knowledge. The study further elicited their opinions about how the course implementation seemed to influence prospective teachers’ learning during on-campus and in-school training. It was anticipated that the issues raised might shed some light for one to establish what might be lacking that led to student teachers’ failure to successfully implement what they had been taught and had learned from the Curriculum Studies courses in their training.

Since the major theoretical notion that underpinned this study was PCK, the questions mainly strived to establish its components which could not be divorced from the other two main domains of teacher knowledge, CK and PK. Since there are various interpretations to the components of PCK which basically bear the inherent factors in any teaching-learning situation, this study was informed by the descriptions of the components according to Magnusson, Krajcik and Borko in Gess-Newman and Lenderman (1999). Although they couple the components with teachers’ beliefs, this study would not essentially delve in the beliefs unless they came out distinctly and significantly as emerging pertinent issue. The components they consider are teachers’ orientations to the teaching of the subject, the
curriculum, students’ understanding of the subject, the teaching strategies and assessment.

The essence of the research questions was about the perceptions and opinions of participants with regard to development of student teachers’ professional knowledge underpinned by PCK. The questions were informed by those asked by Tatar and Buldur (2013) in eliciting pre-service teachers’ opinions about the contribution of the teaching program to their professional development and its effect on their self-efficacy. The main question for this study was “What the perceptions and opinions of Student Teachers, Teacher Educators, Teaching Practice Tutors and Regular Practicing Teachers were, concerning student teachers’ development in learning to teach in their subjects through the subject Curriculum Studies courses and teaching practice.”

2.8 Conclusion

In this chapter the focal concepts in teacher education embodied in the research question have been discussed. A lot of research has been done in varying issues with the exception of that relating to teacher educators and student teachers learning to teach which is still limited. Despite the observed limitations and criticisms, teacher education remains vital for student and teacher learning. The different reforms introduced depending on the needs and their feasibility could provide a source to fall back to in working on improving teacher education programs worldwide. The next chapter relates the methodology employed in this study in an effort to explore the probable cause(s) of the espoused inadequacy with NUL science student teachers in classroom teaching during teaching practice.
Chapter 3

METHODOLOGICAL FRAMEWORK

3.1 Introduction

The main theory of those discussed in the preceding chapter, PCK with its components, in this case is also considered a major domain of teacher professional knowledge as it blends the basic domains, content knowledge (CK) and pedagogical knowledge (PK). PCK as the knowledge that distinguishes a teacher from unqualified practitioner in teaching (Shulman, 1986) is exhibited in action. It was with some aspects of the teacher knowledge domains that the STs seemed limited in their classroom practice during TP hence why this study sought to explore where the gap could lie that led to that deficit. The general question that the research study was answering was “What the perceptions and opinions of the teacher educators, student teachers, teaching practice tutors and regular practicing teachers were about the subject Curriculum Studies courses and teaching practice with regard to student teachers’ development in learning how to professionally teach in their subjects”.

To get people’s views about their perceptions and conceptions of the situation could best be obtained by interacting with them closely in their situation in order to understand their point of view and experiences. From the study site depicted in Figure 1 in the introduction chapter, the undergraduate science student teachers form the centre of this explorative study. It was the STs doing the identified Year IV Curriculum Studies courses offered by the Science Education department at NUL who would be going for practice teaching since the reported limitations with STs’ classroom teaching had been observed during that period in their training. Teacher educators were involved since they basically prepare STs in the coursework extending their work into the practice phase where the TPTs get responsible for STs’ further learning. The regular practicing teachers were not the direct subjects of the study, but another source of evidence for the purported shortcomings with STs’ performance in teaching.

The general research question sets boundaries for the researcher’s ontology “how one sees reality” and epistemology “how one thinks social phenomena should be studied” (De Vos et al. 2012: 310). The researcher therefore posits that it is from the directly involved people in the two phases of the initial stage of teacher professional development that the researcher could establish
the probable cause(s) of the reported shortcomings with the classroom practice of the undergraduate student teachers during teaching practice. In the model for teacher preparation at NUL, STs are offered the theoretical knowledge and some practical knowledge through micro/peer teaching during coursework training on campus with the extended practice in schools in the last semester of their final year of training.

Throughout the whole study period, the researcher kept searching the literature to check on the emerging issues on teacher education, theories underlying the study and the research methodologies to inform the study for appropriate modifications. The various rich sources included the books, journals and websites which were searched using the themes such as teacher education, science teacher preparation, PCK, theory and practice, reflective practice in teaching etc. The accessed resources served as both the source of information and the validation reference for information and research methods which included qualitative, quantitative and mixed methods paradigms.

This chapter discusses the research procedures and tools used to collect the data and the modes of textual analysis employed concluding with the consolidation of the issues discussed herein.

3.2 General Methodological Procedure

Considering the study site identified for investigation illustrated in Figure 1 in Chapter 1 and the main research question, qualitative paradigm was identified as the most appropriate on the basis that it was capable of exploring a wide range and levels of scenarios in order to develop a deeper understanding, or insight into a matter or situation of concern (Cohen et al, 2011; De Vos et al.; 2011; Mouton, 2001). Since the intention was to explore views of a number of different categories of participants of what they experienced and felt about the situation the information that they would provide could shed light leading to the establishment of the probable cause(s) of the deficit with science STs’ classroom teaching. That could help to better understand the situation from the perceptions of the involved people. The quantitative approach would not suffice considering the distinction given by De Vos et al. between the two approaches. They state:

Unlike the quantitative paradigm, the qualitative paradigm requires the design of the research to be more than a set of “worked-out formulas”. The qualitative researcher is concerned with
understanding (*verstehen*) rather than explanation, with naturalistic observation rather than controlled measurement, with the subjective exploration of reality from the perspective of the insider as opposed to that of an outsider predominant in the quantitative paradigm (De Vos et al. 2012:308).

On a similar note, one difference between these two modes of research spelt out by Kreuger and Neuman (2006) is that in quantitative analysis, specialized standard techniques are used to test hypotheses with variable constructs while in qualitative analysis less specialized strategies are used with a wide variety of research approaches and data analysis in the creation of new concepts and theory, blending empirical evidence and abstract concepts. In this study the empirical data collected from the respondents is at the heart of the endeavor because it is on their basis that the researcher would get to the root of the matter of concern, the cause(s) of the observed shortcomings with STs’ teaching, hence not basically driven by predetermined standard techniques.

3.2.1 The study design

The choice of the study site created a case and context for this study. According to Cohen et al (2011) a case study observes effect in real context and context determines causes and effects. In particular, the researcher was exploring the site to discover the cause(s) of the observed and reported shortcomings in STs’ classroom teaching during TP which could be viewed as effects of the training courses and procedures. The identification of the site within NUL with the specific department, courses and participants drew boundaries for the study and thus created a case, (Creswell, 2007 in De Vos et al, 2011). The various ways of collecting, organizing, analyzing and interpreting data in a case study bear the basic attributes of qualitative research hence the two in this instance were inseparable.

The study participants as the subjects in the case were the people directly involved in the pre-service training stage of science teachers at NUL and practice schools that form the two phases in which the STs learn to teach. The identified participants could be the best source of information and would be easily accessed for in-depth interactions in order to get their perspectives of their own situation and in their varying capacities as insiders (Cohen, Manion & Morrison, 2011; Mouton, 2011). NUL and the Science Education Department offering the
Curriculum Studies courses, together with the practice schools providing the tutors as mentors were inevitable components of the case since the student teachers in question were their trainees.

Of the methods commonly used in qualitative paradigm mentioned in literature: observations, interviews, surveys and documents analysis, (Mouton, 2001) the researcher settled for interviews of different groups of involved people who with their consent were all audio recorded. The interviews were semi-structured to give room to elaborative responses while still maintaining focus to enable collection of informative data. In the whole process the researcher was bearing in mind the common errors which call for consideration and ethical issues in relation to the researcher and respondents suggested in literature (Cohen et al, 2007; De Vos, et al, 2011; Mouton, 2001). It was however not possible to completely do away with “research selectivity effect” (Mouton, 2001:106) as the decision on the site of the study and the participants thereof was in itself selective.

3.2.2. The sample and sampling procedure

The population from which the sample was drawn was that of the teachers who had specialized in Biology and Physics and were prepared to teach high school science. Taking it that the science education students were usually few, their subject combinations were considered in order to get the reasonable sample of participants. Normally from experience as a teacher educator in the Science Education Department at NUL teaching a third year course for the whole group, Biology and Chemistry had been one common combination. If Biology and Chemistry would be selected for the study, that would affect the sample size since it would be dividing the same group that would need lifting up to the required sample size by picking other participants from the rare combinations. Hence the final population of STs comprised those in Year IV Biology and Physics. That was a reasonable selection of subjects due to the fact that they comprised the high school science. That choice inevitably included the TEs responsible for the teaching of those Curriculum Studies courses at the time of the study and ultimately the TPTs to whom the STs were attached during TP.

Two regular practicing teachers who had gone through the system within the past five years, one for each subject, were involved to verify the view that STs do have some obvious shortcomings in classroom teaching during TP. That was done to give credibility to the study especially
because the TP reports for the years 2012 and 2013 prior to the year of research were not highlighting STs’ classroom performance during TP. The RPTs at the point of the study were not under the pressure of teaching to attain a qualification and it was believed that they would provide the experiences of their training in relation to the practicalities of employing teacher knowledge on daily basis for an indefinite period.

The researcher employed purposive sampling (Cohen, Manion & Morrison, 2007) for the courses, research participants based on the identified courses, and the documents for analysis which were related to the courses and the research questions. That implies being clearly selective for a purpose. The practice schools were determined by the TP Coordinator on placing STs. The placement schools in turn allocated STs to subject teachers as TPTs.

3.2.3 Research procedure and ethical issues

The initial plan was to run the interviews for the Regular Practicing Teachers (RPTs), Teacher Educators (TEs) and Student Teachers (STs) between October and December 2014 which could not work per plan then, but they were all finally conducted. The plan of action was subjected to change whenever there was a drastic disturbance in the flow of events. Table 1 below presents the design of the initial plan of the interviews showing the groups of participants, the intended period for their administering and the type of interviews with some particulars.

Table 1 Schedule design of the initial plan and the execution of the study interviews

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<td>Interview type, and particulars</td>
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Before embarking on the interviews with the directly involved subjects, the, RPTs were interviewed to verify the concern about the shortcomings exhibited by STs during TP. The first interviews for STs were conducted before they went for practice teaching. They went for (TP) as usual when schools opened in January 2015. Their going for practice created a platform for classroom observations by the TPTs from whom the information was conveyed to the researcher as a report. Upon completion of the practice, post-TP interviews for STs were conducted followed by those for TPTs’. TEs’ interviews were conducted in January 2016 contrary to the initial plan where they would follow the RPTs, but they were the last group interviewed. In all cases, the interview schedules were piloted. The table that follows presents the design of the whole schedule of the interviews indicating the initial plan and the actual execution, showing the period and categories of participants and interviews.

All the interviews were audio recorded with the consent of the respondents. In taking note of the essential ethical issues the researcher also considered the procedural issues including technical state and use of the recording devices (Garcez, Duarte, & Eisenberg, 2011; Morgan & Krueger, 1998). To ensure and respect confidentiality of the participants, the course and schools pseudonyms were used throughout. Being ethical in research according to Stern, (1988) could be equated to being professional, reasonably so because working with professional matters surely requires some significant professionalism. Especially now that the research was looking into teacher professional knowledge with research participants in different capacities, the researcher...
had to be ethical in every step of the research activity as warned by Cohen et al (2007:51) when they say, “each stage in the research sequence raises ethical issues”.

To safeguard the interests of the research participants, the researcher was mindful of the fact that getting people to participate in research was both intrusive and obtrusive in that it involved personal interaction and thus required cooperation between the researcher and the research participants (Marshall & Rossman, 1999). One had to be sensitive to the possible impact of the exercise on the subjects of the study (Descombe, 2002) therefore relating ethically with them.

At the onset of the research, participants’ agreement to be part of the study was sought through the consent form adapted from Derry (Ed.) (2007: 81-83) which they filled, signed and returned. The consent form and the letter of request among the highlighted issues included the purpose of the study, procedure and expectations in the course of the interactions and afterwards. That was in order to enable them to make an informed decision. The communication covered the basic issues highlighted and discussed by De Vos et al. (2012:115–126) and Mouton, (2011:244) about fully disclosing the research. Those issues were also considered in the course of the research and the writing up. In the course of the study, the participants who seemed irritated in some way, were recognized and treated on the merits of their irritation despite the conviction that the issues in the research questions did not have any sensitive elements nor did they have any possible negative impact on their respective work (learning and teaching).

The relevant documents were identified since 2013 when the draft study proposal was first worked on with the preliminary analysis for their choice. The existing documents were gradually analyzed from March 2014 bearing in mind that they could possibly be revised in the course of the study which would require reconsideration. The documents produced by the research participants were collected when they were ready.

The Head of the Science Education Department (HOD), NUL and the school Principals were involved as gatekeepers for ease of access and running of activities with STs and TEs on campus, and TPTs and STs in practice schools respectively. They were informed and requested in writing for interactions with the people within their jurisdiction providing the package for each group of participants as appropriate. The letter of request to the Science Education (SCE) Head
of Department and the school Principal are appended as (Appendices B i and B ii) respectively. The authorities for RPTs were not involved as the interviews occurred during the holidays.

3.2.4 Validity and reliability

The information gathered from this case study was likely to be valid on the view that, one: even though, the most popular and easiest mode of triangulation, that of data triangulation was used, a number of different sources of information was utilized. Two: the use of interviews, observations through TPTs, and document analysis strategies ensured methodology triangulation. The findings from the data from those various sources were consolidated to establish trends, agreement and divergence in relation to the research questions. Furthermore, a significant number of participants were drawn from more than one training course. The main research question was broken down to suit the multiple groups of participants in order to get their relevant and authentic perspectives. The recording of the interviews led to the listening to the conversations several times and in relation to the transcriptions to ensure that they gave the congruent information which would also enable literal quotes as evidence. That employment of multiple triangulation means might depict rigor, depth, complexity, breadth and richness of the study (Denzin and Lincoln, 2005) which could be taken to add the element of integrity.

The preceding discussion and those that will come in the ensuing sections of this work could be taken to bear some attributes of credibility of a research study highlighted in the analysis of the concepts in qualitative research from various researchers referred to in the study by Graneheim, & Lundman (2004). The elements they highlight as those contributing in making the findings credible, include those such as decision about the focus of the study, selection of context, participants with various experiences, most appropriate method for data collection, amount of data collected and identification of most suitable unit of analysis.

3.2.5 Data sources

The interviews conducted with the research subjects and written reports from the STs and TPTs providing their experiences and STs’ performance during TP were the primary source of data. The observations were left for TPTs as they did the usually expected classroom visits to the STs from whose reports the data would be obtained. The primary data were complemented with secondary source, the already existing, available and complete relevant documentary data. The
decision on a relatively wide range of information sources might confirm and/or illuminate one another. The discussion of the procedure for the interviews conducted for each category of research participants is given in the ensuing section.

3.3 Interviews

Interviews were the main source of the primary data for they provided in-depth, authentic and much information from the people who were directly involved in the situation, presenting their real experiences, conceptions, perceptions, beliefs, and opinions. In this case, teacher educators were responsible for the modeling of prospective teachers through the teaching of the specific subject pedagogical knowledge. The student teachers in turn acquired the professional knowledge they required as teachers in the subjects they would be teaching. TEs were believed to be the ones who were to ensure that throughout the whole coursework and practice teaching, the prospective teachers were prepared for the best performance in their career.

The STs as the learners were expected to be aware of what the courses they were offered afforded them in relation to the content in their teaching subjects and the pedagogies they would need to teach in those subjects. Thus, the courses should be providing the kind of knowledge from which they could later draw to execute their professional practices. The expectation was for them to be aware of and develop the knowledge on how to blend the learned forms of knowledge so that they would attain the expected results in their teaching, the meaningful learning of students. During practice in schools, it was assumed that the TPTs in the similar manner would be able to discern professional practice, have proficient ways to support and guide STs for their further professional growth.

The questions sought the voice of the concerned parties in the study site through their perceptions and opinions, opening up for any views held with regard to the training courses. The focus was on student teacher professional development which implied the possession of the attributes of teacher professional knowledge. The unique specialized knowledge that distinguishes a teacher (Shulman, 1986) from anybody who could just conduct lessons not equipped with the tools of the trade. The interview schedules were designed such that they were geared to suit each category of participants, keeping the essence of the research question and sub-questions. From their perspectives, they were asked to describe their views and opinions.
regarding student teachers’ professional learning/training and performance with a great bearing on the “what and how” elements of each training phase. It was hoped that from both explicit and implicit information from those parties, the researcher would be able to observe relationships and contradictions that might lead to their interpretations that could possibly give a cue to the probable gap in the process of initial training of prospective science teachers.

The actual one-on-one interview followed the piloting of the research tool which gave an idea of the duration and comprehensibility of the questions. On the basis of the pilot interviews the wording of the interview questions in some cases, were modified still keeping the essence of the research questions. In the cases where there were a number of interviewees, the first two or so interviews also informed the researcher on the clarity of questions which led to their further refining culminating in the final version of interview schedules appended in this work.

At the start of the interview for every respondent, the researcher expressed appreciation for their taking part in the study even making time for the interview. Then reiterating the issues stated in the preceding communication to them, giving a brief focus of the questions and giving them the pseudonyms per subject and a number depending on their appearance in the order of their coming, also giving them the liberty to use the two official languages as they found convenient. To avoid disturbing the respondent with extensive writing of one’s experiences, feelings, thoughts and reflections, which helped to relate what went on in the whole process (Bogdan & Biklen, 2007), those were picked up later as the observational notes (Hall, 2007). The intention was to work on the field notes as soon as the interview was over, but it had not been possible in most cases due to the set times with the STs and travelling to meet with the TPTs in their schools. Where there was apparent uncertainty with either the respondent or the researcher the summary of the picture reflected was made for the respondent to comment and modify so that the information was as accurate as possible (Maxwell, 2005; Merriam, 1998). At the end, participants were given time to say what they wanted to add or express in connection with the questions and the interview, followed with a small token of appreciation from the researcher.

The recorded interviews enabled the researcher and the assistants who worked on transcribing the recorded conversations to work simultaneously. The researcher did some transcriptions on one hand, especially those bearing the conversations done in Sesotho. Sesotho and English are official languages in Lesotho and to enable free and informative elaboration from the
respondents, the researcher permitted their use as the respondent wished. On the other hand the researcher read through the completed transcriptions correcting and translating the Sesotho into English, at the same time highlighting the expressions that were related to the theme of the question. Later on, the transcriptions were revisited, reading through them concurrently listening to the recording in order to make the necessary modifications to the record to convey the message as it was and further highlighted the points related to the research questions.

In that case the whole transcript was considered the unit of analysis (Downe-Wanboldt, 1992) bearing in mind that the unit of analysis varied with the intent and context of the study. Ultimately, each interview transcript was subjected to the typical textual content analysis procedure with categorization and coding at the core of the undertaking.

The thrust of the question was the development of the prospective teacher in learning how to teach in the subjects they would be teaching in schools. The how to teach among other things involves learning the role and interrelatedness of teacher knowledge domains. Since the pre-service teacher training at NUL comprises two phases, coursework training on campus and practice in schools, the research study participants were drawn from the teacher training institution and practice schools. The essence of the research questions derived from the main question in some way addressed the concerns raised by Ben-Peretz (2011): what is entailed in the teacher training curriculum and pedagogies employed to teach the prospective teachers to teach as well as the observing and documenting of the implementation by student teachers of the acquired knowledge, signifying teacher knowledge. On the basis of the elaboration of the question given, the research sub-questions to address the main question were formulated from which the interview schedules were tailored to suit each category of participants. The research questions underpinned by the theoretical notions were as follows:

1) What content was taught in the Year IV Biology and Physics Curriculum Studies courses? (the what - CK)

2) What methodologies and pedagogies did Teacher Educators employ in the teaching of the course? (the how - PK)

3) How did Student Teachers enact what they had acquired from coursework training during Teaching Practice? (the enactment, practice and theory - PCK)
4) How did coursework training link with classroom practice? (practice and theory, reflection)

5) What were the perceptions and opinions of the directly involved people about the whole process of STs’ training and practice? (views)

The interviews were sequenced as discussed in the sub-sections that follow.

3.3.1 Regular Practicing Teachers (RPTs) interviews

Regular practicing Biology and Physics teachers in the first to five years of teaching who underwent training in the Science Education Department at NUL were identified in order to obtain their views on the pre-service training in the subject Curriculum Studies course and their experiences with the practice teaching they had in the course of their initial training. The thrust of the interview was to get it from the people who had had the lived experiences of the training, the influence of which could be informing their present classroom practice. They were identified on the basis of ease of access to enable the visits to them. They were thus involved to act as the confirmation or falsifying source on the existence of the raised concern about the incompetence recorded with STs during TP. That was on one hand due to the fact that the recent reports (2011 to 2015) of FED on TP did not say anything about STs’ classroom teaching. On the other hand it was with a hope that the information gathered would be authentic enough to confirm or rule out the need for exploring the case.

The three interview questions for RPTs were basically broad with some sub-questions (Appendix D i) targeting 1) the pre-service training in the Science Education Department at NUL, 2) the “what and the how” of the specific subject Curriculum Studies course and 3) Teaching Practice. The RPTs had to discuss their views and experiences indicating strengths, weaknesses and the missing aspects regarding the targeted areas mentioned above.

The interviews were intended to run in November 2014, before the end of the school year. But, that being not possible, upon revising the plan of action, the interviews were planned for December 2014 before running those for student teachers in January 2015. The information was hoped to verify the researcher’s view that there were observable shortcomings in classroom practice of prospective science teachers during practice teaching in the process of training as reported. The preliminary analysis confirming the shortcomings they had then, and still
perceived with STs on practice in their schools supported the execution of this study to establish the probable cause(s) for the observed deficit. Thus, the RPTs were taken on one hand as yet another source of evidence to validate the ground for the study. On the other hand the information obtained from the interviews was another window through which the researcher was able to partly discern the probable shortfall within the pre-service training of prospective science teachers that led to their reported failure to teach competently during TP.

One of the regular teachers who eventually took part in the study was identified from the list of former STs from the time the researcher was the Teaching Practice Coordinator. That teacher and the researcher lived in the same vicinity therefore accessing him was not a problem. The other one in a different subject was identified through that same teacher and he was also within reach since he was teaching in the nearby high school. Those teachers were initially contacted through the phone to request their participation. Then they were met to be furnished with a letter of introduction from the researcher’s supervisor (Appendix A) which was the same for both directly and indirectly involved participants. They also got a letter of request for their participation (Appendix B iii) which detailed the intent of the study and mode of operation, together with a consent form (Appendix C ii) which further highlighted the issues in the letter of request to which they agreed. They completed the consent form and it was collected on the day of the interview. Upon delivery of the package, the date, time and venue for the interview were set by the RPT to which the researcher simply adjusted.

The interview questions were piloted and audio taped with one regular practicing teacher in the locality in early December 2014. The pilot interview helped to modify the questions based on the responses, to make them clearer to address the issues in question. For RPTP, a joint request for a venue in the nearby Primary School was made and a place was secured. After that first interview the wording of the questions was slightly refined so that for the RPTB who followed, a final version of the interview schedule (Appendix D i) was used. That teacher was interviewed from his school. Their profiles are shown in Table 2.
Table 2 Regular Practicing Teachers’ profiles

<table>
<thead>
<tr>
<th>Subject</th>
<th>Name</th>
<th>Training Institution</th>
<th>Teaching subjects during training</th>
<th>Subjects taught &amp; level</th>
<th>Year of completion</th>
<th>Teaching experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>RPTB</td>
<td>NUL</td>
<td>Biology &amp; Chemistry</td>
<td>Science – Junior Biology &amp; Chemistry - Senior</td>
<td>2011</td>
<td>4 years</td>
</tr>
<tr>
<td>Physics</td>
<td>RPTP</td>
<td>NUL</td>
<td>Mathematics &amp; Physics</td>
<td>Maths &amp; Physics - Junior &amp; Senior</td>
<td>2011</td>
<td>3 years</td>
</tr>
</tbody>
</table>

Coincidentally the RPTs completed training at the same time but had different teaching experience. The interviews were conducted at the end of December 2014 and they lasted for about one hour, and their transcription was worked on by the researcher, and then subjected to the same analysis procedure as the rest of the texts. The revised questions and the responses of the RPTs informed the questions for STs’ post-TP and TPTs’ interview schedules. The belief was that the RPTs had ideas about the effect of training by the Science Education Department at NUL as experienced during TP while learning and on the normal teaching they were then fully engaged in. It was believed that their input could provide rich information about training and practice.

On reading through the transcriptions the responses bearing the information in relation to the research questions were highlighted. Following the preliminary analysis the transcriptions were analyzed in the similar manner to others and finally compared to them to arrive at the “what and the how” of the training in the subjects. Following the RPTs’ verification of the shortcomings with STs’ classroom performance during TP the interviews for TEs are discussed in the next subsection.

3.3.2 Teacher Educators (TEs) Interviews

The teacher educators in the teaching of the Curriculum Studies course are responsible for knowledge of the content to be taught and subject-specific pedagogies that student teachers would require for their work as teachers during teaching practice and afterwards when they join the teaching force. Kirk, 1986:165 rightly points out that in Curriculum Studies courses, teacher knowledge is “contextualized” and the student teachers have the opportunity to broaden their conception of teacher’s role in the classroom. In studying teacher knowledge as Connelly,
Clandinin & He (1997:666) express “is part of a revolution in how educators think about classroom practice”, the notion that also backed the choice of TE as part of this case study.

Although the interviews of all different groups of participants were conducted to finally address the same research question, the interview for TEs basically elicited their views and opinions to find their concerns, purpose and approaches (Berry & Van Driel, 2013) in their training teachers in the subject Curriculum Studies. That was to address the “what and the how” of the science teacher training course elicited through the use of the schedule shown in Appendix D iv. As teacher of teachers, TE has a curriculum that guides their training of pre-service teachers.

Essentially, the interview set out to establish the context of teacher educators’ experiences with the training of teachers to teach in their subject area. How in their context they in turn considered the content they taught and the pedagogies they employed to teach prospective teachers to be able to teach as professionals in the field both during training and throughout their career. The interviews in that case were not conducted as a means of an intervention, but the interactions were bound to impact to some extent on the participants. That could be by provoking some changes probably in their thinking and in action as they might be developing new insights in the process. The situation that Kvale (1996) warns the researchers to accept. That further proved the dynamic nature of qualitative research. The probing questions by the researcher and return questions by the respondent in the process of interviewing enriched the data collected as more details and understanding were gathered, hence leading to probable accuracy of the data collected. The researcher followed the step by step, methodical and theory-guided procedure as with the other groups of participants.

The researcher transcribed TEs’ interview recordings to follow and assimilate the message in them which as pointed out by De Vos et al (2011:408) provided the researcher “…an opportunity to get immersed in the data”. On reading the whole interview transcript several times, the issues related to the research questions could already be spotted and captured in some writing next to the text. The caption that researchers call a memo serving as some way of coding which changed on further analysis. The rigorous analysis of data did load the researcher’s memory with the emerging relationships, themes and trends in the endeavor to address the research questions.
The TEs were informally requested to be part of the study in October 2014 to which they agreed. The letter of request for participation and the consent form to them are appended in Appendix B vi and Appendix C v respectively. Although the initial intention was to conduct the interviews with them in December 2014, they were only conducted in January 2016 after being piloted with one TE and the part-time teacher both of whom were in different subjects from those identified for the study. The piloting as in the other cases was for the purposes of informing the questions so that they could be refined, and to determine the duration of the interview.

Because the participants for piloting were on campus on daily basis, the first informal request with them was done verbally face to face. The communication that followed was done both telephonically and through e-mail. Similar to the rest of the participants, they set dates and times convenient to them. The venue was the same one in the department of Science Education that served for most of the STs’ interviews. The part-time teacher felt he was not fully informed about the program and the course that he was teaching and he proposed that an educator who had been involved over the years could provide far richer information that could enlighten the piloting better. That led to the second piloting with the educator who had served for a long time but in a different course from that handled by the part-time teacher. The exercise for both interviewees lasted about an hour.

Teacher educators are considered vital for teacher professional development just as the teachers they train are important for students’ learning. Stuart, Kunje & Lefoka (2000:2) affirm this by saying, “as teachers are a key factor in raising standards in schools, so teacher educators are crucial for improving the quality of the teaching force.” The TE’s decision of what, how, when, why concerning the instructional course curriculum is expected to be geared towards the benefit of the student teacher in his dual status as a direct recipient as student and for the indirect beneficiaries of their teaching, thus their benefit as teachers.

Koster, et al. (2016) suggest competencies for TEs in areas such as organization, content, pedagogy, communication and reflection. That says then that the methodologies the TE employs do not only serve to convey the content of the course, but what TEs themselves are as teachers. That could portray TE’s own understanding of her/his role and function in the process. Since it has been proved that experiences in one’s journey in learning influence the current and future

TEs’ interview would be eliciting their perceptions and opinions to basically find their concerns, purpose and approaches (Berry & Van Driel, 2013) in their training teachers in the subject Curriculum Studies. Berry and Van Driel, (2012:120) attest that teacher educators should “understand what they do, and why, in developing and enacting their pedagogy”. The view echoed by Vanassche & Kelchtermans (2014:125) who say, “The ways in which teacher educators perceive their task determine how they approach the relation with their student teachers and the specific pedagogies chosen to teach them”. On the basis of this view, the interview questions revolved around TE’s work as a teacher of teachers, teaching prospective teachers the teaching of the science subject. That does not necessarily mean squarely allocating TEs into one of the three categories that Vanassche & Kelchtermans (2014) labeled “teacher educators of subject teachers”. The questions would engage the teacher educator in critical thinking and reflection that would extend their introspection to get to the root of the reasons behind their work and its anticipated and actual impact on STs’ learning.

Essentially, the interview was meant to establish the context of TE’s experiences with the training of teachers to teach in their subject area. How in their context they in turn considered the content they taught and the pedagogies they employed to teach prospective teachers to be able to teach as professionals in the field both during training and when they later joined teaching permanently. The process that was thought would make them develop more insight into their crucial and complex work which researchers have not ventured into that much (Korthagen, Loughran & Lunenber, 2005).

In their concluding remarks in their paper on studying the perceptions of student teachers and newly qualified teachers in Ghana, on becoming a teacher Akyeampong & Lewin (2002:350) posit, “until it is clearer what current methods of training do actually achieve in terms of student teachers’ capabilities and attitudes, it will be difficult to design ways of increasing the effectiveness of training.” This view calls for research into TEs’ work also acknowledged by Berry, 2007 cited in Berry and Van Driel (2013) alluding to the limited research about TEs
leading to little knowledge about TEs’ pedagogy of teaching specific subject matter. The importance of TE’s knowledge and understanding of the demands of their work as teacher of teachers was underscored.

The framework for the interview questions was the components of PCK, the CK and PK all constituting teacher knowledge. The questions were about the content taught and how it was related to what the STs would be teaching during practice and later in their career; how they (TEs) trained STs in the pedagogies of teaching in their subject. The pedagogies were twofold in that, they were those employed by the TE and those taught to the trainees in the two phases of the pre-service stage. Research has proved it essential that STs have rich understanding of the content of both the subject matter and pedagogies which would enable them to transform, organize and present the school curriculum to create their teaching curriculum to suit the teaching/learning situation they would find themselves in.

Unlike Berry & Van Driel (2013) in whose study their questions explicitly direct teacher educators in order to elicit their aims and approaches in teaching student teachers to teach in specific subject/topic; in this study the questions were intended to be broad and open to enable TEs to elaborate on their practices and rationale and their responses would direct the probing. The intent was to get their perception of their tasks in relation to their STs’ learning to teach what Vanassche and Klechtermans, (2014) call “professional self-understanding” in relation to their work.

The interview schedule for TEs (Appendix D iv) comprised 10 questions which to answer the five research questions were grouped thus: 1) what content? - questions 1, 2 and 3; 2) how taught? – questions 4,5,6 and 7; 3) linking theory and practice – question 10; 4) enactment – question 9; and views – question 8. There was envisaged possibility of overlaps among the issues which for their categorization and coding would be determined by their essence.

The actual interviews with the concerned educators were conducted in the second and third week in January 2016 and they lasted for about two hours. The researcher personally transcribed the recordings so that the information could be entrenched in one’s mind in order to relate it with that from other sources later on when the analyses were reconciled. The procedure followed in the analysis of TEs’ interview transcripts was basically the same as that employed for others and
in the final analysis they were treated as the rest of the documentary sources. It would be enlightening to get it from the recipients of TEs’ services, the STs, and their interviews become the subject of the ensuing section and its sub-sections.

3.3.3 Student Teachers (STs) interviews

In this study, the student teachers were considered the main focus as they were the cause for the concern. The study was exploring the probable cause(s) of their reported inability to teach competently during TP. Their involvement was to get it from them how they viewed and felt about the extent to which their training in the Curriculum Studies courses prepared them for and impacted on their teaching with competence during practice teaching, a phase within pre-service stage of teacher professional development. They were involved in pre- and post- TP interviews.

That included eliciting their reception of the training on how to teach in their specific subject areas. Later on during teaching practice, their application of their knowledge of the subject matter, pedagogies and educational theories of teaching and learning would be observed by TPTs in their classroom teaching based on their lesson planning and facilitation of the lessons to establish their professional ability. Since professional development is a process, its aspect of pedagogical content knowledge plausibly also should develop over a period of time (Loughran et al., 2010), therefore it was considered that they could not show well developed capabilities. However, a certain degree of reasonable conceptual and practical knowledge was expected to be demonstrated in their teaching that should not raise much concern.

3.3.3.1 Pre-TP interview

At the time of interviews before STs started on the second phase of their training, the interview was conducted to engage them in a moment of reflection on what they had learned, their feelings about it, and how they anticipated it would contribute in their practice. The reflection was done to enable them to link the training they had undergone on campus with the practical training they were going to embark on in schools. At that stage they were merely expressing their assumptions and anticipations about classroom teaching they would be faced with. It was thus getting their minds ready and directing their thoughts. As expressed by Collier (1999: 173) quoting Dewey, 1933, p. 17, teacher reflection “has a potential to enable teachers to direct their activities with foresight and to plan according to ends-in-view”.

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The research questions dug into the participants’ views which are informed by experience, beliefs, knowledge, attitudes, among the many and interrelated possible factors. Before going for teaching practice, the student teachers through the interview questions were made to think about their training, thus to reflect, by looking back into the teacher knowledge attributes they had acquired and the experiences in the process of learning to teach in their respective subjects of specialization.

The focus of the interview questions was the five areas covered in the research questions projected into the upcoming teaching practice experience. Essentially, the main target was teacher knowledge domains and related components. In talking about “critical pedagogy”, Kirk (1986) attests that teachers need to take a certain degree of responsibility for their own learning, relating the knowledge to their lived experiences. By so doing student teachers would be making sense of what they learned, giving it structure in order to merge it with their existing knowledge, the notion of constructivism. That mind set might produce a ground for STs to engage in an ongoing act of reflecting on their activities as teachers which would inculcate in them the practice of considering the contemporary circumstances in which they intended to act differently for the better. Research has shown that professional learning and practice, together with critical reflection develop over time (Bates, 2009) and being the teachers still in the making, the portrayal of those virtues might be limited, but they should be seen to be recognized by student teachers.

The ten interview questions with their sub-questions (Appendix D (ii) a) were based on the five areas embodied in the research questions and grouped thus: (1) what content? – questions 2, 3, 5 and 8; (2) how handled? – questions 6 and 7; (3) enactment? – question 10; (4) theory and practice? – questions 4 and 9; (5) views? – question 1. There was a lot of overlapping among the sub-questions which would be dealt with in context during analysis.

The initial plan was to run pre-TP interviews through November 2014 before STs sat for the examinations in December. Upon reviewing the plan of action, the interviews were postponed to January 2015, following those for RPTs. The post-TP interviews were planned for April 2015 when the student teachers would have completed practice, before the end-of-year examinations.
The student teachers who participated in this study were those doing the final year with Biology and Physics as their teaching subjects. They were going for practice teaching in the last semester, from January to March 2015. After checking the lists of the STs in the two Curriculum Studies courses in October 2014, the plan of working with them was communicated to the Head of Department seeking his approval. He was then furnished with a package of communication that was delivered to thirty-one (31) STs. In addition to the letter of introduction, the STs were given a letter of request for participation (Appendix B iv) and a consent form (Appendix C iii) which they filled giving their particulars, signed and returned. The summary of the involved STs is given in Table 3.

Table 3 Student Teachers involved in the study

<table>
<thead>
<tr>
<th>Curriculum Studies course</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
<th>Consent Form returns</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>7</td>
<td>5</td>
<td>12</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Males</td>
<td>7</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td>14</td>
<td>5</td>
<td>19</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Males</td>
<td>11</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>7</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>10</td>
<td>31</td>
<td>18</td>
<td>10</td>
</tr>
</tbody>
</table>

The intention was to work with a sample of ten (10) STs per course, with equal number of males and females and fortunately that was possible. One male ST from each group who was the first one to be interviewed was picked for piloting the interview schedule. The reason for interviewing more STs than the intended number per subject was to guard against the unexpected occurrence such as the decision to withdraw. The time and date for the interview (including weekend) were set by the STs as they found convenient to them, and one unoccupied office in the department was used as a venue.

The STs who returned the consent form were followed-up for the interview. The appointments were set through phone calls, short message service (SMS) and e-mail, always calling to remind them a day before and confirming their coming if they ran behind the set time. The interviews ran from 11th January 2015 with a hope of completing them before the STs went for TP on 19th of the same month. Since the time was short, on some days two interviews were conducted. Four (4) STs were interviewed in the first week of TP in their practice schools while the fifth one was collected from her home to her practice school for a convenient venue two days before schools re-opened. The interviews in schools were never smooth despite prior arrangements followed by
reminders as it was a case with one particular ST, 70 kilometers away if one started from home. Otherwise, it was about 85 kilometers from work. The researcher travelled a number of times to and fro to finally interview that ST. The last pre-TP interview was conducted on 27th January 2015. All Biology STs were interviewed while five (5) in the Physics group could not.

From the pilot recordings, some questions which the ST seemed to fail to understand readily were rephrased in the process to make them clearer and that influenced the refining of the questions which was done further from the first two actual interviews to produce a final version (Appendix D ii-a) that was used for the rest of the ST participants. The pseudonyms were given per subject and order of attendance at the interview. Thus, the first ST in Biology was STB1 and from the Physics group STP1. The three STs in the Physics group who did not return the consent form were never pursued, and two who had initially accepted to be part of the study could not finally come for the interview and the arrangement to visit them in their practice school did not work either.

During the interview ST’s expressions that bore the essence of the question were accommodated. And they were probed using their words to ensure their understanding of the question followed by the summary of the response where there could be a different meaning. The use of technical researchers’ language was avoided, but rather used the common language to them (Bogdan & Biklen, 2007; Kvale, 1996; Leech & Onwuegbuzie, 2007; Rapley, 2008) sometimes even briefly conversing in Sesotho. In the process of the recording the researcher also avoided writing so that she could concentrate on the interaction to capture any significant implicit message in word and action which were probed where possible. The interviews on average lasted for one hour. They were made aware that their interactions with the TPT would be reported to inform the researcher of their performance during TP and the next time they would meet with the researcher would be upon their return from TP in the post-TP interview.

The transcriptions by assisting persons identified took longer than anticipated and their revision and translation in the cases where Sesotho was used consumed yet more time. The transcription of Pre-TP interview recordings were completed in March 2015 with some preliminary analysis done. Further analysis of individual texts, group texts and their merger ran up to September 2015. Those were done concurrently with transcriptions and preliminary analyses of STs’ post-TP and TPT interview recordings.
3.3.3.2 Post-TP interview

Even though STs’ beliefs about teaching and learning were not the explicit part of this study, the new insights from practice may have impacted on their prior beliefs underlying their expressed anticipations in the pre-TP interview. Since the expectation according to the methodologies of NUL TP was that STs should reflect on their daily teaching, one would expect a change on some beliefs as Larrivee (2000) attests that critical reflection breaks the barriers of beliefs. Ball et al. (2008:196) approve of self-assessment saying, “... is a key issue in autonomous learning as it enables learners to set goals and to monitor and evaluate their own learning.” This makes them responsible for their own learning while at the same time growing professionally.

In the interview after the STs have had ten weeks of classroom practice, it would be elicited from them how they perceived their learning from the experience (Zeichner, 2010) and its relationship to their learning on campus, and the effect they detected on their learning to teach and their personal observations on their actual teaching. By bringing together the factors that contributed to their professional learning and development the student teachers would not only be indicating the degree to which TP experience had been of value to them, but also revealing the actual areas in which they had developed as teachers, thus confirming or refuting the importance of teaching practice as a phase in the initial training stage of teachers.

It should at this point, have dawned to some extent to student teachers that teaching-learning was a complex enterprise and learning to teach was an ongoing process (Spalding, et al., 2011). Their discussing the experiences would highlight the degree to which the theory had been and could be aligned with practice. Thus, it would reveal how they had been helped to develop their pedagogical content knowledge during on-campus and in-school learning enlightening the perceptions they had before going for practice. That would then enable the researcher to further relate what might be inhibiting the merger of theory and practice, and the development of PCK thereof.

Since in the pre-TP interview STs were relating their experiences to the coursework training, this time they would be relating those from the second phase, practice in schools. In the same manner the essence of the questions were still on the issues focused on. Only five broad questions with sub-questions (Appendix D (ii) b) were asked and were grouped as follows: (1) contribution of
content and pedagogies – question 2; (2) contribution of TP; (3) practice and theory link; (4) enactment – 4; and (5) views - question 1.

In the third week of March 2015, STs were contacted to make arrangements for post-TP interviews which continued to the actual end of TP and beyond. The interviews following the same procedure with one pilot interview per course in the same week that contacting STs began though that in another subject dragged for some time due to postponements. With the piloting done and refining of the schedule thereof, the first post-TP interview ran on 15th April 2015 to the last one on 5th May 2015. The final version of the post-TP schedule is shown in Appendix D ii (b). Because it was examination time, STs wanted to be done with interviews so that sometimes three were conducted in a day.

Finally two female STs from the Biology group declined for the post-TP interview despite several trials to communicate with them. Since in the consent form there was an indication that they could withdraw when they wanted to do so, it was finally accepted that they had decided on silent withdrawal. STP3 though willing to take part in the post-TP interview, the conditions under which he practiced could not provide worthwhile information in relation to this study. That was compounded by the fact that unlike the rest of the research ST participants he had taught for a number of years before going for further studies, which could have influenced to a large extent a situation of finding himself working all by himself; although that had not been set as a condition for participation in the study. STP11 did not show up for the interview and was not pursued. The summary of the interviews conducted is given in Table 4. The plus (+) sign indicates the interview that was conducted and the minus (−) sign marks the decline while the blank ( ) indicates no further action and/or product.

Table 4 Student Teachers’ pre- and post-TP interviews

<table>
<thead>
<tr>
<th>Student Teacher</th>
<th>Pre-TP</th>
<th>Post-TP</th>
<th>Total transcriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>STB1</td>
<td>+</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>STB2</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>STB3</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>STB4</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>STB5</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>STB6</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>STB7</td>
<td>+</td>
<td>Pilot</td>
<td></td>
</tr>
<tr>
<td>STB8</td>
<td>+</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>
The anticipated total number of ST participants’ transcription was short of two, instead of forty (40) the finally used transcriptions were thirty-eight (38). The number was considered sufficient and capable to provide the essential information to answer the research questions. The transcription and analysis of the STs’ post-TP interview followed the same procedure as the previous one done before TP. Having obtained the perceptions of the STs about the learning in and from practice (Ball and Cohen, 1999) a look is taken into how the TPTs perceived the undertaking in the section that follows.

### 3.3.4 Teaching Practice Tutors (TPTs) interviews

With a great advocacy for the move towards practice-based teacher education, the need for and importance of practice teaching as part of teacher education programs has been emphasized in literature (Ball, 2000; Gürsoy, 2013; Kapesi 2013; Kourieos, 2012). In its training of teachers, FED at NUL following the coursework training on campus, STs are exposed to the practice in classroom teaching, guided by TPTs who are experienced teachers in the subject areas. This model is more or less the same as that in Australia for their Master of Teaching program which Allen & Peach (2007) describe as a traditional approach in that teacher educators design coursework and prepare pre-service teachers for teaching practice, with their “academic” knowledge and expertise to be jointly supervised by university and practice school staff with their “practitioner” knowledge and expertise (Zeichner, 2010). The partnership between the
teacher training institution and the practice school is deemed important for the success of field experience component of pre-service training program (Ball, 2000; Ball & Cohen, 1999; Gürsoy, 2013; Mtika, Robson & Fitzpatrick, 2013).

As part of this study, the impact of “Nellie” (Kirk, 1986) in Lesotho who is the TPT, on STs’ professional development was explored. The intention was to learn the perceptions of the TPTs from their experiences in the arrangement which it was hoped would help answer the research question. TPTs were those teachers whose classes had been identified by the school for student teachers’ practice and the researcher had no control of choice in that case. TPT is taken as a co-educator acting as a professional friend, guide and supervisor to the ST during the teaching practice experience in the school.

It was our conviction that TPTs should be able to discern professional practice, have proficient ways to support and supervise STs for their further professional growth. A lot has been said about university-school partnerships and the impact of TPT/ mentor/practice teacher/cooperating teacher (Allen, Ambrosetti & Turner, 2013; Allen & Peach, 2007; Bullough & Draper; Gürsoy, 2013; Smith, 2000) which could have positive and/or negative bearing on the development of the ST. To get the information about how STs performed in classroom teaching, the researcher made arrangements with concerned TPTs in schools where the STs were placed. The TPTs had all the time of practice to guide, supervise, observe and reflect on the process.

The researcher was working towards establishing TPT’s perceptions and contributions on the development of ST’s professional knowledge and any emerging issues The TPT as an experienced practitioner knowing the complexities of teaching was expected to be aware of the value of that experience for prospective teachers for their learning to teach. In the same manner as with other groups of participants the interview questions (Appendix D iv) revolved around the five focal areas on the basis of which the questions were grouped as follows: (1) what content? – question 3; (2) how handled? – questions 7 and 8; (3) enactment? – question 4; (4) theory and practice? – questions 2 and 6; (5) views? – questions 1 and 5. Still, there was a lot of overlapping among the sub-questions which would be dealt with in context during analysis.

After studying the STs’ placement lists for TP, two packages for the twenty-four (24) concerned school principals with one school having two Biology STs were prepared and delivered. One of
the STs was engaged in the pre-TP pilot interview and the other in a post-TP pilot. The package comprised a letter of introduction from the supervisor (already referred to earlier – Appendix A), a specific letter of request (Appendix B ii) to interact with the concerned TPT and the consent form (Appendix C i) including copies of the communication to the TPT. The package for TPT had the same basic communication specifying the particularities for the interactions and those between them and the ST including copies for the HOD as their immediate authority. The letter of request to TPT is presented in Appendix B v and the consent form in Appendix C iv. In the communication it was stated that they would be expected to prepare a report on the ST’s performance, without stipulating the areas to report on. That was to give them the opportunity to indicate what they considered important for ST’s learning in that phase of their training. The report was collected on the day of the interview prior to the commencement of the interview exercise. Table 5 provides the profiles of the TPTs per their particulars in the consent form.

Table 5 Teaching Practice Tutors profiles

<table>
<thead>
<tr>
<th>Subject</th>
<th>Gender &amp; Gender</th>
<th>Training Institution</th>
<th>Year of latest completion</th>
<th>Teaching subjects</th>
<th>Teaching experience (Yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>TPTB1</td>
<td>M</td>
<td>NUL (PGDE)</td>
<td>2013</td>
<td>Bio &amp; Chem &amp; Bio &amp; Chem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>TPTB 2</td>
<td>M</td>
<td>NUL (PGDE)</td>
<td>2005</td>
<td>Maths, Physics &amp; Chemistry</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>TPTB 3</td>
<td>F</td>
<td>NTTC (STC)</td>
<td>2013</td>
<td>Bio &amp; Chem &amp; Bio &amp; Chem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>TPTB 4</td>
<td>F</td>
<td>NUL (BScEd)</td>
<td>2011</td>
<td>Bio &amp; Chem &amp; Bio &amp; Chem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>TPTB 5</td>
<td>F</td>
<td>NTTC (STC)</td>
<td>2006</td>
<td>Bio &amp; Chem &amp; Bio &amp; Chem</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>TPTB 6</td>
<td>M</td>
<td>NUL (BScEd)</td>
<td>2006</td>
<td>Bio &amp; Geo &amp; Bio, Geo &amp; maths</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>TPTB 7</td>
<td>M</td>
<td>NTTC (STC)</td>
<td>2010</td>
<td>Junior Maths &amp; Biology (senior)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>TPTB 8</td>
<td>F</td>
<td>LCE (Dip Sc Ed)</td>
<td>2011</td>
<td>Junior Science Bio &amp; Chem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>TPTB 9</td>
<td>F</td>
<td>LCE (Dip Sc Ed)</td>
<td>2006</td>
<td>Maths &amp; Science Bio &amp; Geo</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>TPTB 10</td>
<td>F</td>
<td>LCE (Dip Sc Ed)</td>
<td>2009</td>
<td>Bio &amp; Chem &amp; Bio &amp; Chem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>TPTB 11</td>
<td>F</td>
<td>NTTC (STC)</td>
<td>2000</td>
<td>Biology – Junior &amp; Senior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Subject</td>
<td>Particulars</td>
<td>Training Institution</td>
<td>Latest year of completion</td>
<td>Teaching subjects</td>
<td>Teaching experience (Yrs)</td>
</tr>
<tr>
<td>Physics</td>
<td>Name</td>
<td>Gender</td>
<td>First</td>
<td>Latest + qual</td>
<td>Training &amp; Teaching &amp; Total &amp; With latest Qual.</td>
</tr>
</tbody>
</table>

82
<table>
<thead>
<tr>
<th>TPTP 1</th>
<th>M</th>
<th>LCE (Dip Sc Ed)</th>
<th>2009</th>
<th>Physics &amp; Chemistry</th>
<th>Physics – senior Maths - junior</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPTP 2</td>
<td>M</td>
<td>NUL (BScEd)</td>
<td>2008</td>
<td>Maths &amp; Physics</td>
<td>Physics &amp; Computer Science</td>
<td>7</td>
</tr>
<tr>
<td>TPTP 4</td>
<td>M</td>
<td>LCE</td>
<td>2012</td>
<td>Maths</td>
<td>Physics</td>
<td>13</td>
</tr>
<tr>
<td>TPTP 5</td>
<td>F</td>
<td>LCE (Dip Sc Ed)</td>
<td>2004</td>
<td>Physics &amp; Geography</td>
<td>Maths &amp; Physics</td>
<td>17</td>
</tr>
<tr>
<td>TPTP 6</td>
<td>M</td>
<td>NUL</td>
<td>2005</td>
<td>Maths &amp; Physics</td>
<td>Maths &amp; Physics</td>
<td>10</td>
</tr>
<tr>
<td>TPTP 7</td>
<td>F</td>
<td>LCE (Dip Sc Ed)</td>
<td>2011</td>
<td>Maths &amp; Physics</td>
<td>Maths &amp; Physics</td>
<td>8</td>
</tr>
<tr>
<td>TPTP 8</td>
<td>M</td>
<td>NUL (BScEd)</td>
<td>2007</td>
<td>Maths &amp; Physics</td>
<td>Maths &amp; Science Senior &amp; Junior</td>
<td>8</td>
</tr>
<tr>
<td>TPTP 9</td>
<td>M</td>
<td>NUL (PGDE)</td>
<td>2015</td>
<td>Maths &amp; Physics</td>
<td>Maths – junior &amp; senior Physics - senior</td>
<td>6</td>
</tr>
<tr>
<td>TPTP 10</td>
<td>M</td>
<td>NUL BScEd</td>
<td>2009</td>
<td>Maths &amp; Physics</td>
<td>Maths &amp; Physics</td>
<td>6</td>
</tr>
<tr>
<td>TPTP 12</td>
<td>M</td>
<td>LCE (Dip Sc Ed)</td>
<td>2008</td>
<td>Maths &amp; Physics</td>
<td>Maths, Physics, Junior Science</td>
<td>7</td>
</tr>
<tr>
<td>TPTP 13</td>
<td>M</td>
<td>LCE (Dip Sc Ed)</td>
<td>2006</td>
<td>Maths &amp; Physics</td>
<td>Maths, Physics, Junior Science</td>
<td>8</td>
</tr>
</tbody>
</table>

All the principals and TPTs filled the consent forms which were collected mainly during normal TP visits, by the researcher or a colleague, or the ST where possible and arrangements were made between the researcher and the ST of how to convey the forms. At the end of TP, TPTs were contacted telephonically and through e-mail where possible to arrange for interviews which commenced on 12th May and ended on 8th June 2015 each interview lasting for about one hour. All twenty TPTs were interviewed using the schedule in Appendix D iii. On several occasions the interview had to be postponed after having travelled quite a long distance. It was not unusual to travel to the same school thrice which had a great impact on funds and time.

In a few cases the TPTs had not prepared the report when the researcher got to the school but they would take some time to write it before the interview started. In two cases, however, the TPTs kept promising that the report would follow until the researcher finally gave up after travelling to one school several times. With the other one, because the school was quite far away the communication was through the phone and e-mail. The third TPT made a voice recording of his report which failed to get through after a number of trials and no agreement was reached how that problem could be resolved, then again, we finally had to let go. TPTs’ transcriptions were done by the researcher in order to assimilate the contents of the interviews then basically
following similar procedure to that with ST analysis. The summary of the TPTs’ interviews and reports is shown in Table 6.

Table 6 TPTs conducted interviews and received reports

<table>
<thead>
<tr>
<th>Teaching Practice Tutor</th>
<th>Interview</th>
<th>Report</th>
<th>Total texts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPTB1</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>TPTB 2</td>
<td>+</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>TPTB 3</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>TPTB 4</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>TPTB 5</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>TPTB 6</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>TPTB 7</td>
<td>Pilot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPTB 8</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>TPTB 9</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>TPTB 10</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>TPTB 11</td>
<td>+</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>9</td>
<td>19</td>
</tr>
</tbody>
</table>

| Physics                 |           |        |             |
| TPTP 1                  | +         | +      | 2           |
| TPTP 2                  | +         | +      | 2           |
| TPTP 3                  | Pilot     |        |             |
| TPTP 4                  | +         | +      | 2           |
| TPTP 5                  | +         | -      | 1           |
| TPTP 6                  | +         | +      | 2           |
| TPTP 7                  | +         | +      | 2           |
| TPTP 8                  | +         | +      | 2           |
| TPTP 9                  | +         | +      | 2           |
| TPTP 10                 | +         | +      | 2           |
| TPTP 12                 | +         | -      | 2           |
| TPTP 13                 | +         | +      | 2           |
| Total                   | 10        | 8      | 18          |

All twenty TPTs were interviewed. For the reports, one from the Biology group and two from the Physics group were finally not obtained, leaving 17 reports for analysis. The TPTs were presumably directly involved on daily basis in the work of the ST in the ten (10) weeks of practice. Their counterparts, TEs, had provided the coursework training in the other phase of the teacher development stage. The reports that TPTs prepared on STs’ performance formed part of the documents analyzed and they are discussed in the ensuing section.
3.4 Document analysis

In the process of establishing the cause(s) of student teachers' reported limitations to competently apply the acquired teacher knowledge in their practical classroom teaching, a number of documents that could provide an insight into the problem were identified. The choice of the documents among many educational documents was mostly driven by the question that the study intended to address. The analysis process then started. Those documents that already existed were obtained quite early at the time that the researcher was writing a research proposal. Another set of documents was obtained when the research participants had completed their production.

Each identified document was analyzed on its own merits, still focusing on the question, identifying where the shortfall was in the pre-service training of science education STs at NUL. It was with a hope that the information in those documents could enable the researcher to interpret the meaning in them related to the research question. In the final analysis the focus was mainly the attributes of teacher knowledge taking on board the emerging issues of relevance. The identified documents were:

1. Course synopses for Biology and Physics
2. Course outlines for Biology and Physics
3. Teaching Practice Handbook
4. Student Teachers’ Lesson Plans
5. Student Teachers’ Teaching Practice Reports
6. Teaching Practice Tutors’ Reports

For all the documents, the researcher followed the steps cited in De Vos et al (ibid) as outlined by Rapley, (2008:130-131). The reading through the documents was done several times interrogating the text to identify the units for analysis. Following the intensive reading of each document, the parts that bore information that related to teaching were first highlighted and then followed by coding mostly using the words therein. In most cases similar ideas were found in different parts of the document. At times the expressions would be bearing one meaning while at other times the context would be slightly different, hence calling for a different coding. Through constant comparison of units and codes a comprehensive coding scheme was developed which was subjected to categorization into the domains of teacher knowledge, the dominant one in this
study being PCK which of course could not be divorced from others including the emergent ones. The researcher believed that with those forms of teacher knowledge, STs could exhibit reasonable knowledge in their teaching. The individual documents are discussed in the sections that follow starting with course synopses.

3.4.1 Course Synopses

The course synopses of the program courses offered at NUL are compiled in the University Calendar which ideally should be produced each academic year, incorporating the changes that may have been prompted by issues that emerged in the course of the year. The effecting of the changes in the program and its courses follows very firm, rigorous and iterative procedures through various bodies of the institution as revealed in the draft report of NUL Science Education Self-Review (National University of Lesotho, 2014). It was taken that the course content helped the program to meet its purpose which had to be in line with the university mission to produce graduates that were responsive to the national needs.

As a synopsis is the summary, the course synopses listed the topics that the teacher educator was expected to treat in the training of prospective teachers. It is thus an abridged equivalence of the syllabus, lacking most features of the school syllabus though. It serves as a guiding tool to teacher educator hence why it was selected as one of the documents to be analyzed in this study. The researcher believed that that tool should entail the content to be afforded the science prospective teachers, and explicitly or implicitly how it should be treated to enable that science teacher in the making to acquire the necessary and appropriate knowledge, skills and attitudes to become an aspired effective teacher. The researcher further believed that teacher knowledge was underpinned by content, pedagogy and their blend in action and the interest had been in the blend of content and pedagogy, pedagogical content knowledge (PCK) in the process of teacher training, learning and practice as it is believed to be the core of the work of a teacher.

The course synopsis was taken as a unit of analysis, each topic forming the segment. During that analysis a stream of questions flooded one’s mind and they informed the research questions for the TEs’ interview. The topics and the questions that triggered the mind are given in Table 7.
Table 7 The Curriculum Studies course synopsis content and the questions raised by the researcher

<table>
<thead>
<tr>
<th>Curriculum Studies course synopsis content</th>
<th>Questions raised by the researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Lesson planning and Scheme of work</td>
<td>What procedure? What topics? Whose choice? Assessment?</td>
</tr>
<tr>
<td>4. Teaching strategies</td>
<td>General or subject/topic specific? What about them? Which and why?</td>
</tr>
<tr>
<td>5. Use of the local environment</td>
<td>What of the environment? For whom (ST or school students?) Whose choice? What procedures?</td>
</tr>
<tr>
<td>8. Preparation of subject educational projects</td>
<td>Basis for project choice? Procedure? Purpose? Assessment?</td>
</tr>
<tr>
<td>9. Evaluation of TP</td>
<td>Procedure? Purpose?</td>
</tr>
<tr>
<td>11. Selected topics and specific problems</td>
<td>Whose selection of topics? Procedure? Then what?</td>
</tr>
<tr>
<td>12. Presentation and evaluation of projects</td>
<td>How presented? Evaluation mode?</td>
</tr>
</tbody>
</table>

The subject TEs design the synopses in their subject area and get involved in the review and refining process, thus getting conversant with the training subject course content. The same teacher educator would be teaching the course, though sometimes at some point it might have to be a different person in the same area of specialization. This gives the context under which science Curriculum Studies content is produced, which is reviewed regularly to meet the changes made in the school curricula. The synopses used for this study had not been revised since 2007 (National University of Lesotho, 2007) and there was no reflection of the LGCSE syllabus introduced in 2013. The analysis of the course synopses was done to establish the specific subject content, the pedagogies and their blend depicted therein to guide the teacher educator in what and how the teaching of prospective teachers should be handled.
The text in the course synopsis was coded and categorized and since it was the same for both courses under study, there was no need for comparison and merger. Following on the model of analysis frame shown in section 3.5, the course synopsis was analyzed using the contents of the table depicted in Table 7 presented in Appendix M.

The course synopsis in its abridged form does not portray how the teacher educator would actually go about the training of the prospective teacher’s professional development in the teaching of the specific subject. To know and understand the “what” content from TE’s perspective and the “how” they treated it would address the researcher’s questions on the synopsis content. It was therefore inevitable to find out how the TE transformed and represented the course content for use in teaching which is captured in the sub-section that follows.

3.4.2 Teacher Educator’s Course Outlines

As a way of transforming the subject course synopsis content, the concerned TE represented it as a course outline reflecting her/his teaching syllabus. Over the years, transformation and representation of the course matter was left with the individual teacher educator to decide on the design and execution, on the basis of which the individual would design and administer the formative and summative assessment of student teachers. The teacher teaches prospective teachers as both learners and teachers to be, hence making their role complex (Caena, 2014; MacDonough, 2013).

In 2013, the department enforced the format for the course outline proposed by the University, making the modifications that made it more suitable for the science courses. The format entailed a number of categories including inter alia: Course description, objectives, learning outcomes, content and description, teaching and learning activities, assessment methods, processes for feedback and recommended readings. Those categories though not strictly followed in the course outlines studied for this study formed the analysis units. The analysis addressed the connection between the outline and the synopsis. Both documents were the tools used to assist the STs to learn how to teach the subject. In the process of course outline analysis, the researcher sought clarification from the concerned TE in order to get the message and meaning from them as the designer whose ideas were portrayed therein. The consultation was guarding against the validity of the data that the researcher collected for their credibility and accuracy (Patton, 1990).
The analysis of each category was treated following the common and pertinent steps in the analyzing of the documents. Then the analyses of the course outline parts were further done in relation to one another to determine their relationship and the emerging patterns. The analyses of the two course outlines were compared and a further cross-analysis made. The final product of the course outline analysis was then compared with the course synopsis analysis to get a bigger picture of how the guiding materials for the training of a prospective science teacher envisaged the grounding of teacher knowledge base, with a particular concern about teacher pedagogical content knowledge. The course outline was analyzed using the Table 7 in Appendix N.

To connect the coursework training with practice, the Faculty of Education had a Teaching Practice Handbook for guidance to teacher educator, student teacher and the TPT the discussion of which follows.

3.4.3 Teaching Practice Handbook

Teaching Practice Handbook guides the process of teaching practice and it is given to every student teacher before going for TP. The thrust of that document is to guide student teachers into being reflective in their practice in schools. It thus serves as a means to keep in touch with the student teachers, guiding them during the field experience, away from the teacher educator and the conventional face-to-face setting (Nonyonko & Ngengebule, 2008; Commonwealth of Learning 2002) thus learning at the distance. Although it would help to use the advanced means of continuing communication for further teaching and learning, the print guidelines provided some form of support which was a vital element in the case of distance learners in which the student teachers were, during that phase of their training.

The Handbook was included in the documents for analysis in this study to discover the possible support it provided the STs to further learn to teach, in the physical absence of the TE. However, it should be noted that the Handbook had not been written by the concerned TEs per se, even though their inputs could be sought for its regular revision. The initial analysis of the Handbook was done in March 2014 using the copy produced for the academic year 2012/13 and was revisited in November 2015 using the then current one prepared for 2014/15. The basic structure of the sections of the Handbook was not affected by the reconstruction or rearrangement of content in a few areas.
Each section of the Handbook with its sub-sections was thoroughly studied to get the details and conveyed message. Then the bits that had explicit and implicit elements of teacher knowledge and pertinent issues to the work of a teacher were identified, categorized and coded. The categories within sections were then compared to merge the categories until they gave a refined picture of the relevant elements of the whole Handbook for the student teacher’s professional development. The analysis was executed in the similar way as other documents. In the analysis of the Handbook the themes were drawn from those highlighted therein with very limited abstraction using Table 8 in Appendix O.

From student teachers who were at the heart of the research study, the document they produced was the Teaching Practice File from which the researcher drew the lesson plans and the report which are discussed hereafter.

3.4.4 Student Teachers’ TP file

At the end of teaching practice the ST compiled a file that contained all the textual information from the practice period from which lesson plans and reports were selected for analysis. Those others that could have been included had some shortcomings that led to their rejection as discussed earlier.

3.4.4.1 Student Teachers’ Lesson Plans

The lesson plan became a crucial instrument which organized, guided and directed teacher’s thoughts, intents and actions in teaching the lesson, the impact of which was likely to result in effective teaching (Sougari, 2011). The complexity of teaching and learning requires a teacher to take time to reflect for the lesson before drawing the plan, bearing in mind all the factors inherent in teaching. Among the inherent factors are those such as students, teaching strategies, curriculum (Minott, 1997) and learning objectives, stages of the lessons, activities, assessment (Ghanaguru & Yong, 2013) that form part of the lesson plan format that NUL student teachers are trained on. The NUL lesson plan format further includes students’ pre-knowledge, organizational setting, timing of stages, lesson reflection and how to improve (National University of Lesotho 2015).
Based on the importance of the lesson plan, the researcher included ST’s lesson plans as part of the sources of the data in order to determine their perception of teaching in the preparation phase. That was done in pursuit of the possible cause(s) for their shortfall with classroom teaching while they had been trained. The lesson plan would portray the “what” the ST intended to teach and the “how” s/he intended to teach it which would embody the elements of teacher knowledge.

In deciding what to look for with the components of the lesson plan to act as the elements of the unit of analysis, the researcher developed the indicators on the basis of the observation instrument used in the study by Pellegrino and Gerber (n.d.) in which the participating teachers used the lesson plan for reflection. Their study was with experienced teachers and the instrument was designed on the basis of the National Board of Professional Teaching Standards in Australia. In this case, the researcher was working with pre-service teachers on a ten (10) weeks teaching practice as part of their training due to the fact that the underpinning factors of teaching and learning cut across the continuum of teacher professional development stages. Since the involved STs were still undergoing training, the lesson plan analysis elements were those in the format developed by the Faculty of Education at NUL to meet the context of this study. The non-exhaustive indicators checklist for student teacher’s lesson plan as part of the analysis is in Appendix H as Table 9 leading to the analysis given in Table 10 in Appendix I.

3.4.4.2 Student Teachers’ Teaching Practice report

The guidelines for student teacher’s in writing the report at the end of TP are provided in the TP Handbook ((National University of Lesotho Teaching 2015:). Each section was considered a unit to be analyzed with its sub-sections taken individually to create summaries that would form the segments to be coded and categorized to eventually get the teacher knowledge and emerging issues embodied therein. With the complete analysis of each student teacher’s report, the subject merger followed with finally comparing and merging the analyses of the STs’ reports in the two subjects. That was done with a hope to establish what content and pedagogies contributed to STs’ professional development and the deficit thereof that could be the cause of the reported incompetence in their classroom practice during TP. It was hoped that the compiled reports would enable the researcher to ascertain student teacher’s learning (Majzub, 2013) and the effort
they together with other involved parties put into their professional development. The analysis of the ST report is given in Table 11, Appendix I.

In the second phase of their training, STs were working intimately with the TPT whose involvement is discussed next.

3.4.5 TPT Teaching Practice report

It was essential to get the report on the whole TP exercise by the concerned TPT which the researcher hoped would reflect how things went in order to discern if there could be any detectable deficit that might be contributing to the reported incompetence with student teachers’ practice in classroom teaching. Research has revealed that practice teaching phase has benefits and challenges to student teachers' professional development (Aydin & Boz, 2012). The researcher was particularly looking for the information that had to do with student teacher’s exhibition and development of teacher knowledge as they interacted with the professional guide, the TPT, creating room for those aspects of the work of the teacher that TPT indicated and had a bearing on teacher successful performance.

The TPTs had been informed from the beginning that they would be requested to provide the report on the issues that they deemed essential to report on. Most reports were obtained as handwritten hard copies with a few typed, one of which was provided as a soft copy. In order to be able to easily access and manipulate the reports in the process of its analysis, the researcher typed it to have it on the computer and in the process got to understand the information provided better.

The whole report was treated as a unit of analysis the table for it is shown in Appendix K. After reading each report several times, the key points were highlighted retaining the original meaning and most of the wording. That reduced the data to manageable bits that were then coded and categorized (Cohen et al., 2011; Miles and Huberman, 1994). The coding and categorization were taken through several steps to reach to the stage where teacher knowledge and pertinent emerging issues were established. At the same time of reading through the report, the areas with the content to the research question were highlighted and also writing the issues coming to mind with regard to the text, which would later be considered in the discussion of the findings. When all reports had been analyzed, those in the same subject were compared first and finally for both
and blended the codes to get a holistic picture of how the TPTs had seen and felt about the STs’ training courses as revealed in their performance in practice.

With the various sets of analyzed textual material, in order to get an intact picture of what was going on in the links in the research site pertaining to STs’ development of teacher knowledge, the final analyses were looked into in the context of qualitative content analysis which comes in the succeeding section.

3.5 Qualitative Content Analysis

Qualitative research puts a lot of recognition on participants' voice, and it thus becomes more subjective, unlike the objective nature of the quantitative research. Being subject-oriented it enables digging deep into the participants' experiences and their views about them and their situations which ought to be collected and recorded in totality. One would then take it that qualitative content analysis might not be guided by the pre-determined set of rules or categories of analysis, rather, the categories would solely emerge from the data collected. In as much as qualitative content analysis is less driven by very specific hypotheses and categorical frameworks (Cassell and Symon, 1994:4), it is still guided by the research question(s) based on certain theoretical framework and therefore it is possible to bring some pre-determined set of categories of analysis. It is thus to some extent prone to inductive approach. In this study, the main underpinning theory of teacher knowledge with particular interest in PCK and the inherent components formed some kind of a priori codes while the emergent codes based on the data were considered as crucial too and were either fit into the pre-determined codes or were kept as such. Thus a blend of inductive and deductive approaches was used.

The qualitative content analysis follows a controlled systematic methodology, going logically, step by step (Krippendorff, 1980; Mayring, 2000; Stemler & Bebell, 1998; Weber, 1990). The steps explained to varying degree by different authors basically include the identification of material to be analyzed which after reading, the researcher identifies the features of the material which inform the determining of the categories to work with. The categories are in turn coded on the basis of the concepts borne in them that are pertinent to the research question(s) and their relationships.
Bearing the heart of content analysis, categorization and coding in mind, the researcher drew ideas from different forms of qualitative content analysis. De Vos, et al (2011) point out that in qualitative research, the modes of analyzing data are determined by the purpose and nature of the study and it is an on-going process.

The data were collected from individual events and analyzed at that level and later related to similar category of participants, course, and data type and in the final analysis all events were consolidated to make a comprehensive picture of the whole study. The constant comparison analysis (Miles & Huberman, 1994; Ryan & Bernard, 2000) strategy is the most commonly used in conjunction with different analysis strategies (Leech & Onwuegbuzie, 2007) in which units of analysis, categories and codes from different sources are compared for merger or uniqueness as may emerge from the process of analysis.

The researcher settled for template analysis (TA) which is a particular way of thematic analysis of qualitative data still following the basic steps in content analysis. It appealed to the researcher as it proved to be very user friendly in two ways: one, it uses hierarchical coding adaptable to the particular needs of almost any qualitative research study; two, its flexibility with the format and style suggesting no coding sequence and number of levels. That led to the researcher developing the model of the analysis frame shown in Figure 3 that has been used in this study to develop the analysis tables that were designed to suit the data from different sources. The model was modified in the process of analysis of data as issues unfolded.

The tables are appended at the end of this writing as Appendix A – Supervisor’s letter of introduction; Appendix B –Letter of Request - Appendix C - Consent Form ; Appendix D - Interview Schedules; Regular Practicing Teachers Interview Analyses; Appendix E - Regular Practicing Teachers Interview Analyses; Appendix F –Student Teachers’ Interview Analyses; Appendix G, Appendix H – Teacher Educator Interview Analyses – Teaching Practice Tutor Interview Analyses; Appendix I - Student Teacher Teaching Practice Report Analyses; Appendix J - Teaching Practice Tutor Report Analyses; Appendix K–Lesson Plan indicators checklist; Appendix L – Student Teacher Lesson Plan analyses; Appendix M - Course synopsis analysis; Course Outline Analyses; Appendix O (i) - Teaching Practice Handbook analyses.
Figure 5: Model of Content Analysis Frame

<table>
<thead>
<tr>
<th>Participants’ Responses – indicators of question themes (explicit and implicit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Categorization of Responses mostly reflecting participants’ expressions</td>
</tr>
<tr>
<td>Coded categories – bearing the meaning and words from participants’ responses</td>
</tr>
<tr>
<td>Coded categories - bearing the meaning and words from participants’ responses and emergent codes</td>
</tr>
<tr>
<td>Coded categories - bearing the meaning and words from participants’ responses and emergent codes with some abstraction</td>
</tr>
<tr>
<td>Grouping coded categories – retained and emergent codes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What knowledge?</th>
<th>Teacher Knowledge Domains</th>
<th>Emergent issues</th>
<th>What pedagogies?</th>
<th>What perceptions?</th>
</tr>
</thead>
<tbody>
<tr>
<td>How enacted?</td>
<td>Findings and Interpretation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The perforated lines within and between categories levels imply the iterative nature of the process in which as structural questions were asked then one moved back and forth making modifications within and between levels. The coding levels were influenced by the data that ensured that the essence of the research questions was maintained.

Template analysis encourages extensive development of themes allowing room for both a priori and emerging codes. As described by Brooks and King, (2012), TA enables the researcher to put the themes in the text in order, finally developing a comprehensive coding template, and it also enables analysis of large sets of qualitative data. Considering the sets of transcriptions that the
researcher ended up with in this study, together with the already existing documents, the template analysis technique was the best in this situation. More so because the researcher ended up due to time and financial constraints (for their purchase) in a position where one could not use Computer-Assisted Qualitative Data Analysis Software (CAQDAS) although it could have been ideal to use the advanced means of analysis as initially thought which could have saved a lot of time. Again, considering the time that could be required for learning how to use the analysis means, and preparing the suitable data for their use, and the money for their purchasing, TA was the last resort. Template analysis as a mode of analyzing qualitative data has been successfully used by MacDowall & Saunders (2010) and Brooks & King (2012) in their fields of work other than science education.

The analysis of the transcriptions of all interviewees started with the individual analysis, the cross analysis within groups and between groups making analytical relations. The comparison resulted in establishing patterns and themes. The relations for STs’ data were drawn between the interviews, lesson plans and TP reports. For TPT they were between the interviews and reports. For TEs it was between the interviews, course synopsis and the course outline. That extended further to the ascertaining of the relationship and coherence with the TP Handbook. In the final analysis the analysis results were consolidated and synthesized to understand the whole intact picture of the situation that enabled the drawing of the conclusions and making propositions. Then with the completion of the research methodology description the consolidation of the issues marks the conclusion of the chapter.

3.6 Conclusion

The study explored a complex and dynamic enterprise, teaching and learning. The purpose was to get the perspectival understanding of the directly involved people in the pre-service stage of science student teachers’ professional development. In order to understand the meaning the research participants made regarding the content and the pedagogies employed in the Curriculum Studies courses to prepare prospective science teacher at NUL and STs’ application of the acquired knowledge a qualitative study proved appropriate. The data collected through the semi-structured interviews by the researcher and the observations by the TPTs coupled with the
produced and existing reports enlightened the findings enabling the drawing of the connections between issues arrived at. Through the qualitative content analysis of the resultant textual material the researcher was able to structure and logically present the findings from the data collected mainly based on the five areas that seemed to succinctly answer the research question. The chapter that comes hereafter presents and discusses the findings of this research study.
Chapter 4

RESULTS AND DISCUSSIONS

4.1. Introduction

The preceding chapter related the way in which the research was carried out to obtain the results that are now presented and discussed in this chapter. There had been the continuing reporting on student teachers not adequately putting into practice the knowledge and skills they had acquired from the coursework training phase. In order to get a better understanding of the situation and the issues therein that could be the probable cause(s) leading to that observation, the researcher investigated the situation through the analysis of the interview transcripts and the relevant documents. This chapter in particular presents and discusses the interview results. The main research question sought the perceptions and opinions of the people who were directly involved in the pre-service training stage as a lens through which the insight into science student teachers’ learning to teach in their teaching subjects could be obtained.

4.2 Interview Results

The research questions formulated on the basis of the main question looked into the “what” (content) of the training in the identified courses and the “how” (methodologies and pedagogies) of the training and STs’ enactment (practice) of the acquired knowledge, skills and attitudes. They further explored the link between the theoretical (on-campus) and practical (in-school) learning, both advancing student teachers’ learning and professional growth and finally their general views about the teaching and learning in this stage of teacher professional development. Those issues (content, pedagogies, teaching practice, linking theory and practice and participants’ views) formed the framework for the presentation and discussion of the results. The underlying urge had been the belief that the training the student teachers underwent in the coursework phase should have set a sound foundation for the reasonably acceptable enactment by STs who were of course still in the making. The expectation from STs’ enactment was that it would reveal a reasonable level at which their employment of skills and knowledge would be appropriate for handling their teaching, hence necessitating no significant concern bearing in mind the complexity of that undertaking.
The chapter is structured such that the findings from each group of research participants are first presented and discussed categorically in relation to each data set within the category with a hope to get a clearer picture of the situation from the set. That is then followed by reconciling the findings for the categories of the study groups. In the case where the participants were few, the findings are put together right at the onset. In order not to degrade the likely impact of other probable and pertinent factors other than those focused on in this study, the domains of teacher knowledge and their components, the common and peculiar observations that surfaced and had a potential of being the likely cause(s) of the concern that triggered the study were identified from the voice of the participants.

The results are presented under the five main areas embodied in the research questions from which the interview questions were formulated. The clustering of the interview questions for each group of participants is discussed in chapter 3. The areas comprise: a) what content, b) how the content was handled, c) enactment of what was learned, d) linking coursework training and practice and e) participants’ views. The sequence of the group results starts with the regular practicing teachers (RPTs) in Part I to further verify the authenticity of the reported limitations with STs’ classroom teaching. Teacher educators (TEs) follow in Part II as the trainers of the RPTs and their views would easily be correlated to draw links that might enlighten the investigation. In the same manner, the then current student teachers (STs) follow in Part III as they too related with the TEs just as the RPTs, the recipients of TEs’ training. This part is presented in two divisions (a) and (b) for pre- and post-TP interviews, and finally the teaching practice tutors (TPTs) in Part IV as they will have interacted with STs during TP. The ensuing section discusses RPTs’ perspectives of the situation.

PART I

4.3 Regular Practicing Teachers (RPTs)

The RPTs in their interviews revealed some strong and weak areas that they experienced from their initial training in Biology and Physics Curriculum Studies courses they studied in their final year of training, Year IV. It was envisaged by the researcher that the information they would provide might be influenced by the continuing experiences with the normal teaching they were engaged in. Their views and opinions then extended to their observations on the practices of
prospective teachers coming into their schools to practice. That said the reported shortcomings exhibited by the science STs that triggered this research study still persisted, and therefore confirming the need to explore the matter. The next section looks into the content in the subject Curriculum Studies courses they were trained on then.

4.3.1 What content constituted the Biology and Physics Curriculum Studies courses for RPTs?

Coincidentally the two teachers completed their training at NUL in the same year, 2011, meaning that they underwent training at the same time. That would then mean that they experienced more or less some similar general circumstances prevailing then. However, their teaching experience differed in that RPTB had 4 and RPTP had 3 years of teaching. They both pointed out that the coursework training provided them the essential knowledge, skills and attitudes for them to be able to teach in their teaching subjects. They abruptly raised their general opinions with any aspect of their training as would be learned from the interview excerpts given in the discussion.

The table that follows captures the mentioned aspects of the content by each of the two RPTs involved. The last column gives the elements of teacher knowledge embodied in the information they provided based on the attributes included in chapter 2 as well as the issues that emerged which seemed to have a bearing on prospective teacher's learning to teach.

Table 8: Content taught to RPTs in the Curriculum Studies course and the embodied teacher knowledge and emergent issues

<table>
<thead>
<tr>
<th>Biology</th>
<th>Physics</th>
<th>Embodied teacher knowledge and emergent issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>•High school subject matter</td>
<td>•High school subject matter</td>
<td>Content Knowledge</td>
</tr>
<tr>
<td>•How to teach</td>
<td>•How to teach</td>
<td>Teaching strategies</td>
</tr>
<tr>
<td>•Making content understandable and interesting to students</td>
<td>•Improvisation</td>
<td>Pedagogical Knowledge</td>
</tr>
<tr>
<td>•Teaching through experimentation</td>
<td>•Theories</td>
<td>Students’ learning</td>
</tr>
<tr>
<td>•Helping students to be able to apply knowledge in real life</td>
<td>•Drawing the scheme of work (planning)</td>
<td>Orientations in teaching the subject</td>
</tr>
<tr>
<td>•Knowing and handling the students</td>
<td></td>
<td>Assessment</td>
</tr>
<tr>
<td>•Assessing students’ work</td>
<td></td>
<td>Teacher qualities</td>
</tr>
<tr>
<td>•Dealing with the situations encountered in teaching</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The regular practicing teachers expressed the content they were offered during their training differently revealing similar and different aspects of the course content. Although they did not explicitly mention their use of the syllabus as part of the curriculum, it was implied in the mention of other elements of the content of their study. Taken together, the content the RPTs learned embodied the components of teacher knowledge and qualities. The essence of the expression could be detected and eventually led to the establishment of the knowledge essential for one to become a teacher (teacher knowledge) and emergent issues. The establishment of the final themes was enabled by the meaning gathered from the conversation in totality. In some cases, more than one element of teacher knowledge was expressed within one statement. Basically the teacher training content constituted the school content they were going to teach and the methods to teach it underpinned by the learning theories. Then follows the discussion of how the mentioned content was handled to help them learn to teach.

4.3.2 How was the content in Biology and Physics Curriculum Studies courses handled?

This section captures the RPTs’ perceptions of the methodologies and pedagogies that the teacher educators employed in their teaching depicted in Table 9 with the embodied teacher knowledge and emergent issues.

Table 9 Methodologies and pedagogies employed during RPTs’ training in the Curriculum Studies course and the embodied teacher knowledge and emergent issues

<table>
<thead>
<tr>
<th>Biology</th>
<th>Physics</th>
<th>Embodied teacher knowledge and emergent issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Peer teaching</td>
<td>• Searching for information on few topics</td>
<td>• Content Knowledge</td>
</tr>
<tr>
<td>• Theoretical discussion of content</td>
<td>• Exposure to teaching facilities</td>
<td>• Teaching strategies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pedagogical Knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Practice teaching</td>
</tr>
</tbody>
</table>

The teacher educators mostly employed didactic approaches to enable student teachers’ development of content and pedagogical knowledge. For the development of the pedagogical content knowledge which is observed in action, student teachers got engaged in peer teaching as a means of practicing the acquired teacher knowledge. However, RPTP did not have that practice during coursework training and still felt it was essential. RPTB who had had an opportunity to do peer teaching expressed this view:
Tse ling tsa lintho re ne re li bua theoretically re sa li practice-e (Some things we were just told without us practicing them)... motho u n’u joetsoa feela (one was just told)... lintho re li bone ho fapana le hore ebe rea li bolelloa (we should see things instead of us being told them) …some of the concepts ke il’o li ruta ke hlile ke se certain ka tsona (some of the concepts I am going to teach still not certain about them)… hore na do I really understand these (wondering do I really understand these)?... Na tselo eo ke l’o e fa bana ka eona na ehlile e joalo ka ha e le joalo (Is what I am going to deliver to students what it really is)? (RPTB)

The uncertainty expressed by this teacher might have been caused by “how” the teacher educator handled the training content which was mostly telling student teachers about the issues taught, neither observing nor practicing with them. The feeling confirms the view stated by Magnusson et al. (1999:124) on saying, “Simply telling teachers [emphasis added]…, does not provide sufficient information or support to enable them to successfully put those ideas into practice”.

The importance of seeing things implied by RPTB was reiterated by RPTP on talking about the exposure he had with the manipulation of physics equipment during coursework training hence stressing the need for practical experience. He claimed:

We looked at some materials which maybe some of them was the first time to see them and because I saw them, I saw how, maybe how they work, and I was able to help improvise somehow to help the kids [students] see how some of the things work when I was at teaching practice and even now when I was in the field. Even if I don’t have such an instrument but I am able to help the kids [students] understand, visualize how that instrument is used because I have seen it, I have worked with it and I know how it operates. (RPTP)

The practice with some learned issues was lesson planning which was the integral part of peer teaching though RPTP did not do it. However, both teachers appreciated the value of that practice despite some limitations they observed. RPTP talked of peer teaching from his experiences during TP and those from his supervision of STs on practice. RPTB had this to say about peer teaching experience revealing the positive impact it had on him and some limitations he observed:

E la nthusa ho project-a lentsoe la ka. Joaloka ha e le hore ha ke bua kapele ke ba lehoeleea. So e il’a thusa haholo hore ke khone ho ihphumana hore na ke matla hokae li-weakness tsa ka li hokae, nka khona ho li improve-a joang. Ke bona nako e le khutšoanyane hobane ke hopola hore ‘na ke ile ka ema ka pel’a li-colleague tsa ka hannge eaba ho tloha mono ke se ke tla fielding (It [peer teaching] helped me to project my voice. Like when I talk fast I stammer. So it helped me greatly to be able to establish my strengths and weaknesses, how I can improve on them. I find the time to be limited because I remember that I stood before my colleagues only once and from there I came to the field).
Communication is vital in teaching. Therefore, it was essential that the RPT as a student teacher was offered the opportunity to work on the limitation with his way of talking as a personal attribute so that his communication could benefit the students he would be teaching.

Although RPTP had no actual experience with peer teaching he had an opinion about how best it could benefit the prospective teachers. He said:

I did not have [sic] that chance to stand in front of a crowd and talk about physics as a student teacher but I had to stand in front of the students at the teaching practice. I do consider that peer teaching is not enough to prepare the students [student teachers] to go and stand in front of the kids [students]. In peer teaching you teach people who know the content and some of the questions they ask are just helping to get it right so that you don’t disappoint your lecturer. Learners [student teachers] may be exposed to teaching young children even before they go to the teaching practice or do that peer teaching maybe for several semesters or years, get used to it, get exposed to teaching high school students. If one has not been exposed to teaching students before you just tell the students everything and some of the things shut some of the learners’ mind and they end up not getting anything.

RPTP’s view of letting STs to practice with actual high school students has been shared by researchers as a way of practicing in “context” (Ball, 2000) or doing it in “meaningful context” (Magnusson et al. (1999) or approximating practices (Grossman, Hammerness & McDonald, 2009). Also supporting the view is Lampert (2005:36) who attests that “Because teaching is situated in instructional interaction, learning how to teach requires getting into relationships with learners to enable their study of content” cited by Grossman et al. (2009). The RPTs further claimed that more time had to be spent on practice teaching in every possible way during coursework training on campus. How they used the acquired knowledge in practice is the subject of discussion in the section that follows.

4.3.3 Enactment of the “what” and the “how” of Biology and Physics Curriculum Studies courses

“Enactment involves the planning and carrying out of new practices” (Magnusson et al.1999:125). One believes that with the training the STS are afforded, they should be in a position to exhibit their ability to teach drawing from the learned subject content and the pedagogies including planning for their teaching. The RPTs were aware of the impact of the coursework training on their practice also expressing the importance of Teaching Practice (TP). They expressed their views pertaining to the issues to do with their practice. First talking about Teaching Practice as a phase in the initial stage of their training they raised these views:
Teaching practice really is very important. Hobane ke re ha e ne eba motho ha u ka ba fumana this practice before, ho no tlo ba thata ho sesefa information e bang e loketse bana ho ba ruta. Ka nako e ‘ngoe ke tla be ke balile ke utloisisa concept ebe ke sitoa ho utloisisa hantle hore na curriculum e hloka hore ke rute ho fella kae. Mokhoa oa ho assess-a bana... e ne re neng neng ha ke re ke botsitse ke fumane bana bana ba feitsa kaofela. Ebe ke maketsa hore nthoena ke e rutile. Atše mokho ke botsitseng ka oona le oona ho no se bonolo ho bana ho fumana hore na ke batla’ng. E la nthusa hore ke consult-e other teachers. Nthoeno e la ba exposure ea hore mohlonmong ha ke se ke fihla mosebetsing oo ke seng ke tl’o u sebetsa in the long run, ka be ke tseba hore na ke la ka kopana le mathata a joang pele ...le hore ke tsebe ho sebetsana le li-case tsa bana (Because I am saying if one had not had this practice before, it was going to be difficult to select the information appropriate to teach the students. Sometimes I would have read and understood the concept but fail to understand the scope that the curriculum requires of me. Assessing students...at some point when I had asked them questions I found all the students having failed. Then I would be puzzled that ‘I have taught this thing’. The manner in which I had asked was not easy for the students to get what was wanted. It helped me to consult other teachers. This was the exposure that maybe when I got to the normal job where I would be working in the long run, I would be knowing the kind of challenges I had encountered... including knowing how to deal with students’ cases). (RPTB)

The RPT appreciated the contribution of peer teaching in enabling him to decide on the necessary content to convey to students per curriculum requirements. However, the assessment of learning seemed to have been a challenge to this teacher. He underlines the value of experienced teachers as the reference resource during field experience from where he also learned the ways of dealing with the students.

That same teacher related his experiences with teaching practice saying:

Matsatsing a pele ke ne ke le incompetent hobane e ne le the first experience in the real life teaching, empa as time goes on ka ikutloa ke se ke le hantle leha e le hore joale le eona nako eno e ne ntsa le khusoanye, hobane it’s ten weeks’ (In the first days I was incompetent because it was the first experience in real life teaching, but as time goes on I felt fine though it (teaching practice), that time was short, because it’s ten weeks). “Ke utloisisa hore mohlonmong ha e ne e ka ba ntho e ka nkang bo-seleme ehlile ke ntse ke tsoela pele ka taba ea teaching, joale ke ne ke tla ba hantle. (I understand that may be if it was something that took about a year continuing with my teaching, I would be apt). (RPTB)

As with first experience in anything, this teacher could detect his inadequacy with classroom teaching during TP which eventually improved. He further expressed the need to extent the duration of TP to enable STs’ further learning.

RPTP had this to say about coursework training and TP:

I think teaching practice is one of the important elements [of training]... it exposes one to the real teaching which is needed. We do not have enough time to go through all the elements of physics education to the extent that we end up going to the teaching practice without a thorough understanding of exactly how we are going to deal with it or maybe how it should be done.
practically at the teaching practice. We end up using our own knowledge maybe from high school or from the physics courses or maybe from the other science courses which we underwent. Teaching practice is the only element which exposes us to the real environment of teaching and when we get used to it the time has run out.

With the available time for coursework training, it is obvious that it can never be possible for STs to develop PCK for all topics to be taught in the high school. Again the duration of TP was found to be short, therefore not quite meeting the anticipation that it was an extension of learning to teach for STs. With the two phases of pre-service stage, it seems the feeling expressed by Magnusson et al., 1999:126 that “pre-service teachers would only be able to develop a fraction of the pedagogical content knowledge they will need to be effective” holds. The RPTs, however, found teaching practice vital, offering opportunities to further learn to teach and about teaching in the actual classroom. Time, (duration and frequency of peer teaching and duration of TP) appeared to be a major constraint for the activities in the coursework training as well as the teaching experience in schools. The link between coursework training (theory) and in-school practice is discussed in the section that follows.

4.3.4 Linking Coursework Training and Practice

In the practice phase the STs are still the responsibility of the educators who prepared them in the coursework and they follow them into the field. Both RPTs indicated that the teacher educators visited them during TP for observation and assessment further playing their role as trainers. This section highlights the link drawn between the two phases of the pre-service training stage for continuity of STs’ learning as perceived by the RPTs. There are experienced teachers who are supposed to have the practical expertise to whom STs are entrusted for guidance and professional support during TP, the TPTs. Referring to the educator’s visit RPTP expressed his experience and feeling thus:

I think the teaching practice visiting is not enough. ...students always shake because they are not used to see them ... the number of times the tutors visit or the lecturers visit their students is not that enough. I think they can increase the number of times which they visit their students. ... it will help the students because the lecturer will try to see if this people [sic] is applying what he or she has learned from the university. They [STs] only do most of the work when they know that their lecturers are coming. That’s when you see that one is making so many plans, planning for the topic he has taught for about two weeks ago, which means that lesson plan does not serve its purpose. When answering questions you find that such students do not answer the questions the way they are supposed to answer the questions. They do have the content but it depends na
(whether) were they teaching the required content or not, that comes into play when they don’t plan their lessons very well. You find that the practicing teachers [TPTs] don’t focus much on what these people have learned from the university. Even if they have that focus is not that much as the lecturer himself or herself will do. (RPTP)

RPTP appreciated the visit by teacher educators during TP, highlighting the shortfall with the visits. He considered their frequency to have a potential to combat the STs’ cheating tactics which in the final analysis impact negatively on their professional development. He further points out on the dissonance of focus between teacher educator and TPT. That implied that there might not be much collaboration between the two presumed co-educators, if any existed at all.

Although RPTB did not talk much about teacher educators’ visits he however also raised the supervisor’s effect on him during the visit saying:

...observation from the lecturer from the University, motho u ba le letsoalonyana ha tla khetlo la pele. Khetlo la bobeli le teng ... e boetse e mpha letsoalo (one had some fright the first time s/he comes. For the second time still... again it give me that fright). (RPRB)

The visit by teacher educators keeps the STs’ in touch and could ensure that TEs follow-up on what they had taught in their coursework training to extent what was started during peer teaching sessions. However, one observes that the rare visits to STs create observer effect which might affect ST’s performance in executing the lesson (which could have been overlooked in reporting on STs’ deficient classroom performance) coupled with how they handle their planning for the lessons which is the responsibility that the STs themselves should take for their development.

4.3.5 General views of RPTs

For every question posed, the RPTs inherently expressed their opinions as can be observed in the citations included in the preceding sections of this chapter. Their general feeling was that the courses provided them the knowledge, skills and attitudes they deemed appropriate for their learning to teach. However, there were still some limitations they pointed out, both from their experiences and the observations they made with the STs’ performance during practice in their schools. RPTP felt:

The training itself, it was good even though it had no enough time to be executed... and I do believe that the training if can be given enough time I think can serve its purpose. As for now, it did not serve its purpose fully. (RPTP)
The sentiment about the training was partially shared by RPTB who expressed satisfaction saying:

...training eno kannete eona it was ok. I was satisfied. Course eona ka boeona ke ne ke utloa eka e ne fuee nako e lekaneng. (...that training was really okay. I was satisfied. The course itself I felt like it was given sufficient time). (RPTB)

These two teachers have differing view about the duration of their different training courses. Although RPTB found the time sufficient, that does not rule out the feeling he expressed about the inadequate time for peer teaching.

4.3.6 Summary of the findings from Regular Practicing Teachers interview

The interview for regular practicing teachers revealed their experiences, perceptions and opinions about the training they underwent in the subject Curriculum Studies courses considering the content, pedagogies and practice involved. The prominent issues they raised were that the courses were worthwhile and did prepare them academically, professionally and personally for teaching. However, they also pointed out those areas where they felt there were some shortfalls which contributed to their limited performance. The most prominent factors they mentioned, foremost was the limited time for some activities during coursework training and for the teaching practice in schools. With the practice teaching during coursework training a strong feeling has been expressed for the need to practice in context, with actual school students. They pointed out to the uncertainty with which they entered the practice phase in areas such as content knowledge for teaching, pedagogical knowledge (e.g. planning and organizing subject content), pedagogical content knowledge and assessment. There has not been explicit mention of the teaching strategies and the school curriculum consequently not exhibiting the orientations to the teaching in their subjects. Also, the RPTs appreciated the extension of the support and further training by the teacher educators, still feeling strongly for a need for frequent visits to enhance STs’ further learning to teach to back up the assistance offered by the tutors and other teachers in the practice schools. With the identified issues related to the training courses regarding the what, the how and the enactment of what had been learned by the RPTs, the section that follows looks into the experiences, perceptions, views and opinions of the teacher educators whose role and its impact have been in a way evaluated by their product.
PART II

4.4 Teacher Educators (TEs)

As teacher of teachers, teacher educators have a curriculum that guides their training of pre-service teachers. In this section the researcher presents and discusses the “what” and, the “how” and the extension of TEs’ role during STs’ enactment of what had been learned during coursework training and their general views of the whole process. The TE’s decision of what, how, when and why of their training course should be geared towards the benefit of the student teacher in his dual status as a direct recipient (learner) and the teacher-to-be for the benefit of the indirect beneficiaries of their teaching (students).

The investigation was done with a hope of establishing the context of teacher educators’ experiences and opinions with the training of the prospective teachers to teach in their subject area from which the shortfall that leads to STs’ inadequacy with practice could be established. Thus, it was to find out how in their context they considered the content they taught and the pedagogies they employed to teach in order to enable prospective teachers to teach as professionals in the field both during training and when they later joined the teaching force.

It is deemed important for TE to make informed decision for the choice of what subject matter, what pedagogies, noting the impact their teaching makes on the trainees, which could be in line with the study of TEs’ self positioning alluded to in chapter 2 that was carried out by Vanassche & Kelchtermans, (2014). Their awareness of such issues could then be answering the concern raised by Berry, (2007) referred to in Berry and Van Driel, (2013) about the limited knowledge about TEs’ pedagogy of teaching specific subject matter. They further underscore the importance of TE’s knowledge and understanding of the demands of their work as teachers of teachers.

The ensuing sections unravel the findings in connection with TEs’ perceptions, conceptions, opinions and experiences with their teaching in the Curriculum Studies course thus embracing their “personal interpretative framework” (Vanassche & Kelchtermans, 2014) as teacher educators. The extensive quotes from the interviews are used as evidence of participants’ lived experiences, keeping the original richness and details of the information they provided as much as possible, a characteristic feature of in-depth interview.
4.4.1 Curriculum Studies in Biology and Physics

The courses identified for this study were the Curriculum Studies courses in Biology and Physics offered to the Year IV student teachers. The courses were designed to be taught over one academic year (August to May). Practically, the courses were offered in the first semester (August to January) and the STs went for Teaching Practice (TP) in the second semester (January to March/April). Upon return from TP there is a short time for teaching before the end-of-year examinations. The content for the courses borne in documents and its transformation by the concerned TEs is the subject for chapter 5. The Curriculum Studies courses build on and contextualize the general academic conceptual knowledge offered by sister department, EDF to prepare the prospective science teachers to teach in their respective teaching subjects. The specific course content is considered in the ensuing section.

4.4.2 What content constitutes the Biology and Physics Curriculum Studies courses as perceived by concerned teacher educators?

The basis for the course content acknowledged by both TEs was the course synopsis which stipulated the topics to be treated in the courses (discussed in chapter 5). Table 10 depicts the items of the content explicitly stated by each TE indicating those common to both and those particular to individuals. The elements of teacher knowledge and emergent issues were established through considering the items in general relating them to the conversation as a whole, and they are included in the last column of the table.

Table 10 The content taught in the Biology and Physics Curriculum Studies courses and the embodied teacher knowledge components and emergent issues

<table>
<thead>
<tr>
<th>Common</th>
<th>Biology</th>
<th>Physics</th>
<th>Teacher knowledge elements embodied and emergent issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>School content to be taught - problematic topics based on experience and views of the STs and regular practicing teachers. Teaching strategies Choice of appropriate approach in comparison with lecturing;</td>
<td>Relevance of biology; Value of science fairs; Planning -for teaching at different levels, planning the whole syllabus. Project - unit/topic plan STs’ prior subject knowledge and their misconceptions thereof</td>
<td>Characteristics of Physics; Addressing learners’ alternative conceptions/ misconceptions; Planning - drawing the scheme of work Project – students’ misconceptions or attitudes during TP</td>
<td>Content Knowledge Pedagogical Knowledge Pedagogical Content Knowledge - Teaching methods/ strategies - Curriculum - Students’ learning - Orientations to teaching the subject School context Reflection</td>
</tr>
</tbody>
</table>
The content considered by TEs in the training courses with a few differences depending on TE’s personal, professional and experiential beliefs does offer opportunities for prospective teachers to develop teacher professional knowledge. For instance, they both considered planning and TEB extended lesson planning to unit/topic which also acted as an educational project while TEP dealt with the drawing of the scheme of work and the educational project involved identification and handling students’ misconceptions and attitudes towards the subject. In both cases however, there was no explicit stating of assessment as an important item in teaching that is also a crucial element of PCK. They seemed to pay attention to certain attributes of their respective subjects and getting students ready for the school contexts they were going to find themselves teaching in (the teaching-learning environment in the schools in Lesotho). Their claims are reflected in some of the quotes included. About the content they taught in their respective courses TEs attested:

I am guided a lot by the requirements ... stipulated requirements in the course synopsis. They need to understand relevance of biology, ... the content of biology for high school students, ... different strategies for teaching the subject... check their own understanding of the content ... how to prepare for their own teaching... planning for teaching at different levels, planning the whole syllabus, ... why do we teach the subject? What is this subject? What is in it that we have to teach? (TEB)

From the course synopsis we draw course outlines. Physics content that has to be taught at that level ... ways of teaching that ...addressing the problems that teachers face out there ... to be familiar with that content, sometimes they tend to teach it from what they read so that it is something they don’t understand. (TEP)

Basically the training content in the Curriculum Studies courses comprises the three main domains of teacher professional knowledge, viz: school subject content knowledge (CK), the methods of teaching it, pedagogical knowledge (PK) and conceptual illustration of pedagogical content knowledge (PCK) and its components. The emergent issues that surfaced distinctly were the school contexts, nature or characteristics of each subject and reflection. The section that

| ●school curriculum – syllabus and textbooks  |
| ●planning - lesson  |
| ●Handling learners  |
| ●conceptual development;  |
| ●School context and coping with it  |
| ●Educational project  |
| ●Learning theories  |
follows looks into how actually the stated content was handled to help the STs learn how to teach in those subjects.

4.4.3 How the content was handled in the Biology and Physics Curriculum Studies courses

The methodologies and pedagogies that the TE employs do not only serve to convey the content (conceptual and practical) of the course, but as TEs are themselves teachers, the prospective teachers are looking up to them to model what they preach (Koster et al. 2016; Russell & Korthagen, 1995; ). Here the researcher takes the methodologies as the overall procedure followed by TE, and the pedagogies as the methods and strategies of teaching employed in the execution of the lessons. The activities set out by TE for STs’ development particularly of their specialized knowledge, should embrace the core activities of teaching in the particular subject, what could be equated to what Morine-Dershimer (1989) refers to as “context-specific”. Berry and Van Driel, (2013:120) attest that teacher educators should “understand what they do, and why, in developing and enacting their pedagogy”, thus according to Ghanaguru et al. (2013) they should not only be theorists but be practitioners as well.

In this section the how TEs executed the training of STs to learn teaching is presented in Table 11, illustrating the common and particular methodologies and pedagogies employed by each TE for STs’ consumption, and the embedded teacher knowledge components and emergent issues.

Table 11: The methodologies and pedagogies employed and taught in the Biology and Physics Curriculum Studies courses and the embodied teacher knowledge components and emergent issues

<table>
<thead>
<tr>
<th>Common methodologies and pedagogies</th>
<th>Particular methodologies and pedagogies</th>
<th>Teacher knowledge embodied and emerging issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>•Discussion/classroom talk at different levels – group and whole class</td>
<td>•Strategies - how, practice/presentation, feedback; - pose a question, group talk, class talk, feedback</td>
<td>•Content Knowledge</td>
</tr>
<tr>
<td>•Lecturing</td>
<td>•Senior level syllabi comparison</td>
<td>•Pedagogical knowledge</td>
</tr>
<tr>
<td>•ST presentations of the work on given task/exercise,</td>
<td>•Demonstration-lecture</td>
<td>•Pedagogical content knowledge</td>
</tr>
<tr>
<td>•Rectification, enhancing, adding new aspects (scaffolding)</td>
<td></td>
<td>-Teaching methods/ strategies</td>
</tr>
<tr>
<td>•Providing reading material</td>
<td></td>
<td>-Curriculum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Students’ learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Assessment</td>
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<tr>
<td></td>
<td></td>
<td>-Orientations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>•Reflection</td>
</tr>
</tbody>
</table>
Basically, TEs employed didactic approach the goal of which according to Magnusson et al. (1999:101) is to transmit the facts of the subject in this case being the facts of teacher knowledge in a specific subject area. They further indicate that in executing the instruction under this approach the instructor “presents information, generally through lecture or discussion, and questions directed to students” who are then held accountable for knowing the facts produced by the subject. Although in their case they refer to a teacher but since the teacher educator is acting in the capacity of a teacher, the view holds for them as well. The TEs develop their learners in the teaching skills too hence their consideration of the teaching pedagogies. Apart from helping STs to learn about the subject content to be taught and pedagogical approaches specific to the subject and its topics, they created opportunities for STs to practice teaching (developing PCK) through peer teaching which would later be extended into field experience/teaching practice (TP) in schools. They expressed their methodologies and the pedagogical approaches thus:

I use classroom talk from the first day. I come up with the exercise where they talk… talking at group level and then at classroom level. There is a time when some authority or authoritative discourse comes in. I also give them something to go and read… give them more on the characteristics of Physics so that they see and understand why this approach will be more effective compared to lecturing. For their teaching practice they have to give me lessons where they were doing conceptual teaching and where they were doing classroom talk. (TEP)
I pose a question, they talk about it, we talk about it then I supplement their ideas. Sometimes I do lecture… if I am supposed to give them an outline for how to tackle a topic … I go through them one by one and I would give them a handout… I would elaborate, so I would be talking a lot… I would be talking a lot in that explanation. Show, let them practice, give feedback. (TEB)

TEs in their handling the content they offered reveal a mix of approaches to varying degrees at the heart of which are the domains of teacher knowledge. With a notion that STs’ learning is influenced by the experiences in the teaching/learning environment (Miller and Shifflet, 2016), TEs in their capacity, are role models to the STs. The following excerpt reveals the view of one TE on the role of modeling for STs:

Interviewer: Do you find yourself actually being able to enact these methods and teaching strategies that you train them on?

Interviewee: I play more the role of a guide. I don’t role play for them. I can only do my best to prepare them and then allow the systems in the schools to help them to continue to grow.

Clearly, the TE was unconsciously or unintentionally setting example for the STs.

About peer teaching, the activity that develops STs’ specialized knowledge (PCK) taken as one of the main underpinning theories for this study, TEs expressed the following views:

Peer teaching … because they are teaching people who are of the same level it doesn’t give them the correct picture … of what happens in the class … sometimes the peers control somehow… I am there listening, this person doesn’t feel free … is absolutely not free to do it to the extent that you say ‘does this thing inform me anyhow’? Because this person is not free, is not doing the work the way you would expect … you can’t give them the whole 40 minutes. (TEP)

...they begin to realize what it means now to be a teacher because they now begin to do a lesson plan, they practice teaching, they practice every aspect of a lesson and they get feedback. And that practice is very important. And of course Teaching Practice now gives them more time for the prolonged practice. Confidence begins to grow even before they leave for their TP. But invariably they will leave and I am not happy with them. (TEB)

Although TEP expressed some doubt about the intended effect of peer teaching they both acknowledged the need for that practical experience for STs. It offered not only a platform for practicing teaching skills, but at the same time it enhanced collaborative learning and reflection on the observed action thus learning to critique and accept criticism from the feedback provided.
by both TE and peers, developing necessary qualities in a supportive environment. Then we turn to the STs’ application of the acquired conceptual and practical knowledge as perceived by TEs.

4.4.4 Student Teachers’ enactment of the acquired “what” and “how” from the Curriculum Studies courses

The practice with what has been acquired from the Curriculum Studies courses started with the peer teaching sessions in the first semester and taken further during TP which enabled realistic employment of teacher knowledge. The general practice by the Faculty of Education (FED) is that TEs follow the STs into practice schools stated in the TP Handbook in these words:

The staff of the Faculty of Education (emphasis original) will visit all Student Teachers in their schools. Whenever possible they will consult with the Teaching Practice Tutor and together assist in the professional growth of the Student Teacher by supervising his/her lessons. (National University of Lesotho, 2015:4)

Upon visiting the STs TE observed their strengths and weaknesses and what generally pertained to that training phase. In talking about the strengths that STs demonstrated TEs expressed their observations and views thus:

What the colleagues say about them when they were visiting them … and you find in many cases really positive issues. Presentations are mixed… you’ll find those that are doing it very well. I find them strong in cases where they use practical work … at least knowing what they must do … the choice of teaching strategies, sometimes I feel happy that, ‘okay, this is what I would expect a physics teacher to be thinking’. I have never had a case where people complain about the content. (TEP)

Some are good … very impressive kannete (indeed). It was very few, the ones that I observed, that really really excelled … those who had prepared for the lesson thoroughly. For the majority I see a lot of growth, as human beings in terms of maturity, professionally in terms of holding themselves up like teachers, as classroom Biology teachers in terms of how they are able to deal with content. (TEB)

The STs in their practice exhibited acceptable to good command of the subject matter and pedagogies per TEs’ observations and the reports by their colleagues. TEB went further to note one contributing factor to excellent teaching as thorough preparation for the lesson, hence the inclusion of planning in the training content and methodologies. TEP seems to have been concerned about STs’ content knowledge that the colleagues normally from a different subject area did not complain about. The situation that one would take as inevitable since one would not be knowledgeable in the subject, hence making it difficult to observe the faults that otherwise a subject specialist would have spotted.
Further reference to the observations with STs’ teaching and general practice TEB mentioned a number of areas where STs displayed some shortcomings. She asserted:

Some I find that they have mastered the ability of being comfortable in their classrooms but they are still shallow and they still show misconceptions in the subject. Some are slow learners, so you still want them to go back. You wish they could go back and be taught while they are on Teaching Practice. When I look at the quality of their presentation, the content of it, the depth of it, how they worked at helping the students, facilitating learning, mm-mm (slowly shaking her head and frowning).

There was obvious dissatisfaction from the TE’s face, compounded by the gesture. And she went further to say:

Our teaching practice assessment form talks about the general things like communication skills, qualities of the teacher, classroom management. Those are general things that all teachers need to have. I want to say very few of my students haven’t mastered those. It is on the presentation part. The ones who excelled were the ones who mastered these three as well as teaching Biology as a science subject. The part that has to take almost 70% of the assessment is the ability of the teacher to teach, and that is in the presentation kanna (in my opinion).

They have not been strong enough in terms of how to use the methods effectively in terms of how to at least help the students learn the content to the desired level of understanding. The teaching methods they struggle with especially are the ones that require them to engage students in active learning. Those ones they continue to struggle with ... they are not making much effort to do it.

When I take my files after Teaching Practice and look at how they have done their lesson planning, most of the lessons, it’s not about the students being actively involved. They will make effort when they know somebody is going to be there. Then they will prepare a good lesson that will earn them very high marks, but immediately afterwards, they revert back to their continuous lecturing. But you only see it afterwards because we are not supervising teaching practice in such a way that at least you can follow a number of students on a continuous period of time. They should reflect on how they taught and I even guide them on how they should go about it, simple strategy. But I find that even that they don’t do it in a serious way. (TEB)

TEB alluded to quite a number of areas in which she identified some shortcomings. With STs her major concern was with their teaching in relation to the aspects of teacher knowledge domains which she felt their desirable level of acquisition and employment could be jeopardized by the aspects considered in the assessment form. The mode of running teaching practice in which TE visits her/his STs per chance is also identified as an obstruction to concerned TE to follow up on the fundamental issues for teacher professional development instilled during coursework training sessions.

TEP too had identified some limitations with STs in his subject saying:

What they are not doing so well I think is the issue of planning especially the reflection part of that planning. I always feel like I am giving them too short a time. They know the structure of a
lesson plan but what must go into the lesson plan becomes problematic. The presentation stage you will find that it is too general. There are no activities that you can say if this lesson plan is given to another teacher he can teach. If you watch this person teaching, you don’t see it in the lesson plan.

Classroom talk...they have challenges. When they make students talk, they use question and answer approach… the type of questions that are being asked are the recall questions. In group work you see that they are giving them problems to solve ... you can really see that they lectured and after lecturing then they give group work. So the group work is supposed to be giving students classroom talk, so that is a challenge. They do it the way they were taught … and they still find it to be the best way of doing it. (TEP)

Both TEs take lesson planning and reflection seriously. With the teaching methods mainly employed by STs, the very lecture method that was discouraged dominated in their practice. The desired learner involvement seemed to remain a challenge and where STs posed questions, their poor quality and level one might take to be the result of the missing assessment component in the training content and teaching. In their teaching, TEs did not explicitly indicate the manner and degree to which the STs were assisted with thorough lesson planning and purposeful reflection, exposing them to a number of practical experiences with the activities

Notwithstanding the fact that STs exhibited a number of shortcomings which of course were likely in the case where one was still learning, both TEs acknowledged the positive impact that teaching practice made on STs’ professional and personal development that was also reflected earlier in the excerpt from TEB. TEP also attested:

Teaching Practice makes positive impact on them. When they come back you see now you are working with teachers ... and you see them they are comfortable ... even the language they use you see that these people are now becoming teachers. ... they have that confidence of dealing with students. Some of them were saying the teaching experience if they can be given the teaching experience during the first semester, something like take them to different schools during the semester so that they have that feel because they feel that after teaching practice you really come back as, as, according to them a teacher. We always have an evaluation of TP after their TP. (TEP)

Collaborative group reflection (Miller and Shifflet, 2016) during peer teaching and after TP creates an opportunity for learning from one another’s teaching and experiences premised on the notion that experiences in the journey of learning have a significant bearing on one’s learning. TEs claimed that the information gathered from such reflections informed their teaching of subsequent groups of student teachers in their courses.
4.4.5 Linking Coursework Training and Practice

The two phases of the pre-service stage both offer a platform for STs’ learning. And the complexity of the work of teaching calls for support and guidance throughout the process. Since the learning environment in the two phases differs, different forms of support to the novice teachers (Niemi & Jakku-Sihvonen, 2006) are inevitable. As a way of following STs to the practice schools in which they were placed in order to extent their learning, TEs visit them twice. The first visit is for observation and then assessed in the second one though it was not necessarily with the STs that they had trained. It could be a ST in another teaching subject area therefore the organization breaking the continuation of the direct interaction.

In sustaining their professional relations with the STs into the field where they practiced teaching, TEs functioned in the context of their institution, working within the confines of the institutional principles and practices (Vanassche & Kelchtermans, 2014). Some of the conditions included resources such as finances, transport and personnel needed to meet the population of STs in schools. The TP procedures were also influenced by the practice schools as well as the institutional structures where in the case of NUL it was the sister faculties with which FED shared some activities such as the common examinations time which indirectly controlled the duration of TP.

Regarding those visits and how they played their role further in that phase of training, TEs had these to say:

I visit them during the days that I’m not going for Teaching Practice. I visit them, we also communicate via e-mails. I ask them to bring the videos … I look at the videos and try to assess what has happened when I was not there. From April to May when we stop lecturing it’s mostly giving them feedback looking at what they were doing. (TEP)

The use of STs’ lesson videos sounded a brilliant idea especially if they could be used to serve an effective purpose. In this case the TE provided theoretical feedback to the STs from his look into the recordings, not giving them an opportunity to learn from video clips. If the ST herself/himself was the one taking the video, it could raise a number of issues for the ST and her/his class, including the distraction it was likely to cause. Another issue could be that it was one or two clips from the whole ten week period, of the ST’s own choice where in particular, classroom talk was employed. But at least that marked a start of an approach that could help to
improve the TE’s training pedagogical approaches. From her side TEB expressed her assistance stating:

I help them when I am in the school. I go an extra mile to make sure that I assist. I also respond to their calls… I talk it over with them, and I will even make sure that I get assigned to that school so that I can be in a position to assist them. (TEB)

Despite the fact that the visits by TEs were arranged by TP Coordinator, allocating anyone to any school, those TEs had devised the means to sustain their assistance, support and guidance to their STs and it was not all of them that they managed to visit though they seemed to have the passion to do that.

The Faculty of Education (FED) has developed Teaching Practice Handbook (TP Handbook) to guide the process. TEP did not use the Handbook except the format of the lesson plan therein. TEB used parts of it during coursework training as she explained:

I already train them on how they should make sense of the observation schedule. For assessment I use it personally as a guide for the things that I should check. I use it as something that helps me to observe already and give my students feedback. The lesson plan that I teach them comes from the TP Handbook. I give them a different guidance on how to do their self-evaluation. As teacher educators we cannot be with them all the time. They need to really take their self-evaluation very seriously and reflect. They should know exactly what they are supposed to reflect on. (TEB)

The Handbook was a likely important link for the two phases of this initial training stage that could guide and support the involved people in their work. The reflective practice in teaching is not only called for in the lesson plan format used, but as the underpinning principle for practice teaching as presented in the TP Handbook where it states:

Teaching Practice provides the first opportunity for most of the Student Teachers to experience actual classroom teaching which aims to help students learn. Reflecting on these experiences is the most important learning opportunity for the Student Teachers to identify their strengths and weaknesses which they will then strive to sustain and improve respectively. It is through daily reflections that the Student Teachers should develop a repertoire of their own skills, planning, teaching and practicing professionalism and ethical behavior.

(National University of Lesotho, 2015:5)

The other means of support for STs during practice in schools is the teaching practice tutor (TPT) who is the subject teacher with presumed practitioner’s expertise. TEs expressed their views about the TPTs who were supposed to further guide the STs in their learning to teach. Also
the expectations under the roles of TPT stated in the TP Handbook consider holistic development of the ST (professional, personal and social). This consideration of the overall welfare of the ST is legitimate as the endeavor itself involves thoughts, feelings, knowledge and actions (Lee & Schallert, 2016) of the beginner in the job which indeed requires professional support. TEs expressed their views about the TPTs in these words:

Being in the environment ... that also might have the influence on their teaching because the mentor might say: ‘ah, we don’t do that, do it this way’. So it might have a contribution, what mentors also do ... train the mentors before giving them our students so that they know what we want our students to do. (TEP)

Our teaching practice assumes that our student teachers have mentors in the schools. I am not sure whether the TPTs are doing what they are really supposed to be doing. In some schools, yes they do, in a lot of schools the students say a lot of teachers leave the students to do things by themselves. (TEB)

TPTs, in the view of TEs do have a stake in the development of STs although it sounded more of a wish and assumption and what STs said about the situation out there. There is apparent lack of collaboration between TEs and TPTs. The training of TPT which was started in 1994 was dropped at some point and picked up years later in the form of reflection workshops for Senior TPTs and Principals both of which were crippled by lack of funds. ((National University of Lesotho, 2015:2)

4.4.6 General views of TEs

TEs’ rationale for teaching the course was for STs’ understanding and familiarization with teaching what they would be teaching and the situations thereof so that they could cope. They both found the course important, the major concern being the short time within which they were to teach them. In the first semester when those courses were offered, the STs were still doing other courses both in the department and in the sister department and/or the service faculty hence still having a lot of work to do. Expressing their views about time and heavy loads for both, STs and TE, TEB posits:

… having to do a seven credit hour course in a semester and the students having to do all that … it’s too much... my students’ load is packed. They are always under pressure and it’s painful to see… they are overloaded. A semester is too short to prepare for the whole curriculum especially high school Biology, we need more time. I don’t know where it will come in. If the course could be like err, they are not going for teaching practice until their fifth year. Then we could have a whole year so that this seven credit hour course really is a seven credit hour course. Then we
could have more time to have them here dealing with a lot of aspects of teaching at high school level. I wish they could have more time so that all the prescribed experiments for high school kids my students would know how to do them. I wish I could have an experience of observing another university handling a similar course. I just need an external, another viewpoint on how to teach my course. (TEB)

Not only were STs overloaded and did not have sufficient time for their work, but the TE herself as well earned for learning from a different experience which was not feasible as she indicated. They did not have enough time to do what they wished for successful teaching and learning. She further expressed a number of wishes such as:

I wish my load could go down… I do not know where I will get time … time to do research around the course and to get exposure to innovative ways of teaching the course. (TEB)

Expressing similar sentiment, TEP uttered:

I have reduced the number of assignments because my feeling was that it doesn’t do much help. They did not have time to do these assignments because of the time-table…it is packed … I don’t see how we can reduce it. (TEP)

The limited time was a pressing issue.

4.4.7 Summary of the findings from Teacher Educators’ interview

Under the strain posed by time and workload for both STs and TEs, the observed achievements and limitations with the training, and TEs’ feelings about it, they still managed to the best they could possibly do. They managed to offer the prospective teachers the content, pedagogies and opportunities to enact (through peer teaching) what they were learning in order to prepare them to teach in their subject areas. From the information TEs provided, the content and pedagogies embraced the domains of teacher knowledge in a “supportive context” Magnusson et al (1999) in which they extended STs’ knowledge with the discussions leading to conceptual change (scaffolding) through the two phases of the pre-service stage of teacher professional development though the extension was with some STs only. The STs on their side displayed some degree of professional development with some areas of concern. Those viewed by their TEs included lesson planning, teaching strategies and reflecting on their teaching. The next section presents and discusses the perspectives of the STs who were prepared by the same TEs whose perspectives have been presented.
PART III

4.5 Student Teachers

In this study, student teachers were the main focus as they were the cause for the concern. In exploring where the gap might be in the course of their training that led to the reported limitations in their classroom teaching during teaching practice, their involvement revealed how they viewed and felt about the extent to which their training in the Curriculum Studies courses prepared them to teach competently especially during Teaching Practice (TP). The major theoretical notion that underpinned this study was PCK. PCK blends the components of teacher knowledge which the prospective teacher is supposed to be equipped with through training, and the knowledge essentially manifests itself in practice.

The study therefore, attempted to establish STs’ teacher knowledge acquisition and development from training and learning on campus and in practice. To explore the pervasive theory-practice gap view in teacher education, the STs pre- and post-TP interviews were conducted to get their perceptions, opinions and actual experiences from the on-campus and in-school learning. The results of the two interviews are presented and discussed separately in Part III (a) and (b). Under each set of results basically five main areas though they might bear slightly different expression, in essence they look into: 1) what content, 2) how content was handled, 3) enactment and extension of learning, 4) link between the two phases, and 5) STs’ general views, concluded with the summary of the findings. The part that follows presents and discusses the findings from the pre-TP interviews.

PART III (a)

4.5.1 Pre-TP Interview for Biology and Physics Student Teachers

At that point when the STs had completed the coursework training on campus and ready to embark on actual classroom practice in schools, it was believed that they were in a position to relate their learning to teach in the Curriculum Studies courses to the envisaged learning opportunities during TP. The pre-TP interview created a platform for them to reflect on the envisioned contribution the course had afforded them for teaching with competence in the upcoming TP.
In the section that follows the content of the courses as perceived by STs is presented and discussed indicating the components of teacher knowledge and other emergent issues entailed.

4.5.1.1 Content entailed in Biology and Physics Curriculum Studies courses as perceived by student teachers

Student teachers expressed how they viewed the content of the training course in various ways revealing mostly the common issues which they elaborated as it appealed to them as individuals. Those views are discussed backed with some excerpts illustrating some expressions from verbatim transcriptions of the interview recordings. Table 12 indicates the training content common and particular for each Curriculum Studies course and the embodied elements of teacher knowledge and other pertinent issues that emerged.

Table 12 The content taught in the Biology and Physics Curriculum Studies courses according to STs and the embodied Teacher Knowledge components and emergent issues

<table>
<thead>
<tr>
<th>Curriculum Studies course content</th>
<th>Embodied Teacher Knowledge components and Emergent Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common</strong></td>
<td><strong>Particular</strong></td>
</tr>
<tr>
<td>• High school subject topics (content)</td>
<td>• Biology Unit/topic planning</td>
</tr>
<tr>
<td>• High school subject syllabus and books</td>
<td></td>
</tr>
<tr>
<td>• School context</td>
<td>• Physics Scheme of work</td>
</tr>
<tr>
<td>• Planning</td>
<td></td>
</tr>
<tr>
<td>• Teaching methods and strategies</td>
<td></td>
</tr>
<tr>
<td>• Handling students and their learning</td>
<td></td>
</tr>
<tr>
<td>• Learning theories</td>
<td></td>
</tr>
<tr>
<td>• Teaching aids and improvisation</td>
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</tbody>
</table>

The common content was expressed in different ways and the entire meaning got collected throughout the whole interview. From both groups of STs, the domains and components of teacher knowledge were entailed with the exception of assessment of students’ learning as an explicit topic, which otherwise was touched by STs when they prepared unit/topic plans as mentioned by some Biology STs. Although one might equate unit/topic plan to the scheme of
work, STs did not take it to be. Some STs in their response to the “what” content was taught mentioned quite a number of issues and in other cases there was need to keep probing the ST in order to make issues clearer as revealed in the given accounts of their responses. That was considered as their assimilation of what they had learned. One ST in deliberating on what she learned from the course attested:

...they somehow prepare us to sort of have that ability to transform the content that we have in the simpler manner that it can be understandable to the learners that we are going to teach, and the different teaching strategies that we can use taking in consideration that students have different learning abilities. Therefore they learn differently. That is to say when you use this strategy somebody understands and when you use this one somebody may not understand. So they sort of prepare us to have the diverse ways of teaching, the diverse ways of facilitating the learning of students. ... we learned about our preparation that we have to prepare lesson plan, scheme of work... the constructivism way is saying that I should consider the students having knowledge and the knowledge is constructed... we are basing ourselves on the syllabus and the syllabus itself has objectives that has[sic] to be achieved. So when I’m preparing for my lesson there are already objectives on the syllabus that have to be achieved, those objectives are guiding me on what I want the learners to achieve. (STP7)

This ST touched on a number of learned issues. At the centre of it all seems to be the students whose needs are to be met, leading to their understanding of what is taught in their varying capabilities backed by the learning theories. The syllabus with its objectives was the basis for the various teaching strategies though not singled out here. Lesson planning and facilitation revolved around the student.

Another ST acknowledged their having been prepared for the prevailing situations in some schools in Lesotho for which they were equipped with some ideas of working therein. In his words he said:

She used to refer to some situations that you might happen to come across when you are at high school. The school that I am going to do TP at, it is a new school so it has limited resources. So I think with what I have learned in Curriculum Studies I am going to be able to apply those techniques. In cases where there is shortage of lab equipment I think I am going to be able to improvise and be able to utilize all the resources that are available. (STB6)

Although the STs expressed to varying degree a number of teacher knowledge components entailed in the content offered in the Curriculum Studies courses, one ST still acknowledging having learned some essential content, had a lot of uncertainty about constructivism. She did not see the possibility of students constructing their own knowledge. In her words she said
…there is this constructivist way of learning… eo ho thoeng re e sebelise haholo (that we are encouraged to use mostly)...ke bona ‘na e nthatafaletsa the way ke neng ke nahana teaching e ka ba bobebe ka teng (I find it making it difficult for me the way I thought teaching would be easy), because students are different, …I don’t think it’s easy to construct a constructivist lesson… I find it difficult. Maybe socio-cultural can work, yes it can work. But this one ea hore bana (that children) can construct their own knowledge … maybe simply because ha ke so bone e etsahala (I have not seen it brought) into practice, ka hona kannelte ea nthatafalla (as a result truly it is difficult to me)….it’s more complicated. (STP13)

Assessment, one of the crucial elements of teacher knowledge was clearly missing as a part of the content dealt with as has been acknowledged by TEs too. The omission was recognized by all STs some already indicating their feeling of the impact of that omission. STB5 for instance said, “...assessment ... we didn’t do it, I am still not comfortable …no practice”. Assessment is an inherent feature of teaching and it is treated in the general pedagogical knowledge offered in Education Foundation (EDF) though in that case it was not specifically contextualized in the Curriculum Studies courses to make it specific to the teaching subjects.

Another ST expressing her view about assessing students’ learning said:

...assess… by questioning, concerning the content of the day… students to tell me what they have learned during that lesson… They will be mentioning everything… I don’t set certain questions, I just ask them to tell me what they have learned. (STB1)

That could be viewed to imply that the assessment (at the end of the lesson) would not be addressing the achievement of the set lesson objectives hence missing the basic purpose of it as a tool to ascertain progress and success or failure with teaching and learning. Regurgitation of what the teacher had said would neither be knowing nor understanding what was intended to be taught confirming what Gess-Newsome (1999) attests as a common occurrence with novice teachers to equate learning with remembering information. All STs took assessment as determining whether the students remembered what they had been given which would then be ranked as right or wrong. For all of them, despite their having studied the syllabus aims, objectives and learning outcomes among which the students were expected to develop certain skills did not realize that determining the accuracy/precision with which the student operates a scientific instrument was assessment. In particular, STB2 even after a lengthy discussion of the issue still remained doubtful.

The researcher had the opinion that the STs in both courses were provided the knowledge they needed as teachers and how they would then help students learn. However, STP13 in particular,
seemed to have mixed feelings and actually sounded dissatisfied and doubtful with constructivist theory advocated by the TE. The next section looks into how TEs handled the content in their training lessons as perceived by STs.

4.5.1.2 The methodologies and pedagogies in Biology and Physics Curriculum Studies courses as perceived by student teachers

The STs in their dual status as learners and prospective teachers were taught the art and science of teaching for their consumption but at the same time requiring them to project their knowledge into their work in the future. That was implied by their learning about the high school curriculum (the syllabus, textbooks and contexts). TEs had their own way of conducting the training lessons in which they enacted and advocated teaching strategies appropriate for the specific subjects/topics. That could be making their pedagogical approaches accessible to STs, who might be learning from TE’s practical example, giving them concrete pointers for their teaching practice (Koster, et al., 2016).

Since teaching is mainly in action, it could be expected that prospective teachers would be provided the opportunities for practical experiences with the learned issues. TEs’ training methodologies were more or less the same with a difference in STs’ expressions. For instance, STs in one course would be talking of discussion as the main training approach by TE, and in the other they would be talking of classroom talk, the essence of both being the same in that they involved student-student and student-instructor deliberations. Table 12 depicts the “how” STs in the two courses experienced their training in learning to teach from which the components of teacher knowledge and emergent issues were drawn.

Table 13 The methodologies and pedagogies employed and taught in the Biology and Physics Curriculum Studies courses according to STS and the embodied teacher knowledge components and the emergent issues

<table>
<thead>
<tr>
<th>Common Curriculum Studies course methodologies and pedagogies</th>
<th>Embodied Teacher Knowledge elements and Emergent Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>•Discussion/classroom talk</td>
<td>•Content Knowledge</td>
</tr>
<tr>
<td>•Lecturing</td>
<td>•Pedagogical Knowledge</td>
</tr>
<tr>
<td>•STs’ tasks (assignments and presentations)</td>
<td>•Pedagogical Content Knowledge</td>
</tr>
<tr>
<td>•Reading material</td>
<td>- Orientations to science subject teaching</td>
</tr>
<tr>
<td>•STs’ practice teaching (peer teaching)</td>
<td>- Teaching Strategies</td>
</tr>
<tr>
<td>•Assessment of STs’ learning</td>
<td>- Students’ Understanding</td>
</tr>
<tr>
<td></td>
<td>- School Curriculum</td>
</tr>
</tbody>
</table>
The training lessons engaged both TEs and STs in varying ways to enable the teaching and learning of the “what and the how” to teach in their teaching subjects embracing all teacher knowledge domains and some teacher qualities.

STs expressed varying perceptions and feelings about methodologies and the pedagogies employed in the coursework training. Basically, the methodologies included provision of information coupled with STs’ working with that information, and some practice with the learned issues. The pedagogies were those employed by TEs in their teaching and those that they advocated as appropriate for the teaching of the subjects and topics. Some examples of the portrayal of the ways (not exhaustive) they were trained on were:

What she demonstrated most was the interactive lecture, she involved us in her instruction. We didn’t necessarily have time to maybe do the experiments, it was given as the information to consider... we were given different learning strategies and we were told to go home and research and then present on them. (STB6)

Most of the time kannete (truly) he was telling us what to do … o na demonstrate-a ka hore tsatsi le leng le le leng e ne e le een a ntsa bua (he was demonstrating by talking every day). By lecturing, most of the work was done by him because most of the theories and methods that he told us to use he did not give us a chance for doing them. We were comparing the…the syllabus and the …(pause) …and the topics in the books and try to understand err… how we can approach those topics. (STP12)

Bringing in more information concerning the teaching in this same course STP2 stated:

We were taught many theories. .. tse hlalosang hore na (explaining) how do students learn. We covered most of the theories and then compared them. And then we were told which ones are the best to be used. We would be asked to maybe use say, use a socio-cultural theory to construct a lesson plan or maybe construct a lesson plan that is based on the constructivism. (STP2)

Although STs were provided the essential information required by a teacher and involved in their learning through searching for information from various sources and then discussing and presenting on the issues, they sounded earning for practice with the learned issues.

On creating the opportunities for STs to engage in practice teaching, TEs focused STs’ practice on what they deemed necessary ranging from the syllabus learning outcomes, teaching methods/strategies and theories based on the identified high school subject content on which they would be assessed as well. One ST pointed out a number of issues he felt they were afforded through practice teaching in peer teaching sessions such as extracting the appropriate content
from the syllabus to meet the stated learning outcomes as they drew the lesson plans. In the process the ST would be developing the essential skills and getting to understand the content better which upon presenting before her/his peers s/he would develop the confidence of facing the people. He expressed his perception thus:

E thusa batho ba bangata ba be confident ho ema ka pel’a batho. E re thusa hore re tsebe ho plan-a joaloka ha re tla be ntse re etsa lilesson plan each time ha re lo ruta. E re thusa to extract content from the learning outcomes tse re tla be re li fuoe syllabuseng. U tsebe those methods tseo u ka li sebelisang to teach a certain topic. Motho u fumane hore ka nako e ‘ngoe u coverile le those topics tseo u neng u sa li utloisise, u qetelle u li utloisisa (It helps many people to be confident to stand before people. It helps us to extract content from the learning outcomes that we would be given from the syllabus. You should know those methods that you might use to teach a certain topic. You find that sometimes you have covered even those topics that you did not quite understand, you end up understanding them). (STB11)

However, there seemed to be a great challenge concerning planning a lesson for peer teaching sessions that depicted constructivist theory as stated by two STs quoted below. One of them sounded overwhelmed by not observing it from TE’s own teaching. She wished they could be provided an opportunity to observe it in practice. They had this to say:

Ha ke ne ke ea training eo ea [mentioning the course] ke ne ke ea ke ingoaile hlooho, ‘kore e be se il’o ba the constructivist way of teaching. Hobane’ng re sa nkuoeng ra isoa kae kae moo re l’o bonang this thing e etsahala? Hobaneneng ha re s’o ka re bona ho rutoa ka tsel a e re ka reng nthoee, theory ee e apply-a teng!’ (When I went for training in [mentioning the course] I went having scratched my head, ‘now it’s going to be the constructivist way of teaching. Why are we not taken somewhere to observe this thing happening? Because we have not seen where teaching is done in a manner that we can say this thing, this theory applies!’) (STP13)

What I have seen is that this thing of working on lesson planning in Curriculum Studies I see a mess … I have seen that there is a lot of problem with the method we were required to use by the instructor because what he stressed on was that the lesson plan should show that you are planning your lesson plan in a constructivism way. (STP7)

All STs referred to students’ interactions among themselves and with the TE sharing ideas as a way of learning from one another. From there the TE extended their learning on the basis of what they themselves already knew. One would take that to reflect constructivism. However, their expressed worry about constructivist theory made one wonder what could have been the problem they really had with the theory. But it could be sensed that they had not developed an insight into what knowledge construction by students meant. One might take it that the explanation and enactment of the theory might have not been made explicit and understandable which is a fundamental element in teaching-learning scenario. The STs had not quite got the meaning of the
theory hence it could not have been easy to use it appropriately either in their planning or teaching. In proposing “critical pedagogy” Kirk (1986) points out that student teachers should see the “usefulness” and “meaningfulness” of the knowledge they are made to acquire in that way assimilating the knowledge which relied on their capacity as individuals. In the cited views of the STs one wonders how much effort they had exerted in trying to understand and apply the theory.

Socio-cultural theory which STP13 found possible to use, one could take it as basically constructivism in a social context to which individuals bring their own conceptions of the phenomena upon which they would modify their already existing knowledge hence developing the new constructs. It is therefore saying that planning for collaborative learning (group work as STs commonly referred to it) would be creating a setting for multiple “zones of proximal development” (ZPD) alluded to by Morine-Dershimer and Kent (1999) in their discussion of instructional models and strategies as one of the principles identified by Brown (1997) for learning communities. There was on one hand no reason for that apparent confusion while on the other it might be saying something about TE’s way of doing things in the training lessons. If, as indicated, TEs’ major mode of training was through talking, there remained that doubt which STP13 felt could have been alleviated by having been afforded the opportunity to observe the application of the theory in actual practice. That could be by the TE’s enactment and/or in actual school situation by either the TE or the regular teacher.

Already, one might imagine a situation where the STs would struggle with putting that theory into practice despite the fact that the course synopses included learner-centered approaches which are underpinned by such theories that the STs seemed to have a problem with. The situation that according to Korthagen and Kessels (1999), does not help to connect practice and theory, where prospective teachers are trained by being taught the theories that are hoped to be transformed and incorporated effectively in classroom teaching.

All in all, TEs for both courses basically employed didactic approach in their training lessons. Still there were essential aspects of the approaches employed by TEs from which the STs could draw for their classroom practice and extent their learning to teach. How the “what and the how” the on-campus training would influence their teaching during TP is the subject of discussion that follows.
4.5.1.3 Envisaged enactment and extension by the STs of the “what and the how” of the Biology and Physics Curriculum Studies courses

All STs reported that despite the challenges they observed with the training methodologies and pedagogies, they had learned to plan for a lesson and to some extent learning to teach through teaching their peers, they would be able to teach students during teaching practice. They said that coursework training had developed their content knowledge, pedagogical knowledge and the pedagogical content knowledge with its inherent components as well as the essential qualities one mentioned by most of them being confidence. They reflected those domains in expressions such as:

We were taught how to plan for a certain topic or a lesson, so this is going to help because we will be in a position to plan so that we may teach ... we will be in a position to impart knowledge that is required for the learners. (STB4)

Now I have to prepare, I think now I can teach any topic because even if say I didn’t understand it when I was in high school, but I think now am in a level to understand it better... if there is something I don’t understand I can go to the internet. (STP7)

Standing before people helps to develop confidence. You will be able to teach any topic to learners...confidence helps a teacher to teach learners because sometimes you can read books but if you are not confident enough you cannot be able to teach those learners the way they will understand that topic. (STB10)

Only one ST from the Physics group and none from Biology, as a way of personally doing something to consciously further learn how to teach mentioned that they ran their own practice with other colleagues. Surprisingly none of those colleagues hinted that they had such a practice where they would peer teach on their own within an increased time, more that the 7 minutes that was formerly allocated in the training practice sessions. However that does not make one doubt as those others might have not seen it worth mentioning in that case. Almost all STs said they went extra mile beyond assigned reading, read more and surfed the internet on issues pertaining to the issues taught which they hoped to carry on with during TP. A reasonable number of them foresaw the possibility of extending their learning through observing and being assisted by experienced teachers during TP. One ST in the whole study group mentioned the students as possible inspiration for her further learning saying:
I am going to try to learn together with the students because I still believe that I am a student also, and try to improve the content. Because I believe as I teach I will also be learning somehow and whatever that I do I will take it as learning to me. (STB3)

Although their TEs essentially taught them through telling the expected, their involving them in various ways and mostly engaging them in collaborative learning and searching for information were deemed applicable at high school. There were some elements of their practices however that they would not readily emulate in teaching the school students especially because they deemed their level of education and age as quite different and as a result would have a different influence on the manner the teaching could be conducted. For instance:

Honestly I can’t employ them because secondary level bana ba hloka more guidance than rona level-ng eo re leng ho eona. Ba hloka facilitator el’ore time and again o tla nna a ba check-e, a etse some things le bona a nts’a connect-a ho ea pele (students need more guidance than us at the level we are. They need a facilitator who time and again would be checking on them, doing some things with them making connections as they move on). (STP8)

The fact that the STs had not had practice with actual students, there was still some uncertainty since students with their diverse backgrounds would influence the way the teacher conducted her/his teaching. Cohen & Grossman (2016) do confirm that students have a great influence on the manner in which a teacher facilitates the teaching.

Since I haven’t taught at all, I haven’t met the students, the learners and all, I don’t know, I cannot say I am really, really ready because sometimes the method depends on the students that you teach, how they behave and how well they are equipped with the knowledge that you are about to present to them. (STB3)

The other uncertainty with the impact of the learned pedagogies revealed the influence of the exposure to different learning situations and levels, presenting the link between the past, present and the future (Miller and Shifflet, 2016). In particular STP5 expressed that influence in these words:

I want to implement what I’ve learned ha ke kena class’eng (when I get into class). It’s still confusing le mokhoa oo ke neng ke rutoa ka oona high school hore (with the manner in which I was taught at high school that) how do I not become my Physics teacher at high school? I really don’t want to become my Physics teacher at High School. She was terrible. (STP5)

At least with that ST the negative experience from high school teaching had been influenced by the experience in teacher training hence bringing hope that though the ST might still be struggling to grasp the desirable ways of teaching, he was aiming for a better disposition.
The lesson plan format used requires ST to reflect on every lesson and 7 Biology and 6 Physics STs explicitly indicated lesson reflection as a crucial aspect that would contribute positively to their further learning to teach. Expressed by some rhus:

... reflecting on my lesson... this happened because ke le ka etsa tjena so ha nka ka tlohela ntho e itseng, problem ena e ke ea hlotse e etsahala then you are improving in that way. Ha u ntsu u minimise-a liphoso, that means u nts’u nepa hangata hangata that means oa improve-a, and yah, you are learning. (...this happened because I did this, so if I stop a certain thing, this problem will not happen again then you are improving in that way. When you are minimizing mistakes, that means you are doing well over and over, that means you are improving, and yah, you are learning). (STB5)

The intention of my improvement is to go teach and evaluate myself with the help of other capable people. From the evaluation ebe ke nka tse fosahetseng (I pick the wrong ones), I see hore na (whether) is the problem with the teaching strategies kapo (or) problem ke ka mokhoa oo nna ke etsang lintho ka teng? (is the way I do things?) then from there ke tlo improve-a (I am going to improve). (STP8)

Although almost all STs further pointed out that the experienced teachers, especially the TPTs and the visiting TEs would provide further guidance for them to keep learning how to teach, STB1 did not think the practice phase was a platform for learning but for her to practice what she had learned, hence she could not imagine teachers in the practice school having anything to contribute for her professional development. Her views are captured in the conversation depicted below.

Interviewer: How do you intend to help yourself learn to teach during Teaching Practice?

Interviewee: I think (pause) I don’t know, but I think I have learned enough for teaching. For me what is left it’s just help students to adjust to my styles which I will be providing.

Interviewer: So you feel there is no more room for you to learn anything new, you have it all, is that what you are implying?

Interviewee: Yes madam. Only what is left for me is to discover the type of students I will be teaching and help them to familiarize them with the methods or styles of learning that can help them to find Biology simple.

Interviewer: But as for you, there isn’t anything new that you feel you can learn during Teaching Practice?
Interviewee: Only that I have learnt. I think for now what I have learnt it’s enough, is just for me to bring it into practice.

With further probing the ST finally identified an area where she might get something from the regular practicing teachers in the practice school even though she still insisted that all she would need would be just being told of the discipline policy. She said:

> Classroom management, I am going to learn. It’s the one I am going to learn more… by being told the rules and regulations. Through them, I will be able to know which approach to involve. I as an individual I will have to figure out on how to handle such students following certain rules and regulations. (STB1)

Still, the ST did not take that the provision of rules and regulations was a significant contribution with underlying aspects pertaining to teaching and learning. She believed she would device the means to manage her class on the basis of those rules and regulations which was the expectation as could have been with any other aspect of teaching. That said her conception of classroom management was quite limited because it was apparent that she was merely thinking of student discipline with no relation to their learning and her teaching. In talking of classroom organization and management, Morine-Dershimer & Kent (1999:25) indicate that it does not only entail expectations in relation to behavior but also include “academic work standards” and “classroom procedures”. But it includes all that a teacher does which could influence the classroom environment that in turn impacts on both academic and social-emotional learning which reveals the limited scope the ST held about classroom management.

Since she felt she had it all, as a way of arousing her awareness that learning was a continuing process all the time (for both novice and veteran teachers) which was within the boundaries of this study, the following question was posed:

Interviewer: Do you think there is anything that you are going to contribute to the development, professional development of the teachers in your practice school?

Interviewee: Yes madam. The way I am going to be teaching, it’s going to (pause), I think they are going to be interested in the way I will be teaching. So, they will be the ones coming to consult me on how do I do this thing of teaching.

STB1 expressed confidence and belief that she was ready despite the fact that in the process of the interview she had indicated some limitations she had observed with her practice during peer
teaching, one example being: “I am not good in expressing myself... during the teaching I haven’t managed to clearly express myself. The more I try to be simplest the more I become complex”. She still could not work out the means of either working on the shortcoming on her own or give herself the opportunity of learning the possible means from experienced teachers. One would take her limitation as a serious one because basically teaching is about transforming content to be communicated for students’ understanding as well as giving instructions to students.

On the contrary, STB8 having been embarrassed by failing to answer questions during her second round of peer teaching because she had not done her preparation and planning due to her laziness, she resolved to correct the situation by planning to take time to read a lot and plan thoroughly in advance during TP. Having considered the foundation laid by coursework training for classroom practice and further learning in and from practice, the observed link between the two phases of the training stage is presented and discussed in the following section.

4.5.1.4 Linking Coursework Training and Teaching Practice

STs from both courses unanimously declared peer teaching (used interchangeably with micro teaching in some cases, though different) as the most important link of the coursework and practice phase despite the shortcomings they strongly pointed out. They noted and read about the school subject content as they studied the syllabus, drew scheme of work and lesson plan on some topics. They all proclaimed that although they were not aware of the topics and the levels they would be allocated when they got to TP and thus not very certain about how well they might do it, nonetheless, they were prepared to meet the challenge. They said they could stand before people to teach and had become aware of their strengths and weaknesses from the feedback they got from peer teaching sessions.

They further stressed the significance of lesson planning as a vital tool that they would use to guide their practice in which all factors that come into play for teaching and learning were considered. Those same factors also form building blocks of PCK which constitute the essential knowledge for a teacher. However, some STs adamantly stated the limitations they observed despite the inherent effectiveness of lesson planning and peer teaching revealed in the following quotes:
I have been taught how to teach and I have been given a privilege to do microteaching [peer teaching], teaching my colleagues and I did see that I can teach students. (STP6)

Micro [peer] teaching was the best I think. We were able to stand in front of our peers, and they were able to judge or try to help us in what we did wrong or did right. That helped us to know what I can do best … where I can improve my teaching. I feel like it’s not enough... I think it’s a greater challenge if we go to schools and maybe we are not really equipped in handling the experimental equipment and substances. (STB3)

Micro [peer] teaching returns to elementary (we are doing it minimally) and what I see about it is, we teach people who already know… ho nna (to me) I feel like we should maybe micro teach bana ba banyenyana (smaller children), the people be re l’o teana le bona ha re fihla field-eng (the people that we are going to meet when we get to the field). ... re ke re ntsuoe re ee likolong tsa li high school (we be taken out into high schools), teach and see how it goes then come back, self reflect and re khutle (go back again). Ha re etsa joalo ke utloa ekare e effective ho feta ha re e etsetsa holima rona as li classmate, licolleague (When we are doing that I feel like it is more effective than when we do it with us as classmates, colleagues) ... ke ee utloe e sa mpe the whole classroom experience e ke e hlokang (I find it not giving me the whole classroom experience that I need). Re ruta 7 minutes lesson ea 40 minutes (We teach a 40 minutes lesson in 7 minutes) so you have to… hore u cut-e lintho tse ngata tseo u n’u tl’o li etsa lesson-eng ea hao u entseng lesson plan ebe u ruta lintho tsa bohlokoa feela and cover it up kapelenyana (cut many things you were going to do in your lesson per lesson plan then you teach important things only and cover it up fast). ...nna ke hloka experience eo ke reng ke batla nke ke eo bona batho bana (...personally I need experience that I say I need to see these people [school students]). (STP9)

Duration, number of practice sessions through peer teaching hence not dealing with all the essentials for teaching, and practicing out of context worried STs mostly. One would imagine a situation where the issues not dealt with, not handling real students and fitting the planned work within the given time could create some challenges for STs during practice in schools. The next section discusses STs’ general views about their coursework training and its link with teaching practice they were going to engage in.

4.5.1.5 General views of STs about Biology and Physics Curriculum Studies courses

In general, STs appreciated the contribution that the training in the Curriculum Studies courses afforded them. Even so, they observed some impeding factors suggesting the probable means that could be considered. They primarily talked of the duration of the courses which they actually did in a semester instead of the academic year (two semesters) that it was allocated, and the practice they had with teaching. With their propositions they validated that student teachers were not only the recipients of the curriculum but they had a contribution to make for its designing and improvement (Kirk, 1986). Their educators attested from the interviews that STs’ views
would be taken on at the time of reviewing the program and its courses for their improvement. Some of their views were expressed in these words:

The way we were being trained e ne fana ka monyetla oa hore we should be responsible, ... hore re ebe re fuoa litask, e ne re fa monyetla oa hore now re se re tšepetsoe hore re ka etsa something for ourselves. Then e ne le perfect at this level because ho ne ho sa hlokahale hore ebe re ntse re push-oa like batho ba irresponsible. (The way we were being trained was giving a chance that we should be responsible, ... the fact that we were given tasks, that gave us a chance that now we were trusted that we could do something ourselves. Then it was perfect at this level because it was not necessary for us to be pushed like irresponsible people). (STP8)

If as science education students, we had our own faculty and our own institution, we could learn better. We have a lot of pressure from doing laboratory reports from the FOST [Faculty of Science and Technology]. Sometimes we are not able to give our all to our science education studies but we give our all to our FOST science studies. Increase time for learning more in approaching students... more time to understand how to bring the content we have to the level of students, employ that content through experimentation ... we will be able to do the experiments more effectively. It is not enough to do them for three hours a week...three years of content and one year of Curriculum Studies. If we did the Curriculum Studies only the whole semester, we should, from 8 o’clock till 5. (STB3)

The STs raised issues that suggest what might be termed professional thinking because what they were saying was aligned to them as both learners and the teachers-to-be including their work as teachers. STB3 extended her look into the matter to the structural and procedural aspects of the institution.

4.5.1.6 Summary of the findings from Biology and Physics Student Teachers’ pre-TP interview

The information that the interview provided though expressed in varied ways, STs were aware of what their training courses entailed and how the training was conducted. They were able to relate what they had learned in the coursework to the practice phase they would be engaged in, readily indicating the deficits and the impact they detected then and probably on their practice endeavor later on. The interview thus made STs to reflect on part of the training they had undergone and further reflect for the upcoming level of their training, relating the two phases of one stage (initial) of teacher professional development. The specific strengths and shortcomings identified by STs with the Biology and Physics Curriculum Studies courses studied might eventually enable the researcher to establish what might be inhibiting the STs’ competent merger of theory and practice, and the development of PCK as the gist of teacher’s work. The succeeding Part III (b) presents the findings from the interview conducted after STs had had the experience with actual classroom teaching.
PART III (b)

4.5.2 Post-TP interview for Biology and Physics Student Teachers

In pursuit of establishing the probable cause(s) of the apparent limitations reported in connection with STs’ classroom performance during teaching practice, the researcher further elicited their perceptions and feelings about the training in the two phases of pre-service stage after TP. The premise for that was to understand how they perceived and felt about their actual practice in relation to their anticipations of the influence the training they underwent on campus in coursework would have on their practice. Since they had then been exposed to the actual classroom teaching, they were at that point required to reflect and relate their experiences and views with the whole training. That information was elicited with a hope that it would shed light indicating the ways in which the theoretical knowledge they had acquired had been aligned with practice. In other words, it was hoped that it could to some significant degree reveal how the learning in the two phases might have helped them to develop their pedagogical content knowledge during on-campus and in-school learning. Zeichner (2010) posits that teaching practice for STs should be more about their learning rather than their enacting what they had learned. However, their learning could not be divorced from their practice which would be enacting what they had learned. Even though that was still the learning phase for the STs, the purpose was not to explore the degree of the development of their PCK then, rather, to establish the teacher knowledge domains that were recognized and explored during practice with the reason for their choice and the observed effect on students’ learning.

By bringing together the factors that contributed to their professional learning and development during practice the STs did not only indicate how TP experience had been of value to them, but they also unraveled the actual areas in which they had developed as teachers. That was taken to confirm the importance of teaching practice as a phase in the initial teacher training stage of teachers. It also revealed the ways in which the two phases related, thus addressing the practice-theory issue that Kirk (1986) maintains should be dialectic. In possibly identifying the areas in which STs were lacking, that would then help to improve the coursework training and TP procedures for their better performance in practice.

Similar to the pre-TP interview, the focal aspects of coursework training, in that practice phase interview, the areas reported on, were still content and pedagogies in the Curriculum Studies
courses in connection with TP, the link between the inherent aspects of teacher training - theory and practice, the actual enactment of the acquired knowledge and STs’ general views and feelings. The section that follows looks into the training content that was said to have played a role in STs’ further learning to teach in and from practice.

4.5.2.1 The content from Biology and Physics Curriculum Studies courses that contributed to STs’ professional learning during TP as perceived by STs

The content issues that the STs identified as having had some influence on their practice are discussed backed with some quotes from the interview transcripts to elaborate on the nature of the impact they experienced. Table 14 lists the named aspects of content that STs considered having played a significant role during their practice teaching. Also in the table is indicated whether the topics taught during TP were the same as those treated during coursework training. The last column gives the list of the identified themes.

Table 14 The content from Biology and Physics Curriculum Studies courses that contributed to STs’ professional learning during TP

<table>
<thead>
<tr>
<th>Common issues considered helpful</th>
<th>Biology (N=8)</th>
<th>Physics (N=10)</th>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• High school subject topics (content)</td>
<td>Different from that dealt with during TP (5) Deal with during coursework training (3)</td>
<td>Different from that dealt with during TP (8) Deal with during coursework training (2 – JC)</td>
<td>• Content knowledge • Pedagogical knowledge • Pedagogical content knowledge - Students understanding - Curriculum - Orientations towards teaching Biology and Physics • Teacher qualities • Learning opportunities • Reflection</td>
</tr>
<tr>
<td>• High school subject syllabus</td>
<td>Senior level: LGCSE (5), IGCSE (1) JC: (2)</td>
<td>Senior Level: LGCSE (8) Junior level: JC Science (2)</td>
<td></td>
</tr>
<tr>
<td>• Teaching methods and strategies/ representations enacted</td>
<td>Discussion (8), lecturing (8), group work (8), students experimentation (7), students searching for information (8) teacher demonstration (8), teaching aids (8), improvisation (8), analogy (1), everyday experiences (3)</td>
<td>Discussion/classroom talk (10), lecturing (8), group work (8), students experimentation (9), students searching for information (8), teacher demonstration (10), teaching aids (10), improvisation (9), analogy (2), everyday experiences (2)</td>
<td></td>
</tr>
<tr>
<td>Learning theories</td>
<td>Explicit (2) Implicit (6)</td>
<td>Explicit (5) Implicit (5)</td>
<td></td>
</tr>
<tr>
<td>• Planning</td>
<td>All (8)</td>
<td>(9) (1) – not helpful</td>
<td></td>
</tr>
<tr>
<td>• Lesson reflection/self-evaluation</td>
<td>Explicit (8)</td>
<td>Explicit (9) Implicit (1)</td>
<td></td>
</tr>
</tbody>
</table>
The identification of these common issues was based on the focal concepts of the research questions and they are discussed in the ensuing sections. Although STs considered the captured areas of the training content as having been put on practice and had a bearing, in some cases those areas were instantly given in explicit terms, in other cases they were recognized as a result of probing. In yet other cases some STs did not find such areas having played a role in their development though it was implied in some way that there was some effect though gone unnoticed. Some of their views regarding the identified content issues are captured in the quotes.

The training content for STs in the Curriculum Studies courses comprised theoretical subject content and pedagogical knowledge (taught/advocated and enacted by TE) with their blend (PCK) learned in practice during peer teaching. The discussion captures mainly the areas where the domains of teacher knowledge were reflected and some peculiar emerging issues. The presented quotes are those that expressed and presented the perspective in a manner that the researcher could clearly detect some elements of the issues in the research questions. The cases of STs who expressed the same issues in different words, are left out to avoid repetition. But where the similar issues are expressed but in a different context, those are picked and appear elsewhere in the chapter. There are those who explicitly mentioned the areas of their coursework training that they highly recognized as having impacted on their practice. For instance, STB5 claimed:

“Teaching methods and theories of teaching were the most helpful, and the high school content …it helped us recall what we were going to teach. Content from high school, and content from Biology department and the teaching methods from the Department of Science Education … when you combine all those three things li khona hore li etse hore u be (they enable you to be)... confident enough...” (STB5)

STB5 here picked on methods, theories and school subject content. He went further to indicate that the experiences from other areas of study (high school and university departments/faculties) helped to develop confidence as an essential quality for a teacher. That was an indication that the experiences from different areas one had been exposed to, do have an impact on other learning
encounters hence affecting one’s interpretation and understanding of what was being learned (Lee & Schallert, 2016, Miller & Shifflet, 2016).

STs’ use of the school syllabus was mostly implied and in a few cases explicitly talked of. For instance, STP10 used the syllabus “when preparing tests based on certain goals which were also used to motivate students”. STB5 reiterated how they learned about the syllabus and how that learning later helped him in his field experience, knowing the purpose of teaching that curriculum. He stated:

We looked at the syllabus, its demands, the aims ... how to assess and everything that come [sic] in the first pages of the syllabus. So I found it very important and helping ha ke ruta (when I teach) because I know why I am teaching. I am not just teaching because they need to know this, but why should they know this, because re batla ba tlo tla ba (we want them to be) somebody in the future. So, how are we helping these people develop that character? But when you know hore na Lesotho le batla’ng ha le ne le etsa curriculum enana (what Lesotho wanted when it developed this curriculum), of which this curriculum ena re e learn-ne mona (we learned it here). Ha u tseba na e batla’ng (when you know what it demands), you are able to deliver this information in such a way that one of those aims can be fulfilled because we know that it’s not all the students ba re ba rutang (that we teach) who will be scientists. (STB5)

Another ST from the same group said:

Ho rutoa ho interpret-a the syllabus ea Biology ... ha ke fihla teaching practicing ha e ne ba e le first time ea ka ke bona syllabus kapo ke e interpret-a ke ne nka nna ka sokola. Empa ka ha ho tloha mona ke la ka rutoa hore na ke e interpret-e joang, ke etse linotes joang li tle li fihle baneng li nepahetse, e la nthusa haholo mono. Hobane lipeer teaching re ne re fuoa lilearning outcome, ha u qeta ebe rea li submit-a pele ho bonoe hore na li nepahetse. Ebe ke hona motho a tl’o lo etsa peer teaching (Being taught to interpret the Biology syllabus ...if when I got to teaching practice and it was my first time to see the syllabus or to interpret it I might struggle. But because I left here having been taught how to interpret it, how to make notes for them to reach the students in an appropriate state, there it helped me a great deal. Because for peer teachings we were given the learning outcome, when we were done we submitted before to be checked if they were proper. Then one would do peer teaching). (STB9)

The STs imply that the study of the syllabus directed their teaching through its goals, aims objectives and learning outcomes. Although almost all of them taught different topics from those they practiced with during coursework training, they acknowledged their teaching such topics having been made possible by their having learned to use and interpret the syllabus and lesson planning. Another ST revealed her recognition of the vertical structure of the spiral science syllabus and appreciated the role played by the Curriculum Studies course in indicating the need for a teacher to consider the level at which they would be teaching and the appropriate ways of making the content accessible to the students as PCK affirms. She stated:
Level eo re ithutang lintho ka eona mona ea differ-a from level e bana bane ba ithutang ka eona. Although content e ntse e le e tšoanang, mohlala, concept ea current, haeba joale ke ruta current; ke shebile buka ea bona hore na to what level current e rutoang ka eona mona leveleng ea bona. Curriculum Studies eo re e etsang e u ruta hore u tsebe hore u tlame sa hore u le mokhoa oa hore the very same thing u e fetisetsa baneng ka tsela e ngoe e tla etsa hore e be ka tsela e utloisisehang ho bona. Ebile e u thusa hore haeba re bua ka current, ha e fihla baneng bana u tlame sa ho sheba syllabus ea bona. Syllabus ea bona e re ke fihle mona, mona le mane. Hona joale ha ke re the very same concept ea current u tl’o fumana hore ha u fihla Form C, e ntse e le teng feela e se e batla e nyolonyolotse amount ea lintho tseo ke tšoanetseng ke ba rute tsona ka current. Ha u fihla Form D e ntse e le teng. Form five e ntse e le teng. Mona universiting e teng. E se e le taba ea hore na curriculum, syllabus ea bona moo e re’ng. (The level at which we study things differs from the level at which students learn. Although the content might be the same, for instance, the concept of current, if now I am teaching current; I have looked into their book to note to what level current is taught at this level. Curriculum Studies that we do teaches you that you ought to have a way of teaching the very same thing to students in a manner that it is understandable to them. It also helps you in that if we are talking of current, when it comes to these students you should look into their syllabus. Their syllabus says I should get as far as here, here and there. Now the very same concept of current you will find it in Form C, it is still there but with a bit more amount of the things that you are to teach to them under current. When you get to Form D it is still there. Form five it is still there. Here at the university it’s there. It is a matter of what the curriculum, their syllabus there is saying).

Lesson planning that STs learned about in their on-campus training which also is an integral part of teacher knowledge was said to have had an impact on their teaching and development as reflected in the following excerpt.

When planning the lesson I was now like planning for the slow learners and also managing and trying to look for extra work which could be needed for students who understood faster than those who didn’t so that at the end of the class all students will have understood. (STP9)

The ST here coupled students’ learning with his planning. In as much as the STs appreciated the contribution of lesson planning in making their teaching with success possible, they however had some concerns. For some, it took them time to understand, draw and apply the lesson plan appropriately. For STP10, the planning was not a problem but rather the timing of the lesson, content, activities and stages. In her words she said; “... it took me time to adjust to the 40 minutes period because here we were doing microteaching [peer teaching] of 7 minutes, but eventually I got it ... Not the planning itself and what goes into it” (STP10). All Biology STs and all except one ST in the Physics group acknowledged that lesson planning helped in guiding their teaching even though all of them again clearly struggled at the beginning and gradually improved the skill.
However, the extreme case was that of one ST who did not in any way acknowledge the importance of lesson planning. In her words she said:

 Seriously, I don’t even know why lesson plans are made because something that I am going to teach, it’s in me. I don’t have to put it down because when I get there in the class I don’t check or keep checking the lesson plan. I just give something that I have. Even the activities I might write the activities or the exercises in the lesson plan only to find that I don’t use those exercises, I use the ones that (pause) really I don’t find them helpful. (STP13)

Here one senses the attitude of a ST who takes a teacher as someone “having-it-all on the finger tips” from where s/he would readily draw ideas to suit the prevailing situation. Although one might be expected to be fast in thinking, working out what could be done then acting accordingly one could take it that during fore planning, such reactions could have formed part of what could be reserved as Plan B which also reasonably should have been thought about critically with an informed mind. One might conclude that this ST acted on impulse therefore leaving little room for the learned reasonable theories and pedagogies. In contrast to this ST’s view, STB 5 expressed the importance of planning for the lesson as he would have imagined the possibilities and how to deal with them. He puts it thus:

Nna lesson plan e nthusitse haholo to think before class e qala ke be le picture ea hore na lesson e tlo tsamaea joang (Personally lesson plan has helped me to think before the start of the class to have a picture of how the lesson will run). Ke eona nthro eo ke boneng eka e ne e contribute-a e kholo ho nna because you plan hore during the introduction ke tlo botsa potso tsenana and ke expectile hore ba tlo re tjena ha ba araba (It is one thing that I realized to have had a great contribution to me because you plan that during the introduction I am going to ask these questions and I am expecting them to say this in response). During teaching ke tla nne ke botse potso tse itseng, ke tl’o fana ka mehlala e itseng. (During teaching I would be asking certain questions, I will give certain examples). So ke bone e khona hore situation e ka hlaeang within presentation or during nako ka hara class e se that much surprise. Because ne se ntse ke ngotse hore na what would be happening. And haeba nthoena e hlaile tjenaana I thought beyond. Kore pele ho class hore e ka nna ea etsahala (So I realized that for any situation that might crop up within presentation or during the time in class was not that much surprise. Because I had already written down what would be happening, And if this thing happened in this manner I thought beyond. That is before class that it might happen). So ke tlamehetse ke tsebe hore na ke tl’o react-a joang ha ho etsahala nthoe itseng (So I must know how I am going to react when something happens). (STB5)

The lesson plan format used by STs during TP requires them to reflect after each lesson. STs revealed mixed experiences with reflection. For instance, STB5 who sounded to appreciate the likely effect of lesson planning so much, when it came to reflecting on his lesson, he sounded mixed up. He attests:
I would know hore na hantle-ntle the major things tse ke leng sure hore ha lia tsamaisa class eane hantle ke lifeng, and ke tlo try-ea ho li avoid-a in the new lesson even though ho ngola e ne e le eona ntho e seng bonolo (I would know quite well the major things that I am sure they had not made that particular class to go well, and I will try to avoid them in the new lesson even though writing them down was not an easy thing). Hore joale ke re now I crucify myself ke re monana kannete ke entse ntho tse itseng tse itseng (To say now I crucify myself saying here really I have done such and such things). I would keep postponing it [lesson reflection]. Feela, (but) ha ke ea (when I go) to the new lesson I know in mind hore (that) this one eona ha ea ka ea nsebeletsas(did not work for me) so I had hore ke e lhollele ke bone (to leave it and try) in another way hore na nka etsa joang (what I can do). ...u n’u tla fumana hore u li ngola ka beke (...you would find that you were writing them weekly). Class ea Mantaha motho (For Monday class) you will try to recall hore na hana ho etsahetseng ka classeng ea lona (what happened in your class). Then oa ngola (you write), joalo joalo(so on and so forth). E ne e se ntho eo u neng u ka e ngola joaloka lesson plan eo u neng u e etsa tsatsi le leng le leng ha u ea classeng (It was not something you would write like a lesson plan that you did every day when going to class). (STB5)

This is the same ST who so eloquently expressed the importance of lesson planning but who could not follow it meticulously to the end for it to assist in his professional development as intended. He treated his daily lesson reflections casually not even writing down his observations and the intended means of improvement. The time he sat to write the reflections for the week he would be trying to recollect what happened each day and probably how he had intended to improve. Could it have been possible to remember what happened in, say the fifteen lessons per week proposed by NUL (for different classes for that matter)? Could it have been possible to even link the intended means to improve for each class in the whole week? How would the experiences in a previous lesson inform the subsequent one? And in the final analysis, how would the ST keep growing professionally, having learned in and from his teaching?

The other ST practiced under not so supportive situation with the arrangement of sharing the lessons with the class teacher who was also undergoing studies in Post Graduate Diploma in Education (PGDE) and definitely needed to practice teaching too. Talking about his reflection the ST said:

Ke ne ke e ruta hangoee feela bo bekeng (I was teaching it [physics] only once in a week). So e ne le boholokonyana(So it was a bit painful). Ho reflect-a ke ne ke reflect-a(to reflect I did reflect). I couldn’t say what I’ll do next though...because it will be his period. It helped because some of the things tse ne ke itse ke tla li etsa, ebe kea hopola hore ke li entse ha li etsahetsa, ebe ha li sa etsahala ke re ke hle ke li note-e ka pampirinyana e nyane so that ke tle ke li hopole in the class; ke tšoanetse ho etsa nthoane e ne ke sa e etsa hoane. Li haufi ho feta ha li le bukeng mane(...some of the things that I had said I would do, then I would remember that I had done them, and if they had not been done I noted them on a piece of paper so that I could remember them in class; I have to do that thing I did not do that time. They are more accessible than when they are there in the book [preparation book]). (STP9)
If the ST could not teach a topic continuously, one would think that he could not easily decide on for instance, an alternative explanation, example or an activity that would make students understand the concepts better. The next time he went to class, the class teacher had covered a number of concepts especially with a double (80 minutes) period compared to a 40 minutes allocated to the ST. However, he put some effort and appreciated the exercise as being helpful as he could still consider his observations and the intents thereof.

Other STs appreciated the need to reflect on the lesson and they observed the impact of doing or not doing it. One said that having to assist other teachers in their activities led to her failing to reflect on her teaching which was a concern to her as revealed in her remarks, “I found that I usually repeated the same mistakes that I would have corrected if I had done the evaluation.” (STB4). With repeated mistakes, just as the ST felt bad about it, one could also take it that the ST might have not explored her potential to develop through reflection as well as reconsidering what she had learned from coursework training. Another one really appreciated self-evaluation saying:

> Evaluation helped me to be able to go for the next lessons well prepared... see why my learners did not meet the objectives and therefore being able to plan the methods that would help them to meet the objective... to see when I had to repeat the lesson... I became aware that I had to increase my content so that I could not leave the students confused about certain concepts. (STB9)

One can sense that this ST was learning from self-evaluation/lesson reflection since he could set his goals considering involved factors, observe his lessons and work out the alternative means to achieve the intended outcomes. The ST portrays the effectiveness of reflective practice which Leavy and Hourigan (2016:162) describe as crucial in enhancing effective teaching and learning leading to development of new pedagogical practices, abilities to responding accordingly to unexpected occurrences. In the same manner even the Handbook of NUL takes reflective practice as a crucial component of professional growth hence why STs are required to reflect on every executed lesson. It says:

> It is through daily reflections that the teacher trainee should develop a repertoire of her/his own skills, planning, teaching and practicing professionalism and ethical behaviour. (National University of Lesotho, 2015:5)

The importance of reflecting on one’s teaching is confirmed by (Gürsoy, 2014:421) expressing it thus:

> There is no doubt that trainees learn better when they find out their weaknesses themselves rather than being told by others, which leads to autonomy, the development of critical thinking skills, and increased awareness of their actions and decisions.
In learning about how to handle the students and their learning, teacher qualities were mostly emphasized. The qualities that came out clearly were confidence, being parental, caring, loving, respecting and being honest. All the STs created time outside teaching time for students to consult and that brought a significant change in students’ performance and attitude such as the commonly observed dislike of the sciences. Some STs played a role in the formation and/or development of the science club through which they worked on the contrived mystique about science that had led to the enduring fear in students. The caring and devotion to work are described as the qualities of ‘pedagogues’ (Vanassche & Kelchtermans, 2014). Most STs talked a lot about motivating students and improvising the means to sustain their interest including development of the teaching aids. One ST took advantage of students’ love of experimental work and used the science laboratory as a teaching-learning environment even when he had not prepared an experiment to be done. In his words he said:

Since learners like experiments they enjoyed Physics experiments. So even a topic which does not need an experiment I would only take them to the lab and then now teach. Since they are expecting distractions [instructions] to do the lab then now they will concentrate for that forty minutes then now towards the end of the forty minutes I will say ‘it’s over, it’s time up’. Then they will have enjoyed and contributed and they will have concentrated for those forty minutes, because they were expecting to get instructions to continue with the lab. So that’s how I was maintaining their concentration and also since sometimes the equipment was not enough, so the Curriculum Studies helped me to find ways like improvising. I used some of the equipment which I made like the models when I was teaching. (STP9)

It is obvious from this ST and almost all of them that students like doing the experiments themselves. The one ST who did not let the students do the experiments in the course of his practice seemed to have taken comfort from having learned the alternative means to practical work saying, “...we were equipped with some necessary alternatives to practicals” (STP1). The STs acquired knowledge also from the way the TEs themselves conducted their teaching. The methodologies and pedagogies the STs employed are now the subject of discussion in the section that follows.

4.5.2.2 The impact of TEs’ methodologies and pedagogies on STs’ practice as perceived during TP

As shown in the list of teaching methods, strategies and representations the STs used in their teaching in Table 13, they applied to varying degrees the pedagogies that their TEs’ employed
and advocated. Some STs recalled what went on in their coursework lessons and related their connection with the practice they engaged in. Two STs sharing the same view about TE’s teaching but different feelings about it had this to say:

You are just being offered information ebe re joetsoa lianswer ebe (then be given answers) it’s all. From there se re fumana liexercises on mosebetsi a na re re o etse (from there we are given exercises on the work that we were to do). ...I think the purpose e ne le hore (was ) we should also learn how to engage the learners...  (STP8)

The ST here took the TE to be modeling how they could handle their teaching. This approach to some extent shows the features of an approach of TE labeled a “teacher educator of reflective teachers” (Vanassche & Kelchtermans, 2014). The indicators exhibited by that TE being that the STs were given theoretical knowledge (information and answers) on the basis of which they would be given tasks to extent their knowledge. From such tasks they could discern the appropriate teaching approaches to suit the situations they might encounter in their teaching thereafter. From the same group, another ST revealed similar approach by TE but a different feeling about it.

He would teach and teach and then the lesson is over, giving readers to summaries ... which could not apply in the school situation.  (STP10)

Offering information and teaching, might be taken as lecturing. Although one ST appreciated their being given tasks to do on their own, based on the lectures, the other one felt that she could not quite replicate that strategy. This indicates individual interpretations of the same situation which would definitely surface in practice where they could apply or reject what was observed or learned. However, learner engagement was at the heart of it all. Although expressed differently, the two TEs were employing the same procedure in their teaching. One ST from the other group explained that TE taught them “… by giving us the information and asking us to investigate more about the information”. (STB3)

Most strategies that STs used were discussion/classroom talk, lecturing, group work and letting students search for information and present their work in class. Even the most commonly used discussion method posed a challenge for STs due to the varying reasons peculiar to the situation in the school as revealed in the following quotes:

With a large number of students it was difficult to select appropriate method and materials. Group discussion was time consuming, difficult to control students making noise.  (STB11)
Classroom talk and socio-cultural theory did not work because at school there was much work to be covered and there are some disciplinary and facilitation challenges. (STP10)

Since the central role of a teacher is in action, TEs created opportunities for STs to practice teaching through peer teaching. One TE and consequently the STs in that group referred to the peer teaching as micro teaching. All STs acknowledged its value and impact in developing confidence to stand before people. Confidence is taken as one of the attributes of expertise in teaching (Smith & Strahan, 2004) which the ST really needs to get ready for field experience. They generally stated strongly that they should be given more time to practice the skills they learned about. Some of the views about peer teaching are cited. Referring to the development of their qualities as teachers, STP9 declared; “I gained self-esteem Madam, and also now my voice is now louder and students can hear it well now”. STB2 took advantage of TE’s remarks about his stern voice which she said could work positively for him in his teaching when giving feedback in which personal characteristic were considered (Voerman et al., 2014). Most of them acknowledged the effect of peer teaching in developing confidence which three of them specifically related to the command of subject content like this one who said, “...confidence with subject matter makes students to admire the teacher and like the subject hence change of attitude”. (STP10)

Another ST in his explanation of peer teaching as an opportunity they were afforded to learn teaching revealed some details on how they actually learned through that process, the major setback being the limited opportunities for their practical involvement. He says:

If these peer teachings li ka etsoa hore li nke nako e telelenyana... e ne ntle batla e le a challenge because makhetlo ano a mabeli ao rea rutileng, Madam kannete o na ke a re o re rutile hantle ho ema ka pel’a bana ba sekolo, it was like re try-ile. If li ne li ka etsoa hangatanyana...motho o tla nna fos, a nna fos ho fihlela a npepa. Ha fihla sekolong e se e le ntho e possible feela. Ha motho a na qeta ho ruta, re ne re sheba ntho tse ntle tse a li entseng, re sheba tse seng hantle tse a li entseng hore a tle a tsebe hore a tle a li improve (If these peer teachings could be done for a longer time... it was still a challenge because the two times that we taught, Madam really would not say she had taught us well to stand before the students, it was like we tried. If they were done several times... one would make mistakes, make mistakes until s/he gets it right. On getting to the school it would just be a possible thing. When one completed teaching, we identified the good things s/he had done, identified the not good things s/he had done so that s/he could improve on them). (STB11)
The next section looks into how STs used their acquired knowledge and portrayed it in practice, highlighting the domains of teacher knowledge that they actually considered as a result of what they learned from coursework training and the contribution of TP in their professional development.

4.5.2.3 Enactment and extension of the “what and the how” of the Biology and Physics Curriculum Studies course during TP

The STs recounted their experiences to reveal what actually went on and what they learned from the exposure. Their accounts were guided by the research questions the focus of which was the recognition the STs gave the domains and components of teacher knowledge. Although STs realized the gradual development in their teaching, they admitted that it started off as a great challenge in a number of ways. For instance, this ST reported:

In the first three or four weeks it was a bit challenging ... ke bona (seeing) a doubt in their [students] faces ... ho nkukile nako hore ke ba fe (it took me time to give them) some sort of a constructive feedback. Finally ke ne se ke khona hore ke ba fe (Finally I managed to give them) some sort of probing questions to guide them or sometimes ke ba fe (give them) some sort of constructive feedback ha ke ntse ke ruta (while teaching), but it took me time. (STB2)

If this ST was visited in the third week when the school visits started, or in the fourth week which was actually his first week of practice since his TPT could not let go of his teaching in his class, the visiting TE would definitely identify the limitations that the ST realized. It was not the only case where the STs could not start at the time NUL expected. In such cases, the visiting TEs would find STs in a situation where they would be still grappling and probably conclude that they were still very incompetent considering the time the practice had been running. When could it have been the right time to visit such STs to get a picture closer to where they were with classroom teaching? At the beginning of the year some schools take some time to settle. In others it also takes time for STs to fit into the schedule especially where a ST decides on the classes s/he wants to practice with, resulting in a lot of clashes as it was the case with STP7. And generally, it is the time of the year when schools are highly engaged in sporting activities thus limiting the teaching time.

Discussion as the most commonly mentioned method used to get students involved posed a number of challenges such as loss of control by the ST, time consuming and the approach being disliked by some students (STP10) hence forcing the ST to resort to other means of running the
lesson. Expressing the influence of some of these effects on their teaching, one ST said, “... this forced me to use, most of the times, methods that are more teacher centered” (STB11). In all cases the STs seemed to wish to exert their efforts towards students’ learning but they could not quite reach them. The STs confirmed that students were not the same and required differentiated consideration. Their characteristics were also different from those of their peers. They expressed their experiences with students as follows:

Some of the things, I was aware of and knew them very well. But when I was supposed to apply in class it was difficult because of the ways students responded. Especially if I wanted to use maybe class discussion or grouping students into discussion groups...sometimes they didn’t really follow what I was intending. So the lesson sometimes changed to a greater extent. Sometimes it seemed so impossible for them to work ...maybe give class work sometimes discuss as a whole class not groups. (STB3)

This could be once again pointing out to the need for being exposed to actual high school students as RPTs strongly argued. The ST was aware of the possibilities of facilitating the lesson involving discussion which would not work for her. She also portrayed some degree of flexibility. If in that situation it still did not work positively for her, one gets tempted to question her proficiency in communicating the intended message.

STP2 was challenged greatly by the general student behavior in his class who did not like talking in class. Students’ reactions which could be influenced by their background and the school culture have proved to impinge on instruction (Cohen & Grossman, 2016). The importance of handling actual students rather than ST peers was reiterated by another ST who felt:

TP emphile monyetla oa hore ke bone hore bana ha ba tšoane. Ke hore ha ba behave-e the way nna nka batlang ba behave-e ka teng. Ha ke ruta ke le ka pel’a bana ba sekolo e fapane le ha ke ruta licolleague tsa ka. Ke lamehe ke ba nahanele hore e ka nna ba ho na le ngoana e ka nna ba ha a na background e ntle. Ha ke bua ka topic e itseng e batla ke nne ke ee morao hanyanyana. Ka nako e ngeo liobjectives nka tsoa classeng ke sa li fihlela. It gives a teacher a sense of satisfaction. (TP has given me an opportunity to realize that students are different. That is they do not behave the way I could want them to behave. When I teach the students is different from teaching my colleagues. I have to think of them that there might be a student with a poor background. When I treat a certain topic I should touch on the previous ones a bit. Sometimes I may get out of class having not attained the objectives). (STP12)

This confirms the view expressed by Morine-Deshimer and Kent (1999:22) in their consideration of “learners as critical contextual features of pedagogical practice.” on realizing the influence the ST observed during her practice teaching. Cohen & Grossman (2016) do wonder how much
consideration TEs give this issue as they observe and assess STs’ performance during classroom practice.

Having learned about and used the school syllabus, it guided STs’ lesson planning. STs appreciated the impact of the syllabus and the learned theories in helping them to plan and execute their teaching. One of them said:

Syllabus ... ha ke ne ke le (when I was at) teaching practice ...each and every time ha ke ne ke etsa (when I was doing a) topic I would go back liaiming mona, ke l’o bala liaim ke li utloisible hape hape... so that ha ke ruta ke rute ka kelello ea hore bana ba sekolo ke batla ho ba ruta so that ba tsebe...e ne nthusa to come up with the objectives of the lesson (I would go back to these aims, reading the aims to understand them again... so that when I teach I teach bearing in mind that the students I want to teach them so that they learn... it helped me to come up with the objectives of the lesson). (STB 11)

...I was taught here those learning theories. When I chose the topic and learn from it, then I would refer to which teaching theory should I use. So they helped a lot in choosing which learning theory is best suited for that topic and actually they worked. (STP2)

One ST felt differently with the impact of the learned theories due to the prevailing circumstances in the practice school. In her words she said, “Classroom talk and socio-cultural theory [mostly advocated] did not work because at school there was much work to be covered and there are some disciplinary and facilitation challenges” (STP 10).

This ST reported that she had to drop group discussions since the students would deviate from the intended task causing disciplinary problems and taking much time resulting in failure to complete the lesson as planned. Since the school was one of the few that had a functional computer laboratory, she resorted to students’ individualized search on the internet and then making presentations which the students enjoyed. She was also one of the STs who involved students in experimental work which the students enjoyed.

As was revealed in TEs’ interview and STs’ pre-TP interview, assessment had not been given the consideration it was worthy of as one of the crucial components of PCK which as a result was therefore not even mentioned as having a potential to develop their learning. The impact of that omission manifested itself to an extent that the STs themselves observed it. STP1 claimed:

The skill of testing was lacking and I think it was going to be important if I acquired that skill. I really struggled a lot to come out with a formal test for the level of the classes I was teaching. Maybe it was because I got little idea about how to test. (STP1)
From the other group one ST said:

I wasn’t quite sure of assessment strategies. Ha ke fihla ka classeng (Upon arriving in class) we review content ea maobane (previous day), what we learned, ka lipotso (with questions) - simple questions tse recall-ang (for recalling). (STB5)

One would think that the idea of questioning as a one means of assessing students’ learning progress might have been learned from the general pedagogies courses as this other ST from a different subject group reiterates similar situation that he would ask “questions that might remind us everything that we had done for that lesson” (STB2), that implying mere regurgitation of information which cannot be equated to learning. As TEP indicated, the questions would always be, “What did we say...?” or “Who can remind us...?”

In a totally unique case the ST gave a lot of contradicting perspectives. The only one ST who felt she had been fully competent with her teaching. She claimed students showed knowledge of the matter taught soon after the lesson, but later could not remember anything. Her observation was not different from the rest, sharing the same sentiment were STB5 and STP5 who said, “Students did not pass in a way I expected ... most of them failed the given tests” (STB5); and “Most learners were not performing well when given tests yet they did better in class works” (STP5). Some of the reasons given were that students were not good in English and their own limitation with asking comprehensive questions.

Following up on that particular ST’s observation regarding students’ performing poorly in tests, we conversed thus:

Interviewer: Did you reflect on, how did I teach? How did I assess in the process of teaching? And how am I assessing now? Why this time around are they not getting it? Did you consider such issues?

Interviewee: Like reflection?

Interviewer: Mmh?

Interviewee: On a test or on a quiz?

Interviewer: Whatever you were doing. I have given them a test, this is what I am getting. When I was teaching, at the end of the lesson I thought I had attained the objectives, they understood. But (interrupted)

Interviewee: The thing is, Madam, my students if you really don’t give them a beating, they don’t really get what you taught them right. I really had to give them the beating for them to keep doing their work and for them to keep remembering. [emphasis added]
This ST was practicing in her former school, and one is tempted to think that the influence of the culture at the school was dominating her practice as she seemed not to be considering what she had learned from training about students’ learning and teacher’s role in the process. It might not be very easy for a teacher in the making to boldly resort to corporal punishment especially at the time when there is a clear national policy against that practice. Her attitude and seemingly false impression which according to Feiman-Nemser, 2001 quoted in Miller & Shifflet (2016:21) “may mislead prospective teachers into thinking that they know more about teaching than they actually do and make it harder for them to form new ideas and new habits of thought and action” might be taken as a typical example of that type.

She was actually drifting off the question of reflecting on the lesson which raised a doubt if she did since planning for the lesson was a tremendously futile exercise in her opinion. With this ‘forced learning’ through beating, the learned content seemed to be retained for a short while. This gives a typical example of a situation where a novice teacher equates learning to remembering what has been taught (Gess-Newsome, 1999) manifested in the request for regurgitation of what transpired in the previous lesson. Then one wonders what the ST meant when she again said:

I remember last time [pre-TP interview] I talked about theories and I was kind’a struggling how I am going to deal with constructivism and all. This time around I think I am really okay with everything because during my teaching I really applied those theories. We really struggled a lot when it comes to constructivism because the educator didn’t really practice that in class, or the educator really didn’t give us time to practice it ourselves”.

In our view, this ST has not understood and practiced constructivism with what we term ‘forced learning’ that she had applied. The main means of her teaching were explanation and teacher demonstration. One is even reluctant to say there was learning rather than memorization of whatever the ST was delivering for students to consume which soon got washed off from their memory. Will there ever be a change of attitude, belief and practice with this teacher for her to end up meeting the purpose of teaching Physics?

This situation calls for consideration of the proposal for redesigning of teacher preparation around practice (Ball and Forzani, 2009; Grossman et al., 2009), offering STs guided opportunities to learn to perform a variety of teaching tasks desirably in context (interacting with actual students), providing a wide range of strategies and multiple learning situations (Martin &
Dismuke, 2015). Such a situation might help STs to consequently build their own repertoire of skills considering the inherent factors in teaching and learning which form the domains of teacher knowledge and their components. Otherwise, the training course that the ST teacher underwent might seem to fit into the assertion that “professional education courses are notorious for presenting philosophical theory without assisting teachers in translating those constructs into practice” (Mason, 1999:277). It remains a question though whether indeed, the TE educator did not enact the strongly advocated theory or the ST herself could not interpret and understand the theory portrayed in TE’s teaching which she clearly seemed to have not employed herself in her teaching despite her claim that she did with success.

In the next sub-section, the discussion considers how the STs portrayed the connection they made and observed between the on-campus and in-school learning.

4.5.2.4 The link between coursework training and practice teaching

Although one would take it that the visits by TEs to observe STs’ classroom teaching would serve as one way in which the two phases of this initial teacher preparation stage were linked, the fact that the current procedure at NUL is that any TE from any department in the Faculty of Education was assigned any school, STs could not readily find them being a vital link. But eventually, with the exception of STP13 who did not find anything of benefit from the visiting TE, the rest (17) acknowledged the pieces of advice they got with regard to general pedagogies and teacher qualities, nothing much in connection with content except in the few cases where the STs were visited by their subject TEs. It was only for a lucky few (5 Physics, 3 Biology) who were visited by their subject TEs who made their comments based on what was entailed in the coursework training which STs appreciated so much. Five of the Physics STs had direct communication with their TE while another half did not although the doors were open for all of them to consult mostly through e-mail. STs had their various views about TEs’ visits revealing different expected effects of such visits. One view was:

If ba ea hangata (If they go frequently), and ba ba le li meetings le those teachers tse leng hore re siiloe ho bona as coopt-teachers, ke nahana e tla etsa hore ba focus-e a lot (and hold meetings with those teachers that we are left with as coopt-teachers, I think it will make them focus a lot). Because nna ke bone eka (Because I noticed that) they think they are relieved, ba fumane motho ea mo phomotsang ... (they have found someone to relieves them ...). They don’t think it’s their responsibility ba bone hore learning ena e ntse tsamaea hantle kaofela (to see to it that learning is going on well). Because le rona, we are still learning ha re ntse re ruta (Because even ourselves,
The ST has elaborated on how he felt about the relationship between NUL and practice school staff. We underscore that the limited visiting and lack of teamwork between the co-educators leaves the latter not knowing what is expected of them denying them an opportunity to benefit from the partnership which has been proved to be of benefit to both ST and TPT (Hoffman et al. 2015). One might argue that TP Handbook stipulates the roles of the TPT, which it does. But, it does not inform them about the contemporary issues such as a new version of the Scheme and Record of Work used and also the theories and pedagogies advocated. For instance, at one point, behaviorism was a prominent theory which most of the veteran teachers could have learned while presently the focus is on constructivism. With the stipulated TPT roles in the Handbook though, it could have not created a consideration by TPT that it was time off for them which they unfortunately did not use; “…rona ha rea e tšoara le ho e tšoara, ha rea etsa letho (…we did not even touch it [Handbook], we did not do anything [in it]” said STB5. In as much as TEs’ visits were envisaged to have a potential to nurture the STs’ further learning to teach, being sporadic and lacking continuity leaves one in doubt.

One ST was mainly under pressure to meet the requirements for assessment and ended up confused, overwhelmed and probably not performing so well. In his words he says:

 Ha re observe-uoah tla shejoa lesson plan, ho shejoa content hore na e tla nka 40 minutes. Ho tla shejuoah tla hape hape hore na ke khonne hore ke manage nako. E ne le le tsona ntho tse neng li batla li ntsuku-ntsukutla ha ke ne ke ruta. Oa utloa ha ke sheba hore ke tlametse ke manage nako, ke fe bana content e kana, and ha ke ba involve-a haholo ba tlo tla ba spend-a nako e ngata haholo (When we are observed the lesson plan is checked, checking whether the content could be taught in 40 minutes. Again it would be observed whether I succeeded to manage time. Those were the things that disturbed me in my teaching. You get it that when I have to manage time, I give the
students this much content, and involving them to a large extent they are going to spend a lot of time). (STP11)

The TP Handbook was another plausible means of sustaining the intent of NUL and therefore a means to support the STs who were at that time learning at a distance. STs did not quite make a good use of it. Most of them who took a look at it merely checked on issues such as the Observation Form, Lesson Plan format, Assessment form and the Report Outline. Exceptionally, STB1 though she opted out for the post-TP interview, it was clear from her report that she did not follow even the proposed format in the Handbook at all. Some of them squarely mentioned that they considered the Handbook not useful though in essence there were some benefits reaped from it. STP1 said:

The Handbook did not help me...the only section I read was under the guidelines about TP report...Otherwise all the other information was not so useful to me. The forms within the booklet and those guidelines were the only aspects which were important to me. I was in a position to look at the observation form and analyze how I should present my lessons even during the observation and looked into the assessment form to check how I should present my lessons. (STP1)

Although the ST thought the Handbook was of no value to him, he did pick some areas that he felt he would gain something from them, those that would contribute to his improved performance such as what was going to be assessed in his teaching. STP6 acknowledged the contribution the TP Handbook made in providing general requirements but it was lacking in guiding his teaching, of course the core business for him. In his words he said:

Actually I did not find it informing me on how to teach but it gave me the requirements that I had to meet…what I am expected to do and not to do, but not in actual teaching. (STP6)

The Handbook does not explicitly inform one on how to handle teaching which had been covered in the content of coursework training. But in its introductory remarks one might take it to be emphasizing and calling ST’s attention to keeping in mind that s/he was and what s/he was about which with regular reading of the Handbook might keep reminding her/him of the essence of teaching. Probably just like the rest of the STs, STP6 did not read through such parts of the Handbook attentively. The Handbook states:

Teaching is about conveying passion for learning, innovativeness and solving problems and giving learners inspiration and tools to meet the challenges of life. A teacher is the heart and soul of a class, the pulse that keeps lessons lively and engaging. (National University of Lesotho, 2015:1)
The other very crucial form of support was supposed to be the TPT who also with the guidance of the TP Handbook could contribute profoundly to the professional growth of the STs, enhancing what they had learned on campus and extending it with practical knowledge. Generally, the STs mainly mentioned the orientation to the school environment, provision of teaching materials and introduction to students in classes that all TPTs seemed to have done nobly. Regarding the core business, teaching, in the few cases where they availed themselves and made classroom observations and assisted thereof the STs said:

I was all alone … But she was always there ha ke ne ke na le lipotso *(when I had questions)*… Ke ne ke khona hore ke mo fumane a be a njoetse hore I can do this kapo re be re hlaise li-idea tsa rona re le babeli re bone re tl’o tsao le kae. *(I managed to get her and she would tell me I can do this or we could both bring up our ideas to see how we are going to go about it).* (STB5)

In the case where the TPT seemed to have been closer to the ST quite often, the ST said:

He looked through my lessons and included some of those things which I have left and sometimes he would add some activities for the students. He would identify some important concepts lacking as I teach and … humbly help me towards addressing those concepts. (STP1)

Most STs were not observed as suggested in the TP Handbook. TPTs’ abandoning the STs could be attributed to their lack of knowing what was expected of them. One seemingly offended ST uttered, “some of the tutors would just give the student teacher their class and do not even monitor to ensure teacher’s progress” (STP6).

To extent the means of keeping in touch with the acquired knowledge from coursework training the Physics group formed a group on social media to support one another as they learned mostly from group work during on-campus training. They therefore sustained that collaborative spirit which they did find quite helpful. Talking of their collaboration one of them expressed his experience as follows:

Ne re entse group Whatsapp-ong so that’s where we were talking boholo ba nako. Mantsiboea a mang le a mang ne re bua le hoseng pele re ea mosebetsing se re buile hace hape ka hona ka moo. So re utloa hore mang o reng joalo-joalo, so e ne le monate (We had formed a Whatsapp group where we were talking most of the time. Every evening we talked and in the morning before going to work we would converse again there. So we learned what each one had to say like that, so it was interesting). (STP9)

Although the ST is not specific as to what they discussed that indicated the type of contribution the link offered. If he had indicated how much support he gained, that would reveal one characteristic of the links identified by Fox & Wilson, (2015), the ‘perceived value’. It sounded it
was an ongoing occurrence therefore having the characteristic of ‘strength’ of the link which the ST found interesting. Considering that STs’ networking has been proved to benefit them to further learn while on practice (Fox & Wilson, 2015) one would take it that they might have not sustained it if they were not gaining anything worthwhile from it. That collaboration was STs’ own initiative hence could not bear yet another characteristic, ‘formality’ which would relate their interaction formally to their training that could have been guided by the clear guidelines.

The STs had a view to express in connection with every interview question and some of their views are highlighted in the section that follows.

4.5.2.5 General Views of Student Teachers

It was assumed that from the perceptions of the participants the researcher might spot some aspects of STs’ learning that could give a hint on the probable cause(s) of the observed limitations with their classroom teaching especially those related to teacher knowledge domains without rejecting any pertinent issues surfacing from the conversation. With regard to coursework training most of them claimed that it had equipped them with the knowledge they deemed appropriate and it had enabled them to perform reasonably well. However, they still identified some areas they felt if they had been handled differently they could have performed even better.

One ST strongly and adamantly expressed dissatisfaction with the Curriculum Studies course saying:

I don’t think it contributed much because some of the things we are only learning now and most of the time I would always consult my tutors about how to do things. I didn’t that much consider what we did at school [university] …here at the campus. I considered how to do things from my tutors, they would tell me how to do things, what things to consider when teaching, for instance, what factors to look for ha ke ruta (when I teach) a certain topic. (STP10)

From this ST’s view, the practical experience outweighed the coursework training she was exposed to, which actually took the bulk of her training as a teacher. This ST could be taken to be discrediting coursework training finding the field experience more valuable (Allen, 2009; Marc, 2014; Grootenboer, 2005). That could presumably be beneficial if there could be clear relationship between the two phases where the parties were fully aware of the aspired type of teacher and the essential forms of support, guidance and knowledge were required.
The Year IV Curriculum Studies courses are of two semester (one academic year) duration. But they get disrupted by TP that runs in the second semester. The expectation is that upon return they should resume, hence why some issues might only be treated at that time. For instance, the STs in the Physics group were only learning about assessment on their return from TP. They felt they could have benefited more if some of the issues they treated after TP had been done before. One of them claimed:

Curriculum Studies in Physics is a year course and it’s then that we are being taught some other content of course which I see as important to know it before going to Teaching Practice. And I think if it was presented to us before I would make my best. (STP12)

Although all STs acknowledged the contribution of TP to their professional development they mainly felt that its duration was too short hence not contributing to their development to the desirable degree. One of them expressed his view in these words:

TP duration to be extended to give enough time for practice and reflecting back towards being the best teacher. I think the duration may be extended because within these ten weeks, first two weeks are for preparation... the third week when it’s our first time to go to lessons they are in for observation ... the time is very short. (STP1)

Extending his view about the NUL staff visits and the operations of the whole practice experience this ST further said:

NUL staff to consider student teachers’ time-tables to avoid having to ask for lessons, which was not easy. When they arrive they find me not in class or not having classes at all at that time, and I have to ask for lessons... Even though I would be prepared, but to revise the time-table for the day was not easy. Teaching practice programme needs to be discussed with the administration of the school ... there were some attendance forms provided to us to be signed by the administration and the mentors. They seemed to not know about the forms... (STP1)

4.5.2.6 Summary of the findings from the STs’ post-TP interview

The information provided by the STs on their field experiences first confirms that this phase in the initial teacher training stage is vital as a practice and learning phase in which they enhance and/or extent their knowledge and qualities as teachers. They however expressed their concerns which may be some hindrance to their exploiting their potential to develop into aspired effective teachers whose teaching benefits the students and themselves. The major concerns included the frequency and duration of peer teaching sessions, omission of assessment as part of the training content, sporadic, few and incoherent FED staff visits, TPTs’ random and incomprehensive
support and guidance, TE-TPT collaboration, STs’ personal contribution to their own development and general TP methodologies. The next Part (IV) discusses the findings from the interview of the TPTs.

PART IV

4.5 Teaching Practice Tutors (TPTs)

In the pre-service stage of teacher training as it obtains at NUL, teaching practice is deemed a vital component as it is also a case worldwide. The practice in Lesotho is more or less the same as that followed in Tasmania for the Master of Teaching (MTeach) model which Allen et al. (2013) describe as a traditional approach in that teacher educators design and execute coursework, and prepare pre-service teachers for teaching practice to be jointly supervised by university and practice schools staff. This partnership is believed to be important for the success of field experience component in which prospective teacher’s knowledge, skills, attitudes and dispositions are practically developed. The directly involved school teachers in helping STs to further learn in this phase in the context of NUL are referred to as Teaching Practice Tutors (TPTs). To have TPTs in place is for the support and guidance of STs in learning to teach in the practice phase of training and as an extension of the started conceptual and practical knowledge from on campus training. That could be responding to the view expressed by Grossman et al. (2009:278) when they attest, “Principles developed in the absence of assisted practice lack the depth required for novice teachers to enact such principles in practice.” The support to STs in their professional development requires different forms in the different settings within the phases of the development stage (Niemi & Jakku-Sihvonen (n.d.) and the source of such support would to some extent be influenced by the setting in which learning is taking place.

The NUL Teaching Practice Handbook as a guiding tool developed to provide procedures and roles of the directly involved stakeholders acknowledges the importance of the involvement of schools by saying: “It is to the long-term advantage of the schools to assist NUL in organizing a relevant and positive teaching practice experience.” (National University of Lesotho, 2015:3). This implies that the schools are expected to provide an enabling environment for the STs to learn to teach, learn about the teaching profession and the schools as their future workplace. The
Handbook further attests that this experience is essential in order to “expose the prospective teachers to the realities of the teaching field”. To enable the achievement of this aspiration, the practice is arranged to be done “under the direct supervision of qualified and experienced teachers and lecturers” thus emphasizing the need for university and school staff in the process of ST’s learning during practice.

The roles of the TPT outlined in the TP Handbook reflect the effective supportive elements for the holistic development of the prospective teacher (personal, professional, emotional and social). Throughout the practice period, TPT is expected to regularly afford the ST the essential support and supervision giving continuous feedback to foster their development in learning to teach. The roles are stated as follows:

- **planning** useful experiences such as observations, shared/team-teaching and teaching with the Student Teacher;
- allowing the Student Teacher to observe her/his lessons, to discuss the observations and to participate gradually in teaching;
- assisting in collecting general school information;
- providing information about the Student Teacher’s teaching subject, the departmental structure and activities and the use of the school facilities and official documents such as registers, report sheets, scheme and record of work etc; cooperating with the Student Teacher in
- **planning** lessons, **evaluating lessons**, **designing tests** etc;
- **being present** in the Student Teacher’s lessons, using the clinical supervision approach: deciding on an observation focus before, using an observation form during the lesson and discussing the observation afterwards.
- having informal discussions with the Student Teacher on lessons taught by the Student Teacher and on any other professional matters arising day by day;
- giving personal support whenever needed.
- giving the necessary recognition to the Student Teacher.
- ensuring that there is generally a good rapport between them and the working environment is conducive. (National University of Lesotho, 2015:13)

With such support mechanism in place, one could be of the opinion that the STs might show reasonable proficiency that might not raise a concern that has led to the conduction of this study. With the pronouncement of the enduring signs of inadequacy reported with STs’ classroom teaching during TP, the researcher sought the views and opinions of TPTs about the training of science STs on their coursework preparation on campus (indirectly) and classroom performance in school (directly) during TP. Similar to the study conducted by Ben-Peretz and Rumney (1991), where they explored the mode of interaction and the nature of messages transmitted in
TPTs and STs’ interactions, the researcher considering the same areas here was not as they did unpacking those issues, rather establishing their nature in relation to teacher knowledge domains and their components. The intention was to dig into the information provided to identify the elements of teacher knowledge and the emerging pertinent issues they considered for STs’ professional development that might expose the probable factors contributing to student teachers’ reported inadequate practice.

Table 15 gives the profiles of the TPTs who took part in this study. It captures their gender and that of their STs (in brackets), qualifications, subjects of specialization and those they taught then, and the overall teaching experience and that with the latest (in brackets) qualification acquired.

Table 15: Teaching Practice Tutors’ profiles

<table>
<thead>
<tr>
<th>NAME</th>
<th>GENDER</th>
<th>QUAL.</th>
<th>SUBJECT MAJORS</th>
<th>SUBJECTS TAUGHT</th>
<th>TEACHING EXPERIENCE (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPTB1</td>
<td>Male (F)</td>
<td>PGDE</td>
<td>Biology &amp; Chemistry</td>
<td>Biology &amp; Chemistry</td>
<td>8 (2)</td>
</tr>
<tr>
<td>TPTB2</td>
<td>Male (M)</td>
<td>Not given</td>
<td>Not given</td>
<td>Biology, Physics, Chemistry &amp; Mathematics</td>
<td>7</td>
</tr>
<tr>
<td>TPTB3</td>
<td>Female (F)</td>
<td>PGDE</td>
<td>Biology &amp; Chemistry</td>
<td>Biology &amp; Chemistry</td>
<td>10 (2)</td>
</tr>
<tr>
<td>TPTB4</td>
<td>Female (F)</td>
<td>B Sc Ed</td>
<td>Biology &amp; Chemistry</td>
<td>Biology &amp; Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>TPTB5</td>
<td>Female (M)</td>
<td>B Sc Ed</td>
<td>Biology &amp; Chemistry</td>
<td>Biology &amp; Chemistry</td>
<td>16 (8)</td>
</tr>
<tr>
<td>TPTB6</td>
<td>Male (M)</td>
<td>B Sc Ed</td>
<td>Biology &amp; Geography</td>
<td>Biology, Geography &amp; Mathematics</td>
<td>9</td>
</tr>
<tr>
<td>TPTB8</td>
<td>Female (F)</td>
<td>Dip Sc Ed</td>
<td>Biology &amp; Chemistry</td>
<td>Junior Science, senior- Biology &amp; Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>TPTB9</td>
<td>Female (M)</td>
<td>B Sc Ed</td>
<td>Biology &amp; Geography</td>
<td>Biology &amp; Geography</td>
<td>14 (9)</td>
</tr>
<tr>
<td>TPTB10</td>
<td>Female (M)</td>
<td>Dip Sc Ed</td>
<td>Biology &amp; Chemistry</td>
<td>Biology &amp; Chemistry (junior &amp; senior)</td>
<td>6</td>
</tr>
<tr>
<td>TPTB11</td>
<td>Female (M)</td>
<td>B Sc Ed</td>
<td>Biology &amp; Geography</td>
<td>Biology – (Junior &amp; Senior)</td>
<td>35 (15)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PHYSICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTP1</td>
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<tr>
<td>TTP2</td>
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<tr>
<td>TTP5</td>
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<tr>
<td>TTP6</td>
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<tr>
<td>TTP7</td>
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<tr>
<td>TTP8</td>
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<tr>
<td>TTP9</td>
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</tbody>
</table>
The gender column depicts that with TPTs, Biology had been pursued mainly by female teachers (7F:3M) while it was vice versa in Physics with more male teachers than females (8M:2F). The picture was very different in the case of the STs in which there were almost balanced numbers of gender for both subjects. In the final analysis, the interactions between different and similar gender, did not seem to have any significance in the mode and type of support practice.

TPTs that had been trained from the Lesotho College of Education (LCE) held the diploma in Science Education hence less qualified and were definitely not conversant with what the teacher training program at NUL entailed. As depicted in Table 14, some TPTs were teaching the subjects they were not qualified in (TPTB6, TPTB8, TPTP1, TPTP6, TPTP8); others were teaching at the level they were not qualified for (TPTB8, TPTB10, TPTP1, TPTP8, TPTP12, TPTP13), and with some of them it was the anomaly with both subject and level (TPTB8, TPTP1, TPTP8). However, for the TPTs teaching junior certificate (JC) science, they would have not been prepared for teaching in the third discipline since they got trained in two teaching subjects. Furthermore, although their overall teaching experience ranged from 3 to 35 years, those who had acquired the Post Graduate Degree in Education (PGDE) teaching qualification had a two years experience as qualified teachers and TPTP9 was still studying, doing PGDE with NUL. It was from that caliber of TPTs that the researcher sought information to have a better understanding of what went on the ground during STs’ practice teaching then. That was to establish the probable cause(s) for the reported insufficiency in STs’ classroom performance. The section that follows starts with the discussion of what TP offered STs for their further learning to teach as perceived by TPTs.

4.5.1 What Teaching Practice offered STs for their learning to teach as perceived by TPTs

There is definitely no specific content designed by FED or the Science Education Department at NUL for STs to guide their learning to teach during TP. In some countries such as Turkey where
there are practicum sessions in the course of training there is planned “school experience course” (Gürsoy, 2013) to prepare STs for the terminal extended field experience. In these sessions the practical practices are gradually learned through school and university contribution. One would take it that with NUL, the assumption was that having equipped STs with the theoretical knowledge and the practical tools for teaching, it was then for STs to enact what they had been provided. Even with the TP Handbook, it was the discretion of TE to use/not use it or some parts of it in the coursework teaching.

The “what” the STs were provided that the researcher gathered from TPTs were merely their beliefs about what practice teaching in schools was likely to contribute to STs’ professional growth. That mostly came in response to the interview question 1 and sub-question 1.1 which said:

Q.1 Is Teaching Practice, in your opinion, an essential/not essential phase in the pre-service stage of teacher professional development?

1.1 How does it contribute to student teachers’ learning to teach in their teaching subjects?

It was also from their reporting on how they assisted the STs and what they observed from STs’ operations that what the STs’ learned in and from this phase was gathered and deemed to be what the STs had learned in the process. The information was elicited through questions and sub-questions – 3.1; 4, 4.1, 4.2, 4.3; 7, 7.1 and 8 (see Appendix D iii). Table 16 gives a list of what the STs learned as perceived by TPTs during TP and the deduced themes thereof.

Table 16 What STs learned during Teaching Practice and the embedded teacher knowledge domains and components, and emergent issues

<table>
<thead>
<tr>
<th>Learned issues according to TPT</th>
<th>Deduced themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Drawing the scheme of work</td>
<td>• Teacher knowledge</td>
</tr>
<tr>
<td>• Lesson planning</td>
<td>– content knowledge</td>
</tr>
<tr>
<td>• Formulating lesson objectives from the syllabus objectives/learning outcomes</td>
<td>- pedagogical knowledge</td>
</tr>
<tr>
<td>• Content to teach</td>
<td>- pedagogical content knowledge</td>
</tr>
<tr>
<td>• Questions and questioning during teaching and in setting tests</td>
<td>- curriculum</td>
</tr>
<tr>
<td>• Dealing with students’ questions</td>
<td>- students</td>
</tr>
<tr>
<td>• Class control</td>
<td>- teaching methods/strategies</td>
</tr>
<tr>
<td>• Use of appropriate methods/strategies</td>
<td>- assessment</td>
</tr>
<tr>
<td>• Learner involvement</td>
<td>• Teacher qualities</td>
</tr>
<tr>
<td>• Handling large classes</td>
<td></td>
</tr>
</tbody>
</table>
Facilitating group and practical work  
- Use of teaching aids and the environment  
- Communication (proper use of the board, pacing, audibility, concept sequencing)  
- School environment and interacting with the school community  
- Respect for students and appreciating their differences  
- Motivating students  
- Sourcing information (various books, TPT, other teachers, internet)  
- Extending work beyond the classroom (helping students with class work, cleaning campaign – lab and school premises, science club, study and assembly supervision, staff meetings, sports and cultural activities)

From the table the knowledge acquired by the STs includes personal, social and professions attributes. In general, all TPTs acknowledged that the practice was a very vital phase in the initial training of teachers. The prominent issues they identified as contributing to STs’ further learning were their exposure to the realities of teaching by dealing with actual students in the actual school environment putting to practice the acquired knowledge, and the possibility of learning from practitioners on the ground. One of them elaborated in these words:

I think it is essential because ke hona moo motho a ilo (that’s where a person reflects) reflect-a hore a ichebe hore na nthoe a na e rutoa ho tloha ha a le sekolong o khona hore a (to see if what he was taught while at the institution applies) li apply-e ha a fihla field-eng (when he gets to the field), and thoeno e tla mo thusa hore le ntho tseo a na ntsa sa li bone ha a ntsa le sekolong tse a na ntsa sa li ulotisise ha ho buuoa ka tsona (and that will help him to realize what he might have missed from training, those things that he did not understand when they were discussed), but ha fihla field-eng ke hona a khonang ho li ulotisise, ke hona a khonang ho li understand-a (when he gets to the field he begins to understand them) better than ha a na ntsa li rutoa e le (when he was taught as theory there) theory mane. Practice is better than theory. The most important part ke hore ha u fihla field-eng (when you get to the field) a student teacher there are people who are going to guide you be se ntse e le (who are already) li-professionals and those people ba tlo tla ba khona hore ba u thuse (are going to help you). Ke bona ba tlo tla ba khona hore ba u thuse hantle ho u beha (they are the ones who are going to put you) in the line, ba u bontše hantle (show you clearly) the field of teaching kaofela hore na ho sebetsoa joang (everything of how things are done). Then le uena u reflect-e hape hore na (then you reflect whether) all these concepts tseo u li learn-neng (that you have learned) from school na u khona ho li ulotisisa (you manage to understand), na u bona batho ba se ntse ba le field-eng ba khona ho li apply-a (whether you see the people in the field able to apply them) just like you were taught. Then batho bano kaofela ba khona ho ho u thusa (all those people are helping you). And as a student teacher u tlo khona u develop-e (you are going to develop) some other skills. And those ones tseo u bonang hore li
handle ho bona *(that you see are working well for them)*, then you take them. So mosebetsi oa ka haholo-holo ke ho bona hore ke tla mo thusa hore a gain-e confidence. Ke tla mo thusa hore a shebe ... concept ea ilo e ruta ... re shebe mokhoa oa hore na o ilo e fetisa joang in front of the students, re shebe hape hape hore na by the time a botsang lipotso ... na re test-a skill sefeng. *(TPTP1)*

Some of his views were also shared by another TPT who in her words said:

I believe it [TP] is essential… she should be given chance to practice… the interaction with the students… it gives this new somebody the real picture of what is teaching and learning and how they should handle it… I think he learned from us. That means he learned from the university and he also learns some new things from us too. *(TPTB5)*

The TPTs captured a number of the elements they considered STs were gaining from the field experience. They clearly found the practice in the school as a platform for further learning and reflection for the STs, relating their current learning and the practices of the veteran teachers to what they learned during coursework training, picking the new ideas and skills. TPTs believed that confidence for a teacher was very crucial which the ST was being assisted to develop with regard to content to teach, the methods of teaching it and assessment. The issues that they felt were of great importance included daily lesson planning, active learner involvement and motivation, regular assessment with timely feedback and good command of the subject matter. The ensuing section discusses how the STs were actually assisted in their professional learning during TP.

4.5.2 How STs were assisted to learn to teach during TP according to TPTs

Student teachers out in schools have special needs and requirements that need to be met. The omnipresent divide between the theoretical university and practical in-school learning and the interventions to close the chasm have for a long time been a subject of research in teacher education. However, the features of the possible divide between NUL and practice schools have not been explored hence why they were considered as part of this study. It is maintained that if there could be some evident and strong support, guidance and supervisory systems which keep the trainees, trainers and TPTs interactively engaged, there could be less worrying limitations reported on STs’ classroom practice during TP.

The procedure in teacher training programs in which the acquisition of theoretical knowledge from on-campus courses is coupled with practice teaching in which STs observe the experienced teachers in action assuming they have the practitioner’s expertise; then those teachers in turn
observe the novice teachers, co-teach and gradually let to do it on their own, is the general methodology followed at NUL. However, Grossman et al. (2009) in their advocacy for the “pedagogy for enactment” considering core practices in teacher education, contend the impact of the procedure as might have been envisaged that ST could learn to teach through it. In their opinion, this procedure promotes “a dichotomous view of theory and practice”. This could be so in that, there is that learning of the principles and practices preceding STs adopting the stance of a teacher. They argue that blending the essential practice with the required teacher knowledge into the conceptual learning during coursework training with the assistance and guidance of the educator could impact more positively. In their words they encourage:

…moving away from the more common method in teacher education of presenting principles for teaching or academic knowledge in university courses, asking preservice teachers to observe a related strategy in their field placements, and then requiring them to enact that strategy on their own. (Grossman et al., 2009:278)

They do not in any way object to the learning of the principles, theories and academic content upon which the practice might be based, in the absence of which they attest that that would be reinforcing a view that teaching is a set of techniques which is far from what teaching is, taking the dynamic complex nature of teaching-learning operations and environment.

As one way of how STs could learn during TP, STs at NUL are encouraged to observe and discuss the lessons with their peers in the same and different subject areas. That form of interaction is deemed to serve as one way to support the means of developing teaching skills (Biermann et al. 2015). Having two science STs in one school could be a great help to the STs who had undergone the same training. But it is a very rare occurrence due to the relatively low numbers of the science STs on one hand and practice schools in demand of science teachers on the other which in trying to address this dilemma NUL makes an effort to widen their spread in schools.

TPTs, as it obtains in Lesotho at the moment, are expected to serve as co-educators, professional friends, guides and supervisors to the STs during that experience in the school. In the process of observations, both the ST and TPT are provided the forms for recording their observations and those record forms are to be included as part of the STs’ TP file. With the expressed expectations
by NUL and the set roles for TPTs, the interview questions sought what they actually observed and did as the means to assist STs in their professional learning which could then constitute the ‘what and the how’ they learned their work as teachers. Table 17 shows what was done by the concerned people to assist STs in their learning to teach during TP.

Table 17: How STs were assisted to learn during TP as perceived by TPTs and the emergent themes

<table>
<thead>
<tr>
<th>How STs were assisted to learn during TP according to TPT</th>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUL supervisors/TEs</td>
<td>• TP methodologies</td>
</tr>
<tr>
<td>• Identifying practice schools and STs’ placements</td>
<td>• NUL /SCE Teacher Educators and Practice Schools/TPTs partnership</td>
</tr>
<tr>
<td>• Visiting to observe and assess STs</td>
<td>• Student Teachers’ support and guidance</td>
</tr>
<tr>
<td>TPT</td>
<td>• ST-TPT interactions</td>
</tr>
<tr>
<td>• Familiarizing STs with the school environment</td>
<td></td>
</tr>
<tr>
<td>• Availing oneself for all required support by the ST,</td>
<td></td>
</tr>
<tr>
<td>encouraging and advising</td>
<td></td>
</tr>
<tr>
<td>• Providing teaching materials</td>
<td></td>
</tr>
<tr>
<td>• Observing ST, being observed by the ST, Sharing teaching with the ST, letting ST do independent teaching</td>
<td></td>
</tr>
<tr>
<td>• Assisting with matters such as drawing the scheme of work, modifying and checking the lesson plan, writing test questions, identifying appropriate content to teach, suggesting suitable methods of teaching certain topic/concepts</td>
<td></td>
</tr>
<tr>
<td>ST</td>
<td></td>
</tr>
<tr>
<td>• Seeking information and assistance in issues related to planning, teaching materials, teaching certain topics, testing</td>
<td></td>
</tr>
<tr>
<td>• Searching for information related to the topics dealt with</td>
<td></td>
</tr>
</tbody>
</table>

It can be noted that although TP Handbook and ST peers could be part of how STs learned during TP, none of the TPTs alluded to the role they played in the process. Basically, all TPTs oriented the STs to the school culture, familiarizing them with the work environment and introduced them to the students in their classes. To help them get ready for the actual teaching, they provided them with the necessary materials for teaching, helped with the drawing of the scheme of work, and availed themselves to assist generally as requested. They mostly checked
STs’ lesson plans and in a few cases discussing them for modification (injecting or removing some concepts and suggesting the dos and don’ts) or planning together.

A few who explicitly indicated that they engaged in a number of lesson observations while the rest implied their observing STs; they first let STs observe them teaching and in school SB2 it was the requirement by the school that ST should be observed, giving the weekly report on the progress. In line with the procedure laid down in the TP Handbook, those TPTs further team-taught and eventually let STs to teach on their own still observing them though not being regular so that they could not say how often they did.

With team/shared teaching however, there was no clear hint of how it was actually done as can be detected from the following example: “Sometimes you do team teaching...that somebody teaches this and then you come in as a tutor ... let’s look at it this way” (TPTB11). Even if it would mean that that was where the TPT came in during their joint teaching, it does not suggest that that could have been done following the agreed plan, in line with the expressed expectation about shared teaching in the Handbook:

> The Student Teacher can be given some part to play during the teaching of his/her Tutor ... They must plan that lesson together with the Tutor ... the Student Teacher must also write a lesson plan for his/her part of the work... (pg7).

What TPTB11 said about team teaching had the hidden meaning of someone chipping in on realizing a shortfall with ST’s performance then, which could amount to interruption of one’s teaching. After teaching they would discuss the observations. Both parties did not keep any record for evidence. TPTP1 related their interactions saying, “I taught the first two topics alone, demonstrating to him, then we made a team teaching for about 3 topics so that he gained confidence. Then I let him to teach on his own”. (TPTP1)

Although the starting point according to the guidelines in TP Handbook was for the STs observing TPTs as they taught, that was not done by most TPTs except for 4 TPTPs and 5 TPTBs who also observed STs’ teaching and discussed the lessons after teaching. However, they could only give brief accounts of what they observed and raised in the post-observation conference. There was nothing that the TPTs could give from TEs’ visits that they could say contributed to STs’ further learning since there was no communication at any point between
them. TP Handbook expresses the interaction between the visiting TE and TPT as a wish manifested by “if possible”, not as a ‘to do’.

To contribute to their own learning STs mainly consulted regular practicing teachers especially their TPTs, and reading. In 2015 when the research was conducted, unlike in the previous years there were no site/district peer meetings arranged for STs, although even when they were arranged in the previous years, the actual running and what to consider was left to the STs themselves, who would then send a report of the proceedings to the office of TP coordinator. In all cases regarding how the assistance and support to the ST should go seemed to have been left to the discretion of individuals, there were no concerted efforts. The quotations that follow, in particular indicate how TPTs’ could instill their beliefs about and practices in teaching and learning into STs. Some of them posited:

They [STs] actually go with the owners of the subjects. They get there with them and then the teachers themselves are going to point out the weaknesses of the student teachers. The tutors actually demonstrate to the student teachers. They demonstrate how they handle the class...the classroom management. They teach and these student teachers, they will be observing the tutors and we would be expecting him or her to do exactly what we are doing in the class; the way they handle classroom management as a whole, the way you handle your topics. (TPTB11)

The other TPT expressing the same view differently uttered:

If he had problems in presenting certain topics especially this one of diversity of organisms, I remember he said, how am I supposed to present this? Eaba kea mo joetsa hore u etse tjena, u etse tjena, u etse tjena. At the end, li-notes I gave him my notebook moo ke neng ke entseng last preparation last year (I told him that you should do this, do this, do this. At the end, the notes, I gave him my notebook where I had made the last preparation last year). (TPTB9)

In both cases there is no perceptible indication that there was a formal way of carrying out the observations and discussions despite the desire put forth in the TP Handbook (pg 7) where it says:

To be useful, observations by the Student Teachers should consist of three parts: [a] the student the Student Teacher and the Observed Teacher discuss the focus of the observation before the lesson. They then agree on how the observation is to be recorded; [b] the Student Teacher makes his/her observations and takes notes; [c] the Student Teacher and the Observed Teacher discuss the findings afterwards and the student teacher records the results of their discussions on the Record of Discussion Form. (emphasis original)

In a similar manner the Handbook stipulates how TPT should go about the observation and
discussion of the observed lesson stating:

When the Student Teachers teach on their own or are involved in shared teaching the tutors will discuss the plans with the Student Teacher before the lesson, observe the Student Teachers during the lesson and discuss the lesson afterwards. Lesson Observation Forms should be used and a Record of Discussion should be completed by the Student Teacher and Tutor together and signed by both. (pg 9)

It goes further again suggesting the mode of this interaction which basically should follow the clinical supervision style, the three stages of which are reflected in the Handbook as:

[a] Discussion before the lesson observed

The observer and observed teacher use this time to study what is planned for the lesson and, most importantly, to decide on which aspect(s) of the lesson will be focused on during the observation. Then the observer and observed teacher must agree on how the agreed-on focus will be observed and recorded. The aim of such observation instruments is to have an objective mirror (reflection) of what really has happened during the lesson, which then can form a basis for discussion and counseling afterwards.

[b] The lesson observation using an agreed observation instrument

It is only fair that during the lesson the observer uses only the agreed on observation instruments so that the observed teacher knows what is recorded and will feel less threatened.

[c] Discussion after the observation

This discussion is the most important part of the learning experience and it is here where the professionalism of the Tutor and Faculty of Education Staff comes into play. The Observation Instrument should provide the facts (not the judgments) of what has happened. The enterprise at this point is meant to assist the student teacher to be assessed at a later stage. (pg 5)

The purpose of counseling at this stage is to help the Student Teacher:

[i] to identify possible problems,

[ii] to investigate the origins of the problem, to search for information to solve the problem (e.g. by referring to theories learned during his/her courses),

[iii] to develop multiple solutions and select the most appropriate approach,

[iv] to encourage trying out such a solution and to find ways to evaluate its outcome. (pg 5-6)

The message entailed in the purpose of counseling here reflects the advanced level of reflection for STs with the guidance of TPT. Even when probed on reflection done by the STs during the interview, TPTs seemed to have no idea of the issue itself. It could not be realistic to expect them to have been able to do anything in relation to reflection though one would argue that to
some extent the very fact that they discussed the observations from ST’s classroom teaching, indirectly that was helping the ST to reflect on teaching and learning from the lesson.

Questioning is an unavoidable assessment technique in teaching and since the STs had not been trained on it in the specific subject Curriculum Studies courses, it might be reasonable that STs found it challenging to ask appropriate questions and handle STs’ questions in return. STB1 made an effort to learn construction of questions to improve on the low order questions she asked by checking various sources especially the internet which the TPT admired and her familiarity with ICT. Most STs sought assistance from TPTs and they were assisted in various ways. For instance, TPTP7 attested, “Before she could give a test to students she would come to me and we discuss it and allocate marks thoroughly”. In the cases referred to here and those with the rest, STs made effort to learn how to assess students’ learning.

Basically, STs were assisted in their learning to teach to enhance and extend what they were trained on in the coursework teaching. The assistance was provided to varying degree in different areas of teaching considering the elements of teacher knowledge. The missing component of teacher knowledge then, assessment, was dealt with hence signifying the importance of the practice phase. In the section that follows the information provided by TPTs in connection with STs’ enactment of what they learned in coursework and what they were learning in and from practice is discussed.

4.5.3 The Student Teachers enactment of the acquired knowledge from coursework training

The researcher was not to directly observe the STs in action. Rather, STs’ classroom practice was sought from the TPTs. According to NUL Teaching Practice Handbook, the TPT is regarded as a pivot of support and guidance to the ST during this period. The Handbook stipulates that:

> It is necessary to gradually introduce Student Teachers to the practice of teaching. It is therefore, proposed to start with observations and shared teaching or team-teaching before giving the Student Teacher the responsibility for teaching a class on his/her own... the Tutor is expected to be present in the lesson and is encouraged to use the Lesson Observation Form and to provide feedback to the Student Teacher by discussing the observations after the lesson. (pg7)

It was on this expectation that the researcher hoped to obtain the observations of the STs’ performance in classroom teaching from which the components of teacher knowledge and other pertinent issues in their practice could be discerned.
Generally, very few TPTs did actually observe the STs to a significant extent with the exception of 5 Biology and 5 Physics. The rest of them went with the STs to class in the first week to get them started either merely for introducing them to the students or observing one or two lessons. In two cases in Biology, TPTs could not help the STs through the experience due to their health problems which led to their absence from the school for most of the practice period. The haphazard procedure in classroom observations resulted in no records which eventually led to the dropping of the Observation Forms as the documents for analysis as was originally planned.

From the sketchy reports given on STs’ teaching, the main issues that surfaced are captured in Table 18 which reflected what TPTs recognized from ST operations and from which the themes were then deduced.

**Table 18: STs’ performance during TP as perceived by TPTs and deduced themes**

<table>
<thead>
<tr>
<th>STs’ Performance according to TPT</th>
<th>Deduced themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strengths</strong></td>
<td>• Teacher knowledge</td>
</tr>
<tr>
<td>• Drawing the scheme of work</td>
<td>– content knowledge</td>
</tr>
<tr>
<td>• Daily lesson planning using the syllabus</td>
<td>- pedagogical knowledge</td>
</tr>
<tr>
<td>• Good command of content and confidence</td>
<td>- pedagogical content knowledge</td>
</tr>
<tr>
<td>• Varying teaching methods/strategies (discussion, question and answer, experimentation, lecturing, explanation, teacher demonstration, group work)</td>
<td>- curriculum</td>
</tr>
<tr>
<td>• Good at laboratory work</td>
<td>- students</td>
</tr>
<tr>
<td>• Reference to students’ prior knowledge in lesson introduction</td>
<td>- teaching methods/strategies</td>
</tr>
<tr>
<td>• Reference to life experiences and locally available materials</td>
<td>- assessment</td>
</tr>
<tr>
<td>• Taking advice</td>
<td><strong>Teacher qualities</strong></td>
</tr>
<tr>
<td>• Assessment (questioning, quiz, class work, exercises, assignments, tests)</td>
<td><em>Shortcoming with STs performance</em></td>
</tr>
<tr>
<td>• Timely marking and feedback</td>
<td></td>
</tr>
<tr>
<td>• Motivating and encouraging students (joining science club, searching information for themselves,)</td>
<td></td>
</tr>
<tr>
<td>• Assisting students beyond classroom teaching</td>
<td></td>
</tr>
<tr>
<td>• Showing devotion and passion for the work and care for the students</td>
<td></td>
</tr>
<tr>
<td>• Respect, cooperation and having good relations</td>
<td></td>
</tr>
<tr>
<td>• Punctual, disciplined and presentable</td>
<td></td>
</tr>
<tr>
<td><strong>Limitations</strong></td>
<td></td>
</tr>
<tr>
<td>• Struggling with lesson planning (appropriate content in the columns)</td>
<td></td>
</tr>
<tr>
<td>• Low confidence and shyness</td>
<td></td>
</tr>
<tr>
<td>• Inappropriate content (lacking/irrelevant) and not pitched at the right level of students</td>
<td></td>
</tr>
</tbody>
</table>
• Communication (improper use of the board, low/high pacing, confused concept sequencing, brief explanation)
• Poor control where group discussion or group experiments were used
• Poor time management (not completing the lesson)
• Mostly lecturing even when it was not appropriate
• Derailed by/ inability to handle students’ questions (dwelling on the raised point not quite part of the day’s lesson, deviating from the lesson; spending a long time trying to respond a question)
• Not reaching students’ understanding (brief and unclear explanation)
• Questions mostly at the end of the lesson, none or not much in the course of the lesson to check concept connection and understanding
• Poor questioning skill - mostly low order questions

All TPTs talked of their STs having engaged in drawing the scheme of work, drawing daily lesson plans with reference to the syllabus, involving students in their teaching and showing command of the subject matter. They reckoned their involvement to varying degree and in differing ways in general school activities. Although they made less elaborate descriptions of STs’ classroom teaching, they highly appreciated extended assistance to students beyond the teaching time even those from the classes they were not directly involved with. However, there were some limitations with those attributes with the exception of the scheme of work where it was done jointly by a number of teachers sharing the same level with streams of classes which is a common occurrence in Lesotho secondary schools.

The observations seemed to have basically been on STs’ actions and students’ reactions which TPTs mentioned only upon probing. But it was not revealing the leverage to the enriched teacher knowledge and reflective thought and practice. That triggered some questions like; “Is it because that is what they consider the core of teaching? Or is it because they believe the STs with the training they have been offered have it all? Or is it because they are uncertain as to what exactly they are to observe? Because, unlike the TPTs in the study conducted by Ben-Peretz and Rumney, (1991) in which TPTs readily identified STs’ shortcomings with classroom teaching, in this case it was mostly the positive side of the matter that was presented, mostly about STs’ disposition, to an extent that there were even some contradictions between what the TPT and
her/his ST reported. To confirm the limited classroom observations made by TPTs, one of them stated:

Ha ke re motho eo o rutile lesson tse bo peli tse tharo ke le teng. Feela joale ha ho s’o ka thoe ke bue ka eena ka matla matla ke tl’o sitoa hobane oa utloa hore e la ba se ke re motho enoa ke mone hore o sharp (This person has taught two, three lessons in my presence. But now when I am to talk of him in depth I won’t be able to because you get it that I said I had seen that that person was sharp’). (TPTP6)

However, those TPTs with more experience with working with STs and PGDE qualification had something more to say about STs’ classroom performance, both strengths and weaknesses. For instance TPTB1 talked of quite a number of issues among which were shortcomings he observed with his ST acknowledging as the rest of TPTs that the ST improved on their various shortcomings with time. He included areas such as the introduction and conclusion of the lessons saying, “The introduction was not exciting, and the conclusion not impressive”. He was impressed that the ST highly involved the students in her teaching. However, that involvement led to her failure to cover the objectives within the allocated time.

One cause for the poor time management (challenge for most of the STs) was seen also as lack of skill to deal with students’ questions as she would spend most time discussing those questions. TPTB1 even confirmed that the ST was not fluent as she also confessed in the pre-TP interview which he coupled with the problem she had with pace, tone and uncertainty and confusion with scientific terminology. Another shortcoming with communicating information was with its written mode where she “struggled with proper use of the board, not able to separate the important points from those provided during brainstorming”. On the contrary in handling students’ questions, STP9 according to his TPT, “When learners asked questions, he would just give a brief response and continue teaching without being concerned if the learner understood or not, like they were just memorized for the lesson”. (TPTP9)

During most of his classes, he would continue teaching even when the class is very noisy because of learners discussing.

In both cases the ST’s dealing with students’ questions had a limitation that could jeopardize teaching and learning. In the case where the explanation of one issue was prolonged, time would
be spent leaving little or no room for other planned issues, also leading to loss of interest and concentration with some students that could eventually lead to some disciplinary problem. In the other, the brief response could result in students’ left without having quite grasped the concept. While one also felt it could have been due to ST’s inadequate knowledge of the concept or what the students ought to have been furnished with, the TPT in question opposed the view that it might have to do with ST’s content knowledge which he concluded was fine.

In expressing their views about STs’ strengths and limitations in varying areas in their performance as teachers, some TPTs declared:

I was very happy with her content and we are basically being helped by our syllabus which is just guiding us as to how far are we to go as far as the content is concerned. (TPTP13)

TPTB8 made the following observation with ST’s transformation of the content, “she struggled in giving learners content appropriate for them.” Probably realizing the same limitation, TPTP7 decided to use the following strategy to combat the situation where she, “normally used to sit with her to prepare notes”. In a few cases the ST would show shortfall with the teaching of the content as could be noted in TPTB9 articulation:

...especially when teaching the one that deals with the micro-organisms. That one, it was tricky for him to teach. I don’t think it’s his weakness. I think the topic itself, it’s tricky. We cannot have teaching aids unless we have, maybe we can present smaller things on the chart which he did not do. He was lecturing. (TPTB9)

Some other areas that TPTs referred to are reflected in the following views:

...always used a very audible voice that attracted the attention of his learners ... most of the time would state the objective(s) of the lesson and introduce the lesson very well ... always showed a very confident display in terms of the subject matter. (TPTP9)

It was a bit challenging for him to make a lesson plan. Had to learn a proper way of doing it and get familiar with the format, had to get used to it. For the first two lessons teaching on his own, the confidence was still low, but improved as time goes on. After every class we sat down discussing the lesson, we talked about where to improve, in controlling the classroom, so that he can finish the content he was prepared to teach. (TPTP1)

Major challenge ... is the process of monitoring the learners during the activity.... Due to lack of equipment, which normally resulted to large groups and activities lasting for longer than expected... always consulted on the interpretation of the curriculum objectives ...[transforming] the syllabus objectives into classroom objectives. (TPTP2)
TPTs had their focus on differing issues with STs’ classroom teaching. One would then wonder to what extent they were aligned to those targeted by the TEs in their training and those that they mainly wished the STs could master through the field practice to contribute to their knowledge (Charlès et al. 2014). Without clear collaboration and shared goal(s), it could not be easy for the TPTs to focus their efforts in the same direction as the TE resulting in STs’ suffering the consequences of the divergent perceptions about STs’ learning to teach. They further included teacher conduct and qualities exhibited by their STs. The qualities that all of them mentioned were respect, cooperation and having good relations with TPTs and the school community at large some also included punctuality, discipline and being presentable. They however did not get into relating the qualities exhibited with the teaching by the STs.

The methods that the ST employed were question and answer, group and class discussion, lecturing, and experimental work (teacher demonstration and students experimentation). As some STs declared their resorting to lecturing when confronted by a challenge, others used it as the main method of their teaching as TPTB6 claimed about his ST. In their assessing students they used class work/exercises, quiz, assignments, tests, giving timely feedback in the form of providing the expected answers. It is evident that STs exhibited varying strengths and weaknesses in their teaching. How coursework training and STs’ practice seemed to link is discussed in the section that follows.

4.5.4 The Linking of Coursework Training and Practice Teaching

At this point in the teacher pre-service training stage, the link between coursework and practice learning was revealed through, as one means, the interactions between NUL and the practice school staff in relation to ST’s professional growth. The TPTs appreciated the role played by TEs in preparing the STs and following them into the schools. In practice schools, those STs were attached to the teachers who gave their classes for practice. Since the field experience is part of pre-service training, it is reasonable that TE, having trained these people then extent their training into the field. Given that only two visits were possible, one for observation (assistance) and the other for assessment, TPT was entrusted with daily support and guidance to the ST.
TP Handbook was yet another means of support and guidance through which the University linked its work with that expected with TP. Its use by TPT could enable them to play their role in assisting STs in their professional growth. All TPTs attested that the partnership between them and TEs was non-existent. In their words they proclaimed:

Batho bana ha ba fihla mona ba fihla ba behoa matsohong a rona ebe ho fella mono. Ha ho na motho e mong eo ke bonang a ntsa fihla ho thusa hore a utloehore na ho ntso ea joang (When these people get here they are only put into our hands and it ends there. There is nobody that I see coming to help to find out how things are going). Ke taba ea experience feela hore ‘na ha ke le teaching practicing ke la ka etsoa tjena. (It is a matter of experience only that when I was on teaching practice I was helped in this manner). Ha ho na ntho e ngoe eo ho thoeng motho enoa o sebese le eena ka tsela ena le ena le ena le ena (There is nothing else that says you should work with this person in this manner, that manner). Ha ho na le motho ea ka tlango ho uena a re ‘batho ke bana re lebeletse one two three’. (There is nobody who comes to you saying here are these people we expect one two three). (TPTP6)

This clearly indicates that on their visits, TEs did not meet with the TPTs to discuss the assistance needed for the ST and thus creating an opportunity to get it from TPTs how the STs were progressing with their learning to teach. Having had no copy of the TP Handbook, TPTs used the experiences they had with their TPTs when they were STs themselves or they used their individual pragmatic knowledge. That could not essentially be enhancing what the STs had actually been taught and expected to follow in their teaching. Another TPT expressed a worry with visiting TE from a different subject area to that of the ST who definitely could not be knowledgeable about the specifics of the subject and therefore being not aware of the nuances of the subject matter and requirements. That could also be one of the reasons for not interacting with TPTs on their visits. He said:

I think things are not that well because you find that the observers or the supervisors who came to the school usually they were just people from the Faculty of Education sometimes you find that they are not people who are specialists in the science subjects. I think it was essential for the science department to ensure that one should be a person coming directly from the department is the one to observe the science teachers. I think the science [Education] department should try to derive ways of ensuring that science students are well assessed by specialists in science, the lecturers coming directly from the department. One feels someone who is teaching science or the student teacher from the science department is being observed by someone maybe from totally different field, one have [sic] in mind that probably a person might not be familiar with the appropriate strategies and methods of teaching science… most of the time it involves practical work. So my assumption is that the person coming from the department would be familiar with the way the science practicals should be conducted. I do believe that they need someone who is really familiar with the proper methods and strategies in teaching science. (TPTB1)
Another TPT reckoned that the University should work in close relationship with practice schools in various educational matters other than TP, including general areas which could benefit both sides thus echoing the view of the participants in the comparative study conducted by Allen and Peach (2007:119) who “called for more personal contact between university and school staff through such initiatives as regular, formalized discussions and social events and more frequent visits to schools by university staff”. TPTB11in her view stressed that “NUL people should always, always make it possible that people [tutors] should talk to them where they need help”. Elaborating more on how the university and the practice schools should function, that same TPT suggested:

One thing that I think should be done is, if we want to help this person, we should have a discussion. That is, when you have come, try to tell me what it is you have found from the student teacher so that... I should follow up. I should know that this student teacher is unable to do this, could you please help. As the educator you may have seen things that I have not seen. But then you are going back to the university with that and I don’t know. It’s true you have told the student teacher, but I don’t know it. We can actually sit down with the student teacher, either I follow that in class or we sit down and talk about it. I may have a way of, for him or her to go about the problem. (TPTB11)

One would think that since the TE, especially in the same subject area who has trained the ST and knows what was expected could, by bringing in the TPT ensure continuity and coherence with what the ST had learned on campus while the tutor would inject the contextual practical elements as the experienced practitioner. But, while the TE did not share the responsibility with TPT on their visit to schools, they did leave the written report of their observations and discussion with the ST from which the TPT could learn the situation of the ST and then work out how to take things further for ST’s professional development. The following excerpt reveals what TPTB11 perceived of the TE’s observation record and visit.

Interviewer: But on their visit the educators, they leave a written record for the student teacher.
Interviewee: It doesn’t normally get to the tutor.
Interviewer: But there is normally a record that is written, of the findings and the discussions.
Interviewee: That means the student teacher doesn’t know that she can discuss that with the tutor.
Interviewer: How can she know?
Interviewee: The educator should advise that this thing you can discuss with your tutor and see that you are doing things better than you did in the past.
Interviewer: Does this imply that actually there is no clear, or there are no clear guidelines or mechanisms or there isn’t clear collaboration as to what the student teacher should do? Actually you don’t know how you interrelate, the three of you; the student teacher, the tutor and the educator?

Interviewee: What I do as a tutor, I just go there...we will discuss with the student teacher whatever problems he came across in class and it stops there. It is between me and the student teacher. On the other side it will be between the student teacher and the educator...I don’t even know what it is that I have to guide this person in, what is expected of me. What I feel is, we must make a three legged pot, the student teacher, the educator and the tutor, work hand in hand in trying to help this person.

This view of three legged pot supports the tripartite dialogue (Mtika et al., 2014) which in their case included the joint observation by the TE and TPT and in this case the TPT has not referred to it. When TE and TPT assist ST in separation, that might not lead to a common goal as people could have different perspectives on what the ST should learn and how s/he should be assisted to achieve the aspired development. That could be calling for reconsideration of the training for TPTs and Senior TPTs that used to be done before TP and had been discontinued due to lack of funds (National University of Lesotho, 2015). That training might lead to NUL ensuring that TPTs obtain and use TP Handbook thus raising their awareness of what is expected of them and they could time and again be able to refer to it. Again, together they could work towards a common goal and ensure they collaborate and three of them benefit from the reciprocal nature of the enterprise they engage in.

The main constraints for well established and viable partnership between the universities and practice schools identified by Allen et al, (2013), apply to NUL as revealed in the data collected from RPTs, TE and STs. Those are; “a dearth of time, resources and workload flexibility” (p119) which might have restricted the enforcement of the activities that could build and sustain the beneficial partnership. Almost all the participants in this study complained that the duration of TP was limited. That could be one of the probable reasons for TEs leaving out TPTs upon visiting STs especially when it would not necessarily be the TE in the subject area. Normally, there are relatively too many STs to visit during the ten week TP period, and they are placed in schools that spread from the North to the South of the country’s Lowlands region. Some general views of the TPTs regarding the pre-service training of STs including the interview follow.
4.5.5 General views of TPTs

In addition to their acknowledging the vital contribution of teaching practice to STs’ professional development despite its short duration which they wished could be reconsidered, TPTs appreciated the contribution that STs’ made towards students’ learning. All of them recognized that contribution from students’ teaching in students’ performance in tests in the process of STs’ practice and for some, even some time after they had left. There was noticeable change of students’ attitude towards the subjects, one indicator being the increase in the number of students enrolling in the science club where they existed. One TPT excitedly had this to say, “Science Club activities enforced the subject matter outside the normal classroom. Learners have acquired new skills not often included in the classroom” (TPTB5).

TPTs further acknowledged that they had learned some teaching techniques from the STs as well as some content especially with the new topic included in the LGCSE biology syllabus dealing with diversity and classification of organisms which fortunately was dealt with in the Biology Curriculum Studies during on-campus training. As a result, they all enjoyed STs’ presence and wished they could have one in science every year so that they could work on their role for the development of the STs. They confirmed that they had not done much towards STs’ development and learning to teach, especially that they did not have guidelines. They were already planning to find the ways of getting hold of TP Handbook for its use in the future. They strongly regretted the missing collaboration between them and the NUL subject TEs.

The most experienced TPT who underwent training at the Teacher Training College and later at NUL had a lot to say comparing her experiences with her training in the two institutions. She elaborated her perspective thus:

At NTTC (National Teacher Training College) the student teachers would start by micro teaching. Then from the micro teaching … they go to schools around that area, and I found that to be very good. It will have started with the peer teaching or micro teaching, that when you are in front of the students you have to be presentable, things like that. And presentable simply means even the dressing up and things…and the way you talk to your students. This was going to be taken over to a proper classroom situation where there are students who are going to behave differently from your peers. We used to go [mentioning the high schools in the vicinity of the College] even the primaries we would be taken to [mentioning one primary school] so that you have the feel of all the different ages of children, so that when you go there you know that I will
meet this kind of children. That’s one thing that I think could also be done at NUL as a way of making these people learn to teach. (TPTB11)

This TPT was echoing the importance of practicing in context and considered it a crucial means through which the STs could be helped to learn to teach which has been proven to be effective in most of the TTIs in the countries where STs are taken for practicum sessions in the course of their training. At NTTC then, it was termed Teaching Practice Preparation (TPP) during which after several visits to various schools, the responsible TE would teach in a school while the group s/he was allocated observed after which they would start teaching.

Talking about the situation at NUL she attested:

They [STs] are actually not given enough time because I think there are just few lessons from education. Most of the time, they are given the content [from Faculty of Science and Technology] more than the professional skills. We only meet the education people at second year and sometimes you find that there are only two courses. My view is that … NUL in providing this education, it should be wholly, wholly education; peer teaching, micro teaching… But the time factor with that… my feeling was that if NUL could have the School of Education, I think in that case we could have very good teachers. The students are not going to be combined with general students, for instance, the general B Sc [Bachelor of Science] students. Actually the education students are ill-treated by the Faculty of Science in that, the education students, they cannot say that their classes are clashing. The lecturers who are teaching these kids just look at the B Sc general students. If the general students are fine with the time-table, it is up to the education students to see to it how they can cope with the time-table. I am talking from experience. (TPTB11)

Some TPTs were also thrilled with the interview which they felt was an eye opener to them and most of them wished it could be a normal procedure that there were discussions about STs’ practice. In their words some said:

...this is a chance that I’ll never forget myself. I have been a coop teacher since long time back… but it is my first time today to be talking to a tutor like you are doing Madam, and this is really very good to me. (TPTP13)

Sharing the same sentiment and elaborating on why she appreciated the conversation, TPTB9 said:

This has opened my eyes on role that I was playing that we have discussed or talked about. And I think for the future things that I wasn’t aware of I will make use of, ka potso tsena tseo re buileng ka tsona (with the questions that we have discussed). Haholo (Mainly) the Handbook and the use of the environment. Especially this Handbook, it’s going to guide me even the student teacher and I promise I am going to make use of them”.

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However, TPTP6 felt differently saying that if it was going to be a practice to hold such discussions in relation to TP and STs, he was going to refuse to give his classes to the practicing STs. Although there were mixed feelings among the TPTs, their views provided the information which gave a hint to some issues that needed to be reconsidered as a way of reducing the chances of not meeting the needs for STs enabling them to acquire the conceptual and procedural knowledge essential for teacher efficient and effective performance thus diminishing the reported shortcomings with STs’ classroom teaching.

4.5.6 Summary of the findings from TPTs interview

Inevitably, teaching practice in the pre-service stage in teacher professional development is deemed crucial for STs’ professional growth as also attested by all TPTs who participated in this study. TPT is entrusted with the responsibility of supporting, guiding and supervising the student teacher to enhance and extend their professional teacher knowledge which they have done to varying degree and proficiency. Nonetheless, STs as perceived by TPTs gradually developed content knowledge for teaching, appropriate ways of teaching that content and assessing students’ learning as well as developing teacher conduct. TPTs further acknowledged the impact of STs’ teaching on students’ learning.

There were also limitations identified in connection with the way teaching practice was run especially with its duration and lack of collaboration between themselves and TEs hence their not knowing exactly what was expected from them in contributing to STs’ learning from and in practice. But the longstanding partnership between NUL and practice schools seemed to be more of the cooperative than collaborative nature. Although most TPTs provided hazy information about the elements of STs’ classroom teaching, all of them alluded to their conduct and qualities. Nonetheless, the provided information bore the points that could shed light for the identification of the probable cause(s) for the observed and reported shortcomings in STs’ teaching during TP. The section that follows consolidates the findings of the whole chapter.

4.5.7 Conclusion

In an attempt to answer the research question the essence of which was to explore the two phases of the pre-service stage for the initial professional development of science teachers at NUL in
learning to teach, groups of relevant stakeholders (RPTs, TEs, STs and TPTs) were interviewed to discern from their perspectives, the probable cause(s) of the reported inadequacy in STs’ classroom teaching during TP. They all acknowledged to varying degrees the conceptual and practical knowledge that the STs were afforded in the two phases of their training which consequently led to their professional development. However, even this time around, there were apparent limitations observed and reported in STs’ classroom teaching around the domains and components of teacher knowledge.

Since the focus in the context of this study for STs’ portrayal of their competence with teaching was underpinned by teacher knowledge domains and their components, teacher knowledge became an a priori theme which seemed to have been considered and handled in different ways in different learning opportunities and settings. Several emergent themes surfaced, some shared by all and others shared by some participants across the groups. These emergent themes are: teacher qualities, practice teaching and STs’ enactment, TP methodologies, NUL/SCE teacher educators-practice schools/TPTs partnership, ST-TPT interactions, ST support and guidance, and participants’ general views.

Alongside the factors positively influencing STs’ learning to teach were some shortcomings in the opinion of the participants which probably jeopardized the desired impact on the professional development of the STs; the most prominent ones being time factor and collaboration. The assumption could be that with ‘sufficient’ time and well organized partnership activities, the rest of the emergent themes could have been catered for. The ensuing chapter discusses the findings from document analysis.
Chapter 5

RESULTS AND DISCUSSIONS OF THE DOCUMENT ANALYSIS

5.1 Introduction

The previous chapter presented and discussed the interview results the findings of which will be complemented with those obtained from analyzing the identified existing relevant documents. In this chapter the results presented and discussed are those obtained from initially analyzing the documents culminating in their identification as bearing some information related to the research question. The results from each document are presented separately coupled with a brief discussion. The sequence of the document starts with the course synopses that serve as the content syllabi for the courses offered to STs. Then follows the course outlines as the teaching curriculum developed and used by teacher educators derived from the course synopses. The Teaching Practice Handbook that guides the second phase of the pre-service stage of teacher training in a way linking the intents of TEs’ endeavors in preparing STs for their teaching with the actual practice. Student teachers, as the focus in this study provide information on a crucial element of their teacher knowledge, lesson planning, on the basis of which they execute teaching. Hence, the lesson plan comes as the fourth document analyzed. Having been given the opportunity to practice teaching, the end-of-practice report by the ST comes as an analyzed document providing ST’s field-experiences from which the researcher intended to elicit the areas of professional development and how they came into play in the ST’s learning in that phase. The last document discussed is the report by TPTs who were to nurture STs’ professional growth throughout the practice period, adding to STs’ personal experiences.

The order of presentation was based on the premise that the preparation of STs was guided by the set curriculum which had to be implemented for STs’ coursework learning. The effect of the curriculum could be detected best from STs’ practice where the directly involved persons in the context of this study were the STs themselves and their mentors, TPTs, hence the inclusion of their documented experiences and views. The summary of the findings from the analyzed documents and their discussions are then summarized completing the chapter in a consolidated conclusion. With the document analysis, the presentation and discussions do not necessarily involve all the five areas per document that have been followed in the preceding chapter. Rather, it was the nature of the document that informed the analysis which also applied for the presentation. The baseline is still the essence of the research question and its sub-questions.
Thus, each document does not necessarily answer all the five areas the questions target but any one or more as it was feasible. The analysis in this case has been qualitative and interpretive in that the meaning the documents bore was interpreted with the focus on teacher knowledge domains and components being developed and the methodologies employed in the process still considering the emerging pertinent issues. The section that follows discusses the course synopses for the Curriculum Studies courses selected for this study.

5.2 The Course Synopses

The course synopses of the program courses offered at NUL should ideally be produced each academic year, incorporating the changes that may have been prompted by issues that emerged in the course of the year to appear in the University Calendar. The effecting of the changes in the program and its courses follows very firm, rigorous and iterative procedures through various bodies of the institution as revealed in the draft report of NUL Science Education Self-Review produced in 2014 (National University of Lesotho, 2014). One takes it that the course synopses bear the content that best helps the program to meet its purpose which should be in line with the university mission (National University of Lesotho, 2007) which is to produce graduates that are responsive to the national needs.

The course synopses list the topics that the teacher educator is expected to treat in the training of prospective teachers. It is thus an abridged equivalence of the syllabus, lacking most features of the school syllabus which would basically include issues such as the introduction pronouncing its purpose/goals, aims and objectives and curriculum content as revealed for instance in the LGCSE physical science syllabus (Kingdom of Lesotho, 2014). The course synopsis serves as a guiding tool to teacher educator hence why it was selected as one of the documents to be analyzed in this study. The researcher believed that the tool should entail the content matter to be afforded the science prospective teachers, and probably, implicitly, how it could be treated to enable the prospective teachers to acquire the necessary and appropriate knowledge, skills and attitudes for them to be effective teachers. The researcher further believed that teacher knowledge was underpinned by content, pedagogy and their blend in action, guided and supported by educational theories. Then our interest was mainly with the blend of content and pedagogy, pedagogical content knowledge (PCK) in the process of teacher training, learning and
practice which cannot in any way be divorced from its pillars, content and pedagogical knowledge.

The subject TEs design the synopses in their subject area and get involved in the review and refining process, thus getting immersed with the training subject course content. The same TE would be teaching the course, though sometimes at some point it might be a different person in the same area of specialization. This is the context under which science Curriculum Studies course content is produced, which is supposed to be reviewed regularly to meet the changes made in the school curricula. The analysis of the course synopses was done to establish what specific subject content, the pedagogies and their blend were depicted to guide the TE in what and how to teach prospective teachers to teach. The following sub-section presents and discusses the content borne in the selected course synopses.

5.2.1 The content borne in the selected Curriculum Studies course synopses

The course topics in the selected course synopses for Year IV were the same for both Biology and Physics courses differentiated by course codes and the mention of the specific subject. Table 19 gives a list of the topics in the course synopses together with the established teacher knowledge domains and their components and the emergent issues.

Table 19: Content topics in the Biology and Physics Year IV Curriculum Studies courses

<table>
<thead>
<tr>
<th>Course Synopsis Content</th>
<th>Teacher Knowledge Domains and Components, and emergent issues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part I:</strong></td>
<td>• Content knowledge</td>
</tr>
<tr>
<td>1. Study of O’Level curriculum materials</td>
<td>• Pedagogical knowledge</td>
</tr>
<tr>
<td>2. Lesson planning and drawing of Scheme of work</td>
<td>• Pedagogical Content knowledge</td>
</tr>
<tr>
<td>3. Student-centered activities and practicals,</td>
<td>- Curriculum</td>
</tr>
<tr>
<td>4. Teaching strategies,</td>
<td>- Orientations to subject teaching</td>
</tr>
<tr>
<td>5. Use of the local environment,</td>
<td>- Students</td>
</tr>
<tr>
<td>6. Methodology of selected [subject] topics,</td>
<td>- Teaching strategies</td>
</tr>
<tr>
<td>7. Micro/peer teaching</td>
<td>• School context</td>
</tr>
<tr>
<td>8. Preparation of [subject] educational projects.</td>
<td>• Reflection</td>
</tr>
<tr>
<td><strong>Part II:</strong></td>
<td></td>
</tr>
<tr>
<td>9. Evaluation of teaching practice</td>
<td></td>
</tr>
<tr>
<td>10. Common problems in O’level [subject] teaching;</td>
<td></td>
</tr>
<tr>
<td>11. Selected topics and specific problems</td>
<td></td>
</tr>
<tr>
<td>12. Presentation and evaluation of projects.</td>
<td></td>
</tr>
</tbody>
</table>
As the course synopses had not been revised since the introduction of LGCSE curriculum in 2014, the school curriculum was still reflected as the Ordinary Level (O’Level) offered by the United Kingdom as Cambridge Overseas School Certificate (COSC) then. The Curriculum Studies courses designed to run over the academic year were divided into two parts to be offered before STs went for TP and upon their return. The topics as they stood did not in explicit terms say which ones were for the STs in their capacity as learners and which for their status as teachers for the benefit of the students they would be teaching. But the synopses content had the elements of teacher knowledge and its components with the exception of assessment of students’ understanding as one of the components of PCK which was not included in the list of topics. Assessment as a crucial skill and an integral means in education to support learning (Yan, Chi, & Cheng, 2015) by determining progress with teaching and learning has to be learned and practiced as it would be required later in STs’ teaching throughout their career. The effects of this omission have already been alluded to in chapter 4.

The course content reflected in the course synopses covers the essential issues surrounding the knowledge and skills that a teacher requires in order to execute his work of teaching. It basically includes the subject content to be taught (CK), the pedagogies to be employed in teaching the content (PK) and the blend of the basic knowledge (PCK). The very fact that the course synopsis identifies among other factors, the subject, the syllabus with its aims, objectives and content, the level to be taught and the methods to be used for students better understanding, it sets the context for which the teacher is prepared to operate in with some form of practice (micro/peer teaching and teaching practice).

Furthermore, their intricacy and interrelatedness make it difficult to deal with them in isolation both theoretically and practically, in planning and teaching. Ultimately, the topics forming the building blocks of PCK which cannot be applied outside some form of context are identified. Thus, the proposition of various domains of teacher knowledge and their components in research is believed might be a way of helping the better understanding of the otherwise very complex and obscure work of teaching that engages cognitive, efferent and afferent domains. That disentangling makes it possible to some degree to explore teacher knowledge from various angles.
The course synopsis in its abridged form does not portray how the TE would actually go about the prospective teacher’s professional development through the teaching of the specific subject in the Curriculum Studies course. Neither does it address other areas of concern in the research question, the how the content was planned to be accessed by STs on assuming their work as teachers. It was then compelling to find out how the TE transformed and represented the course content for use in teaching. The section that follows presents and discusses how TEs in their course outlines transformed and presented the synopses content to make it accessible to the STs who are learners and teachers to be; learning to attain a qualification on one hand, and competencies for being effective teachers on the other.

5.3 Biology and Physics Curriculum Studies course outlines

Over the years, transformation and representation of the course matter was left with the individual TE to decide on its design and execution. On the basis of the course outline an individual would design and employ the methodologies (general procedures) and the pedagogies (the teaching methods and strategies) s/he deemed appropriate for the course. The TE is now a teacher of teachers, the role considered complex by researchers (MacDonough, 2013, Korthagen, 2010), and therefore the role that would require one to have been well founded for doing. There is no training program at NUL for TEs, neither is there induction scheme for them for any form of responsibility as expressed in the National University of Lesotho (2014) draft of the SCE Self-Review Report. One would therefore contend that the guiding tools should be as explicit as possible to enable whoever is to use them to be able to understand their intent.

In 2013, the Science Education Department (SCE) at NUL enforced the format for the course outline proposed by the University, making the modifications that made it more suitable for the science courses. The format entailed a number of categories the basic ones including: course description, objectives, content, teaching and learning activities and assessment methods which were the units from which the information in relation to the research questions was drawn and included in both course outlines. The course outlines are presented and discussed in the ensuing sub-section.
5.3.1 The Content in the Biology and Physics Curriculum Studies Course Outlines

The course outlines were drawn on the basis of the course synopses as gathered from TEs’ interviews reported on in Chapter 4. The content issues presented in the course outlines for both courses (briefed and as is), their similarities and differences, as well as teacher knowledge domains and their components including the emerging issues are depicted in Table 20.

Table 20 Content in the Biology and Physics Curriculum Studies course outlines

<table>
<thead>
<tr>
<th>Biology Course Outline content</th>
<th>Physics Course Outline content</th>
<th>Similarities</th>
<th>Differences</th>
<th>Teacher Knowledge domains and their components and emergent issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>•Aims and relevance</td>
<td>•Aims and relevance</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>•Pedagogical content knowledge</td>
</tr>
<tr>
<td>•Context of learning</td>
<td>•Learning Theories</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>Curriculum</td>
</tr>
<tr>
<td>•Effects on the teaching and learning</td>
<td>•Teaching Strategies</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>Students</td>
</tr>
<tr>
<td>•Curriculum requirements/demands, content and challenges.</td>
<td>•Practical Work</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>Teaching strategies</td>
</tr>
<tr>
<td>•Resources - the local environment, textbooks, students’ diversity and motivation</td>
<td>•Nature of Science and Physics</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>Assessment</td>
</tr>
<tr>
<td>•Topic planning/resource file relevant</td>
<td>•Lesson Planning</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>Orientation</td>
</tr>
<tr>
<td>•Audio-visual and laboratory materials, scheme and record of work</td>
<td>•Attitudes and Beliefs</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>Content knowledge</td>
</tr>
<tr>
<td>•Planning instruction and implementation</td>
<td>•Testing and Evaluation</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>Pedagogical knowledge</td>
</tr>
<tr>
<td>•Self evaluation</td>
<td>•Part A: Learning Theories</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>Context</td>
</tr>
<tr>
<td>•Teaching strategies -Learner-centred teaching (active learning, practical work/experiments and demonstrations, investigative learning, high school projects Problem solving approaches</td>
<td>•Part A: Learning Theories</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>Reflection</td>
</tr>
<tr>
<td>- Direct acquisition of information</td>
<td>•Part A: Learning Theories</td>
<td>•Part A: Learning Theories</td>
<td>•The content bears some elements of the synopsis content.</td>
<td>•Use of questioning, diagrams, pictures and</td>
</tr>
</tbody>
</table>
models or real specimens, analogies, elaboration, examples, discussion groups, concept maps, field trips; independent learning and student presentations
- Peer Teaching and functions
- Preparation for and Evaluation of Teaching Practice

<table>
<thead>
<tr>
<th>models or real specimens, analogies, elaboration, examples, discussion groups, concept maps, field trips; independent learning and student presentations</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

The content for student teachers is multidimensional in that it bears subject matter for teaching (high school subject content) which the prospective teachers are to know and understand. Their knowledge of the content is for their assessment leading to their attaining a qualification. Their knowledge and understanding of this content prepares them to project it into its implementation in teaching. They are then taught the methods and strategies for the specific subjects, how to identify and apply the appropriate ones to use in teaching the subject and some specific topics taking into consideration the factors that come into play which basically form the domains of pedagogical content knowledge. The content constituted the conceptual and practical knowledge. Although the content seemed to be expressed and presented differently by individual TEs, the essence of what was targeted for the professional knowledge of the prospective teacher was heeded. The next sub-section looks into how TEs designed their plan of implementing the set content.

5.3.2 The methodologies and pedagogies reflected in the Curriculum Studies course outlines

The domains of teacher knowledge highlighted by researchers such as Shulman, 1986; Grossman, 1990; Magnusson et al. 1999) are highly interwoven in the Curriculum Studies course teaching syllabus (course outline) that triggered a dire need for further investigation into how the concerned teacher educators enacted it. The methodologies and pedagogies the two TEs employed are reflected in Table 21 showing their similarities and differences.

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Table 21 Methodologies and pedagogies employed by TEs as reflected in the course outline

<table>
<thead>
<tr>
<th>TEB</th>
<th>TEP</th>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
</table>
| Approaches  
TE has not explicitly mentioned how she would conduct her teaching but implied in the outline. | Approaches  
Learning activities will mainly be dominated by group work (small and whole class) and classroom talk | •In explicit and implicit terms the main approaches are group work, classroom talk/discussion, STs' practice and educational project.  
•Assessment modes and targeted areas. | •Presentation style and expression. |
| Assessment modes  
Assignments, tests and examination | Assessment modes  
Assignments, tests and examination | | |
| Assessment areas  
Class work, Presentations, Peer teaching, Unit Plan Project, Lesson plan, Practical work, | Assessment areas  
Class work, Class Participation Micro Teaching, Project Reading Summaries, | | |

Student teachers were to be engaged in classroom discussions in various styles which were likely to have been directed by TE. From the modes and types of assessment the STs would do some work on their own that they would then present in class which could be in any form, practical or exposition. The presentations basically give STs an opportunity to practice and thus develop some teaching skills. The momentous practice with teaching would be with peer/micro teaching for which the STs ought to do some reading and draw the lesson plan. That task involved preparation of the necessary learning materials and environment.

Peer teaching brings in a number of factors that play a role in teacher work. In the same manner, the educational project that STs were to create and develop demanded a lot of preparation before its implementation. The methodological and pedagogical issues employed by TEs included both theoretical and practical aspects of teaching and learning for which varied learning opportunities were provided. For instance, the available curriculum materials such as scheme and record of work, and the syllabus could not only be discussed but would also be used in planning for a school subject topic from the syllabus in current use. The STs would therefore be assisted to acquire knowledge of subject matter and how to deliver it for students' learning while at the same
time they would be guided into taking the responsibility for their own learning through some proposed reading and producing a focused and utilizable project in the specific subject.

Although the educational project designed on campus during coursework training and implemented during TP is included in the course outline for both courses, their focus was not the same. For instance the information in the Biology course outline concerning educational project file states:

Teaching file to include and reflect among others the following: Biology content taught; Teaching methods used; On-going reflection after each lesson; Summary evaluation essay of student TP experience (Considering identified major factors/influences that affected effective biology teaching and learning; need for or possibilities for critical change and strategies to be adopted; classroom context and students’ engagement in and understanding of biology”.

The Biology project which is a topic plan seems to be considering the elements constituting teacher knowledge about which the STs are to reflect and work out the means to improve. The focus in Physics project is students’ attitudes or misconceptions which the STs would have to observe during TP and write on producing a report that had not been identified as one of the study documents.

At the end of teaching practice STs reflect on and evaluate their teaching and students’ learning, including their projects. The video clip on a lesson where the Physics STs would be employing classroom talk though mentioned in the interview, is not reflected in the course outline. Even though the similar course synopsis is used to guide TEs, they are at liberty to use their discretion of how they actually carry out their teaching e.g. how much of the discussion relative to practice, number and nature of tasks, assignments, tests etc. In Biology, coursework assessment is organized thus: “Class participation (5%), Peer teaching (15%), 2 Tests (50%) Unit Plan (30%)” and it is not stated in the other course outline. Already there is a disparity in some areas of the training programme within the same department.

The end result of this situation might be different groups of STs having developed different competencies because even with the similar exposure, individuals develop to varying degrees. One suspects it might be even greater in the differences with the TEs’ reflected modes of operation. TEs have their “personal interpretative framework” (Vanassche & Kelchtermans,
2014) with their own perception and interpretation of the situation in which they operate hence influencing their actions the impact of which has been discussed in the preceding chapter. For instance, because TEP used micro teaching when he meant peer teaching, all students from his group did the same. Kelchtermans (1993, 2009) referred to in Vanassche & Kelchtermans (2014:118) defines personal interpretative framework as “the set of cognitions and beliefs that operates as a lens through which teacher educators perceive their job situation, give meaning to, and act in them”, a clear indication of which is the design and implementation plan of the course by each TE using the same source, the course synopsis.

Since in the course outlines it has not been specified how the STs would be engaged in practice teaching in the form of peer/micro teaching to enact what they would be learning, the area to do with STs’ enactment is not presented on its own in this section. It is taken that since for peer teaching STs planned using the curriculum materials for schools, practiced the skills essential in teaching, reflected on the presentations and devised the means to improve, that in itself was helping with the enactment of the acquired knowledge. Again, the planning for, and engaging in peer teaching set the ground and therefore relating what STs were learning to the extended practice later. Thus, the enactment and link of theory and practice have been subsumed in the preceding section and sub-sections. The linking of theory and practice would even be extended with the development, implementation and evaluation of the educational projects done throughout the two phases of the pre-service development stage. In the previous chapter, TP Handbook was taken as one means of linking coursework training and field practice and there is no mention of it in the course outlines. The sub-section that follows looks into the assumed views of TEs regarding the training course they instruct in.

5.3.3 Views of teacher educators as perceived from the course outlines

Teacher Educators’ views would be expected to reveal what they perceived of the courses they were teaching. The presentation of their views is interpretive as it is based on what they have stated in their description and objectives of the courses. These are presented (not verbatim in some cases) in Table 22 together with the similarities and differences observed.
Table 22 Teacher Educators’ perceived views about the Curriculum Studies courses they offer as presented in the course outlines

<table>
<thead>
<tr>
<th>Category</th>
<th>TEB</th>
<th>TEP</th>
<th>Similarities</th>
<th>Differences</th>
<th>Teacher knowledge domains and their components and emergent issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rationale/ Course description</td>
<td>• Teaching as a complex activity demanding commitment at the preparation stage. • For students preparing to teach at high school level - Lesotho context. • developing relevant pedagogical content knowledge and skills for students’ understanding of the subject concepts • providing opportunities to appreciate the complexity and devise ways of handling it for students’ successful learning and teacher satisfaction. • refreshing/upgrading own knowledge and understanding of high school subject content</td>
<td>•Widen student teachers’ -Understanding of effective ways of transforming content - teaching methods at senior secondary level in Lesotho. •introduce student teachers to practical problems facing physics teachers in Lesotho. •pedagogical content knowledge • teaching strategies •broad theories (socio-cultural perspective, Constructivism) knowing students, evaluation</td>
<td>•Lesotho context •Practical challenges •Knowledge and understanding of high school content and teaching •Pedagogical content knowledge •Knowing students •Teaching methods/ strategies</td>
<td>Explicit expressions Biology •Teacher satisfaction •Refresh and upgrade own knowledge and understanding of high school content Physics • Broad theories - socio-cultural perspective, constructivism</td>
<td>•Content knowledge •Pedagogical knowledge •Pedagogical content knowledge Curriculum Students Teaching strategies Assessment Orientations •School context</td>
</tr>
<tr>
<td>Objectives</td>
<td>For STs to: •Understand -Lesotho high school context -Effect of context on teaching and learning -School curriculum content and challenges •Develop scheme of work •Develop topic plans for active learning</td>
<td>For STs to: •Apply - subject content knowledge -effective pedagogical skills for planning and teaching the subject at secondary school level. •Demonstrate knowledge of laboratory</td>
<td>•Familiarity with and understanding - the high school curriculum -context of teaching and learning in •Lesotho Assessment and evaluation strategies •Development and</td>
<td>Style and expression</td>
<td></td>
</tr>
</tbody>
</table>

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- Develop plans for biology lessons and implement the lessons during peer/microteaching
  - Use of motivating and engaging teaching approaches and skills
  - Design ways of utilizing the local environment
  - Use of appropriate assessment and evaluation strategies (self and students)

<table>
<thead>
<tr>
<th>equipment used at secondary school.</th>
<th>Be familiar with senior level syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device valid methods for diagnosis, assessment and evaluation</td>
<td></td>
</tr>
<tr>
<td>Demonstrate awareness of students’ problems and possible strategies to address such problems.</td>
<td></td>
</tr>
</tbody>
</table>

application/implementation of materials, knowledge and skills

- Be familiar with senior level syllabus
- Device valid methods for diagnosis, assessment and evaluation
- Demonstrate awareness of students’ problems and possible strategies to address such problems.

Although at some points the expression differs, in essence both educators’ rationale for the course considered STs’ dual status as learners and teachers in the making. Basically, the ST is being prepared to handle the curriculum and the learners at the senior secondary level in Lesotho bearing in mind and devising the means to deal with the challenges that prevail therein. The ideas covered in the course description and objectives originate from the topics listed in the course synopses and have been transformed to meet the needs of the prospective teachers in the teaching subjects as each TE deemed appropriate for the specific course.

5.3.4 Summary of the Findings from the Biology and Physics Curriculum Studies course outlines

In the same way that any teacher is expected to make what s/he teaches accessible to her/his learners, TEs in their designing the course outlines as their teaching curriculum have transformed the same course synopsis content for their personal access in order to make their delivery of the content accessible to their trainees too. Clearly, as individuals they each had their own perceptions and conceptions of the synopsis revealed in their course outlines, which though bearing some elements of the original content, the style and expression used to present that content differs. Basically, both TEs’ are concerned with the professional development of their STs both as learners and prospective teachers, creating as much as possible the opportunities for them to be involved and be responsible for their own learning. They considered the development of the domains of teacher knowledge and their components, paying attention to the context in which the STs would be working.
Although the TP Handbook is not reflected in the outlines as an available tool to connect the two phases, the inclusion of the educational project that is designed and developed during coursework training utilized the knowledge provided and acquired then which would later be extended during TP. The reference to school in different ways, engagement of STs in peer/micro teaching, use of and the practical development of the project in the second phase of training linked to some extent, theory and practice. TP Handbook is the subject of discussion in the section that follows.

5.4 Teaching Practice (TP) Handbook

TP Handbook provides information about practice teaching for all STs of the Faculty of Education at NUL. It thus serves as a means of support to the ST while physically away from educators for a reasonable learning period. The identification of this document as one of the study materials was based on the belief that the information that it would furnish might shed some light on the issues considered to extend and sustain the momentum of learning for the ST while on practice in schools. It was also taken to be a means of keeping this professional development stage intact. It was hoped that it would enable the researcher to understand better the message it conveyed that might ultimately enable the discovery of the possible shortfalls that could be the cause of the reported limitations with STs’ teaching during TP. Our further belief had been that the sound foundation of teacher knowledge and practice would have set a ground for competent teacher practice throughout the career, starting at the TP level. In other words it was trusted that the exposure during the ten weeks of practice would enable the development of some repertoire of teaching skills, knowledge and attitudes which could be observed during TP and continuously be improved and increased with some form of support at that stage. The ensuing sub-section discusses the content of the Handbook.

5.4.1 The Content as Presented in the NUL Teaching Practice Handbook

The Handbook mainly provides guidelines to the involved parties in the practice phase. It is structured such that it comprises four main units expanding to varying levels revealing what each unit entails. Under the sub-units and their elements in some cases, there is more elaboration which is not included in the table presented below. Some parts of the elaborations are used elsewhere in this writing as excerpts furnishing evidence in support of the discussed issues. Only
the content and TP procedures are discussed since the Handbook is itself a tool providing conceptual information that links the theoretical knowledge offered on campus with the actual practice in schools in and from where further learning for STs goes on. That being the case there was no possibility of demonstrating the actual enactment by the study subjects. As a result, there is no sub-section that specifically discusses that area on enactment.

The views about the Handbook as a guiding tool have been discussed in chapter 4 and will be touched on again when discussing the reports by the STs and TPTs in the sections that will follow this chapter. The main units and the sub-units of the Handbook are reflected in Table 23 and the themes drawn from them. A wider scope of the structure of TP Handbook is presented in Appendix O.

Table 23 Main content areas of the NUL Teaching Practice Handbook reflected in its units and sub-units and the embodied themes

<table>
<thead>
<tr>
<th>Units</th>
<th>Sub-units</th>
<th>Units</th>
<th>Sub-units</th>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT I: Description of Teaching Practice</td>
<td>A. Introduction</td>
<td>UNIT III: Forms Used During Teaching Practice</td>
<td>A. Used by Student Teacher</td>
<td>• Teacher professional qualities, • Teaching Practice in pre-service teacher training stage, • Teaching Practice procedures, • Student Teacher Support and Guidance, • Student Teacher Professional Development, • Student Teacher Assessment.</td>
</tr>
<tr>
<td></td>
<td>B. General Organization of TP</td>
<td></td>
<td>B. Used by Teaching Practice Tutor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Learning from Experience (Reflective teaching)</td>
<td></td>
<td>C. Samples of the Forms: (Used by FED Staff – not explicitly stated as with the ST and TPT)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. TP Methodologies</td>
<td>UNIT IV: Teaching Practice File</td>
<td>A. Guidelines for Teaching Practice Report</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E. Assessment</td>
<td></td>
<td>B. Assessment of Teaching Practice</td>
<td></td>
</tr>
<tr>
<td>UNIT II: The Roles of The Student Teacher and The Teaching Practice Tutors</td>
<td>A. Student Teacher (ST)</td>
<td></td>
<td>C. Guidelines for Teaching Practice report</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Teaching Practice Tutor (TPT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Senior Teaching Practice Tutor (STPT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Student</td>
<td></td>
<td></td>
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</tbody>
</table>
The description of TP in its introductory remarks in Unit I the Handbook highlights the virtues for an effective teacher which depicts the views of the teacher training programs about a teacher and her/his work of teaching. The emphasis is placed on the importance of TP in the professional development of prospective teachers. In highlighting the place of TP in the institution’s courses and how the schools are an integral part of the program confirms the need for partnership between a teacher training institution (TTI) and practice schools that has been proven in literature to have a great bearing on prospective teachers’ learning to teach (Darling-Hammond, 2006; Cochran-Smith, 2009; Allen et al. 2013). The NUL Teaching Practice Handbook states its view on this matter in these words:

Teaching is about conveying passion for learning, innovativeness and solving problems and giving learners inspiration and tools to meet the challenges of life. A teacher is the heart and soul of a class, the pulse that keeps lessons lively and engaging.... In any practical profession, academic knowledge is not enough. As part of training to be a teacher, one needs to be exposed to the realities of the teaching field. This practice is done under the direct supervision of qualified and experienced teachers and lecturers.... It is a crucial learning experience that requires serious consideration by all stakeholders. ... The Student Teacher must continually educate herself/himself, by learning about new developments in education, new technologies and new ways to encourage learners to reach their full potential. (National University of Lesotho Faculty of Education, 2015:1)

The significance of this massage might not be addressing the subject-specific needs, but it is very inspirational to the prospective teacher. It entails who the teacher is and what s/he is about in this enterprise and at this stage as a learner being offered the support by the people presumed to have the pertinent expertise. The content further informs the ST about how TP is organized and run, how her/his learning is enhanced through reflective practice, the expectations for each party playing a role at this point of training essentially bearing the aspired procedures which the ST is expected to be aware of and abide by and how finally this part of training would be assessed. The domains of teacher knowledge and their components including the emergent issues in the areas in the research questions some of which could not be explicitly presented on their own were picked from all the units of the Handbook.

The themes in general bear the conceptual information that helps to promote professional growth and practice and the operations within teaching practice period. This information basically forms
the content for this second phase of the pre-service training stage without necessarily reflecting any subject-specific attributes which would have to cover the many subjects offered in the Faculty, which could be practically impossible.

The assumption could have been that the individual subjects had been taken care of in the Curriculum Studies courses and have essentially equipped the STs with the required knowledge, skills and attitudes. In this phase of training, the ST is mainly learning in and from practice hence being given the guiding tool in the form of the Handbook, to remind her/him of who s/he is as a teacher, and the expectations about her/him together with the concerned parties. Thus, one of the domains of teacher knowledge, Content Knowledge (CK) is put in the context of practice. The TP Handbook content entails other elements of teacher professionalism. For instance, the orientation of practice per this Handbook is reflective practice evidenced in its different sections some of which have been cited in chapter 4 of this writing. The methodologies stipulated by the Handbook are presented and discussed in the next sub-section.

5.4.2 TP Methodologies in the Handbook

In elucidating the organization and operations of the practice the Handbook highlights within its units how TP is organized, activities involved, the tools used for the operations, the actors in the endeavor with their specific roles, the performance assessment of the trainee and trainee’s own evaluation of oneself and the undertaking. They comprise what in the context of this study is termed methodologies.

For TP organization it is stated how once the ST arrives at the practice school they are expected to operate.- working closely with the TPT, being involved in school activities, the documents to be compiled for the end-of-TP file and her/his gradual induction into teaching. The expectation is that there should be a senior TPT (STPT) to oversee the activities of TP who seem to be currently almost dysfunctional. The researcher observed only one case with a study school where the STPT really operated as such the day the researcher was on a normal TP school visit. TP Handbook emphasizes that “the Student Teacher will do his/her work in close consultation with the Tutor” which was also reiterated in the Orientation Workshop. The FED staff is to visit the STs in schools for observation and assessment as already indicated in the previous chapter. The expected joint observations and discussions though expressed in the Handbook do not sound
binding, stated: “Whenever possible they will consult with the Teaching Practice Tutor and together assist in the professional growth of the Student Teacher by supervising his/her lessons” (pg4). Thus the organization is based on expectations. There are no set operational procedures that guard against haphazard implementation by concerned individuals.

The provision of support agents in schools provides the necessary mechanism for the STs even though in the same manner, the implementation of the all promising roles for the involved people is left to individual’s discretion. Although TPT is supposed to be responsible for the professional development of the ST during TP, there is no clear agreement between the university and the schools regarding the mode of operation, hence why some schools could take STs for practice in their schools as they found convenient for them at the time of placements.

The samples of the forms that are used to guide this practical phase for monitoring the learning experiences and the professional development of the ST include those that are to be used by the ST and the supervisors (TPT and TE). They include observation and assessment forms. The observation form requires the observer to record the ‘strong’ and the ‘weak’ points observed in connection with the agreed issues by the ST and the observer which would then be discussed. There is no checklist or scale to determine the strength and weakness of the attribute of performance, hence again left to one’s judgment. Because the STs are working towards obtaining a qualification, assessment comes in different forms. The observation as an endeavor meant for assistance, it is formative to help ST to learn progressively.

The summative assessment is specifically handled by FED staff and it considers the domains of teacher professional knowledge and teacher qualities borne in the five sections of the assessment form. The sections comprise: (a) Lesson Plan, (b) Lesson presentation, (c) Communication, (d) Classroom Management and (v) Teacher Qualities. The TP assessment mark of ST’s classroom practice is finally coupled with the report written that of her/his view about her/his development as a teacher which is one of the study documents and it is discussed in section 5.6. The purpose of the inclusion of this form in the Handbook as stated therein reflects the targeted competencies. According to the Handbook, “The **Lesson Assessment Form** indicates the skills which are considered essential for teaching a normal lesson and reveals good examples of lesson **observation foci** during the learning period”. (National University of Lesotho, 2015:10). The lesson presentation which could be taken as the heart of teacher’s work comprises nine items:
logic, variety and relatedness of activities in the process of the lesson, command of the subject matter, flexibility in the use of teaching methods/techniques, gradual transition to new content, learner involvement, creativity and innovativeness and learner motivation. The areas embody pedagogical and content knowledge. Their blend, pedagogical content knowledge could only be determined through observation.

To assess the degree of ST’s competence, the form gives a four-scale grading ranging from zero (0) to four (4). However, there is nowhere where the grading is explained to indicate what each grade denotes. That is, it is not indicated what competency attributes should be demonstrated to enable the allocation of a suitable score. Even though the Lesson Plan form had been the outstanding area of the Handbook that the STs looked at, without a comprehensive checklist of indicators for the targeted competence, one might suspect that it offered inadequate help for their learning to teach just as it could be the case with the assessing TE. The other sections of the assessment form evaluate pedagogical knowledge components; communication skill – audibility to sustain students’ interest, effective questioning and language competency. The classroom management looks into creating conducive environment (cohesion, interaction and cooperation), leadership qualities, positive feedback and managing time. It also checks teacher qualities portrayed by signs of knowing students, being presentable, showing confidence and maintaining positive attitude. The last unit of the Handbook gives the guidelines for the ST’s Teaching Practice report which comes as the end product of TP and it is discussed in one of the ensuing sections of this chapter.

5.4.3 Summary of the findings from the Teaching Practice Handbook

The information provided by the TP Handbook, despite probable limitations in detailing the issues, which has been the case with the manuals designed for a similar purpose such as the Faculty-School Cooperation Booklet used in Turkey (Güsoy, 2013), it has been designed to provide support to the ST in addition to that provided by the TPT and the TEs on their observation visits. Unless the concerned people are aware of the wealth that the TP Handbook holds for them, it might end up being worthless. Otherwise, it offers the conceptual knowledge that could help the concerned people in the practice phase and with concerted effort and clear target would develop STs in professional teacher knowledge and dispositions. The next section presents and discusses the STs’ lesson plans.
5.5 The Student Teachers’ Lesson Plans

The lesson plan format that the STs are trained on is well organized and sequential. It contains the general information such as the subject, level/form/class/grade, topic and sub-topic, duration/time which are taken to give part of the context in which the ST would be operating. Other parts which resemble teacher knowledge domains and their components include: Lesson Objectives, Students’ presumed knowledge, Teaching and learning materials, Teaching and learning environment, Stages and their timing, Topic content for the lesson, Teacher activities, Students’ activities, Assessment /Assignment and Lesson reflection/self-evaluation on the basis of which the results are presented. The aspects for each lesson plan component were informed by those used in the lesson observation form used by Pellegrino and Greber (n.d.). The presented aspects from the findings are those of the indicators reflected in 50% and above cases for each ST in the two groups. In the discussion, the indicators and/or their portions in the checklist were blended as they appeared in the document. The sample of the detailed checklist of the aspects is presented in Appendix (K). The presentation and discussion of the findings from the STs’ lesson plans follow.

5.5.1 The student teachers’ lesson plans

According to the Teaching Practice Handbook, STs are expected to teach 10 to 17 lessons per week with an assumption that each teaching subject could be allocated 5 periods a week, bearing in mind the allocation recommended by the Ministry of Education and Training for different level and subject (junior/senior). The STs are advised to plan for a lesson in advance to enable them to reflect on it so that they appropriately align the parts for a smooth, logical and coherent implementation that could lead to the attainment of the set objectives. The Science Education department requires the ST to include 10 lesson plans per subject in the file and those were the lesson plans used for this study. Table 24 presents the levels at which the STs taught and the number of submitted hence analyzed lesson plans. In those cases where the ST was teaching the subject at both junior and senior levels, the senior class was opted for in line with the identification of the TPT involved.
Table 24 Level taught by the Student Teacher and the number of analyzed lesson plans in Biology and Physics

<table>
<thead>
<tr>
<th>Biology</th>
<th></th>
<th></th>
<th></th>
<th>Physics</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ST</td>
<td>Level</td>
<td>Syllabus</td>
<td>Lesson plans</td>
<td>ST</td>
<td>Level</td>
<td>Syllabus</td>
<td>Lesson plans</td>
</tr>
<tr>
<td>B1</td>
<td>Grade 11</td>
<td>IGCSE</td>
<td>5</td>
<td>P1</td>
<td>Form D</td>
<td>LGCSE</td>
<td>10</td>
</tr>
<tr>
<td>B2</td>
<td>Grade 11</td>
<td>IGCSE</td>
<td>10</td>
<td>P2</td>
<td>Form D</td>
<td>LGCSE</td>
<td>10</td>
</tr>
<tr>
<td>B3</td>
<td>Form B</td>
<td>LJC</td>
<td>9</td>
<td>P5</td>
<td>Form D</td>
<td>LGCSE</td>
<td>10</td>
</tr>
<tr>
<td>B4</td>
<td>Form D</td>
<td>LGCSE</td>
<td>10</td>
<td>P6</td>
<td>Form D</td>
<td>LGCSE</td>
<td>4</td>
</tr>
<tr>
<td>B5</td>
<td>Form D</td>
<td>LGCSE</td>
<td>10</td>
<td>P7</td>
<td>Form B</td>
<td>LJC</td>
<td>9</td>
</tr>
<tr>
<td>B6</td>
<td>Form B</td>
<td>LGCSE</td>
<td>7</td>
<td>P8</td>
<td>Form D</td>
<td>LGCSE</td>
<td>6</td>
</tr>
<tr>
<td>B8</td>
<td>Form D</td>
<td>LGCSE</td>
<td>10</td>
<td>P9</td>
<td>Form D</td>
<td>LGCSE</td>
<td>9</td>
</tr>
<tr>
<td>B9</td>
<td>Form B</td>
<td>LJC</td>
<td>9</td>
<td>P10</td>
<td>Form D</td>
<td>LGCSE</td>
<td>6</td>
</tr>
<tr>
<td>B10</td>
<td>Form D</td>
<td>LGCSE</td>
<td>10</td>
<td>P12</td>
<td>Form D</td>
<td>LGCSE</td>
<td>10</td>
</tr>
<tr>
<td>B11</td>
<td>Form D</td>
<td>LGCSE</td>
<td>9</td>
<td>P13</td>
<td>Form A</td>
<td>LJC</td>
<td>9</td>
</tr>
<tr>
<td>Total number of lesson plans</td>
<td>89</td>
<td></td>
<td></td>
<td>Total number of lesson plans</td>
<td>83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Although NUL wishes that STs could practice at senior level for which the Year IV Curriculum Studies courses prepare them, the practicalities on the ground over the years has been that the STs are allocated classes as the school deems appropriate and NUL has been complying. This is confirmed by the results presented in the table above where STS B1, B6, B9, P7 and P13 taught at the junior level and the rest were allocated a senior class. The lesson plans for all STs, even though two from the Biology group declined for post-TP interview could still be accessed from their TP files hence enabling the analysis of all.

The general information in the lesson plan enabled reference to the suitable syllabus in order to determine the alignment of ST’s plan to the demands of the syllabus. The lesson plan format was designed by the Faculty of Education, and it looked well organized with logical and appropriate sequencing of its components. All STs followed that lesson plan which they were trained on. Some of them, however, omitted some areas such as time for a stage or all stages in some plans. Also content was omitted in either the introduction or conclusion and student activities especially in the conclusion. Again, there were those plans that were very sketchy hence very inadequate making it difficult to make much sense of them.

The sample of NUL lesson plan format is given in Appendix (L). The items for assessment in the lesson plan format used by FED which also formed reference for the analysis include: precise and comprehensive objectives, content clearly stated (appropriate and related to the topic) and
related to the lesson objectives, lesson steps logically sequenced and reflecting a variety of teacher and students’ activities. The lesson plan assessment by NUL touches on the curriculum and its content, students and pedagogical knowledge which are parts of teacher knowledge. The results for each lesson plan component are discussed separately in the sub-sections with the summary at the end of the whole section

5.5.1.1 Lesson objectives

In general, the objectives were related to the syllabus objectives/learning outcomes. They were checked to establish whether they were appropriately/reasonably stated and pitched/not pitched at the level of students, related/not related to syllabus learning outcome(s) and the objective(s) were achievable within the given time. They varied so much between individual STs and even with individuals themselves thus ranging from poor with some, mostly reasonable and few appropriate. The variance was with expression, comprehensiveness, coherence within the lesson and with those in the ensuing lessons and matching the given time. For instance, STB1 in the lesson on classification of viruses that was to run for 1 hour 10 minutes, she had two objectives written thus: “At the end of the lesson students should be able to: (1) Identify main features used to classify viruses. (2) Describe the features of viruses that enable them to adapt to their environment.” One might get the impression that identifying the main viral features and explaining adaptation features might not take that very long time. Probably, their being qualified further (which was not done) to reflect what the students would be doing could have enlightened the analysis. However, there were few cases where the objectives were reasonable as can be observed with ST who stated the objectives thus: At the end of the lesson students should be able to:

- Describe how mass, length and amplitude affect the period of the pendulum
- Determine the period of a pendulum
- Calculate the frequency of a pendulum (STP5)

In general, there seemed to be a significant deficiency with the writing of comprehensive lesson objectives with almost all the STs.

5.5.1.2 Students’ assumed knowledge

The assumed knowledge which is students’ pre-knowledge could have been acquired from various sources such as the very subject being taught, other subjects and life experiences being
theoretical and/or practical. For instance, if the ST was going to engage students in experimental work, certain skills might have been/not been developed which could be required in the current lesson then. There was no single case where a necessary pre-requisite skill was mentioned. In stating what the ST assumed the students were bringing with them in connection with the topic/concept of the day upon which teaching was expected to be build per constructivism, the ST’s recognition of such requisite knowledge and its possible source were not evident. That which was presumed could have extended to probably their stating students’ variety of understanding of the concept and possibly some misconceptions. A mention of misconceptions surfaced in a very few reflection cases where it was just that they were identified and corrected, giving no clarification of the misconception, its connection with the topic/concept in question and the actual steps taken to rectify it. All in all it was how explicitly the assumed knowledge was stated showing its connection with the lesson subject matter in question then.

STs did consider the knowledge that they assumed the students could be having in relation to the topic/concept for the lesson, mostly from the previous lesson(s) and it was in a very few instances that other sources of students’ existing knowledge were considered. For instance STB3 in coming to teach about algae, she stated students’ assumed knowledge thus: “Students already know that other plants such as liverworts and mosses lack true plant structures which are roots, leaves and stems” which are the main distinguishing features. In one of the rare instances, such as that with STB6, consideration was made of students’ life experiences saying that students were expected to already know, “How their senses work according to their daily experiences”. STB11 though not stating what concept(s) in particular the students were expected to have acquired from Chemistry, at least there was an indication of the source of knowledge. In most cases it was just a mention of the related concept not indicating either explicitly or implicitly how that knowledge was related to the concept(s) for the day’s lesson.

5.5.1.3 Materials

Concerning the additional materials other than the chalkboard and the textbooks initially the relevance, adequacy for the planned activities and usability of the mentioned materials the use of which would lead to the attainment of the lesson objective(s) were included. With no case stating the quantities of materials adequacy was finally omitted from the indicators. The indicators used for reference were finally; no materials/resources other than textbook, or appropriate/reasonable
materials/resources. In a significant number of lesson plans for both groups, STs had some teaching materials in the form of charts, specimens and laboratory materials. In other cases there were no materials or resources prepared even when there were possibilities the use of which would also require the informed choice of the teaching and learning environment which is a subject of the sub-section that ensues.

5.5.1.4 The Environment for teaching and learning

The choice of teaching and learning environment could be selected based on a number of factors such as the type of activity with a number of students, basically with the intention of making the working environment as enabling as possible for both the teacher and the students. The indicators drawn on were; no other environment than normal classroom despite possibilities, or appropriate choice of environment. In almost all instances, the classroom was taken to be an appropriate environment considering the planned activities with the use of stated materials though in some cases for the optimum involvement of the students, an alternative environment such as a science laboratory with spacious working area could have been a better choice. Where there was no laboratory in schools such as SP2, SB3 and SB10, the possible environment could have been out-of-class such as the school compound which SB3 utilized in teaching classification of plants.

5.5.1.5 Timing of the lesson

The STs conducted lessons either as a single, 40 minutes or a double 80 minutes period. That time had to be allocated for the three lesson stages, the introduction, the presentation and the conclusion. They included the time estimated for each stage of the lesson except for a few who with some lesson plans left the column blank. In most cases the timing seemed reasonable in relation to the reflected content and activities for the teacher and students with some clear under/over planning in some cases. Even though one would take the timing appropriate that could better show in the actual teaching.

5.5.1.6 Lesson content

To assess the content of the lesson, the indicators used were; school content at appropriate/not appropriate level, appropriately/inappropriately/fairly stated, and reasonable/not reasonable amount within given time. Except for one ST who seemed to have based his plans on the COSC
syllabus, all others used the syllabuses in use then, hence using the appropriate school content. However, a good number of STs, more than half in each group, with many of their lesson plans stated the content vaguely and with others it was not even stating the concepts within the topic. In a few cases one would say it could be possible to complete teaching the stated content. In many cases it could have been either inadequate or too much for the given time.

5.5.1.7 Teacher Activities

Teacher’s activities component reflects PCK more since it is here where the teacher displays her/his ability to bring together the factors that come into play in teaching and learning. A look made was into how the content was planned to be transformed for instruction, then checking the appropriateness of the representations employed in relation to the level of students, the objectives of the lesson, the use of the materials, consideration of students’ prior knowledge, flow of the lesson and suitability and relevance of the assessment.

As per NUL Teaching Practice Handbook, home assignment could be given and in the case it was given it was checked how it related to the day’s lesson or the ensuing lesson(s) or even whether it extended to everyday life (application). For ST’s consideration of the main factors in teaching and learning, that is, how students’ engagement enabled the attainment of the set lesson objectives and how it also enabled assessment of objectives achievement. The indicators used were: limited variety of methods, inadequately stated with limited relation to lesson objectives, fairly stated with limited relation to lesson objectives, variety of methods, clearly stated and related to lesson objectives. There was a very wide spectrum of presentation of teacher activities with the analyzed number of lesson plans per ST.

In most cases there was limited variety of teaching methods/strategies dominated by teacher talk. A tendency for most STs was them explaining and asking student some questions and the same procedure was followed for almost all the planned lessons. Since the activities would be stated vaguely there would be no apparent relationship with the set lesson objectives. The facilitation portrayed would not be showing a clear focus leading to the achievement of the set objectives. In a number of cases STs in their introduction followed the same teaching style, asking students what was taught in the previous lesson, not what they had learned. That in a way was making a connection between the previous lesson and the current one for continuity. One would say that
they were aware that students’ prior knowledge in relation to the concept(s) at hand was essential. But again, one would argue that telling what one learned from what was taught is different. Remembering what was taught would be merely regurgitating, likely to result in that knowledge fading with time as STs had claimed in their interviews presented in chapter 4.

STB1 for example in stating teacher activities in one lesson on viruses, in the introduction she intended to “enable students to be sensitive ...” by simply asking students a question. Moving into the presentation in which her aim was to “illustrate with examples…” it was explaining the content that she extended into the conclusion where she again went further to “illustrate the structure of viruses and explain...” Clearly, in that teacher centered instruction, the ST was lecturing, opening with a question to students as probably reminding them of the topic at hand.

5.5.1.8 Student Activities

The objectives set for the lesson are meant for students’ comprehensive knowledge and understanding of the subject matter or development of skills. Therefore, it is reasonable to expect the students to be engaged in every possible and effective activity using the suitable teaching materials in an enabling environment all geared towards their beneficial learning. The students are the centre of teaching hence why in Lesotho, as is the case in other parts of the world, of the possible orientations in the teaching of science is “discovery”, the attribute of which is learner-centered approaches. According to Magnusson et al. (1999:101), learner-centered instruction is the one in which “students explore the natural world following their own interest and discover patterns of how the world works during their exploration”. With the countries following a national curriculum that is examined through the national examinations, there is pressure to meet the demands of such a curriculum so that students perform well in the opinion of the public. Therefore, in as much as students ought to make discoveries on their own, time would always impede on their working to meet their curiosity and interest. Nonetheless, a teacher is expected to design and facilitate learning activities that would make students unravel the secrets of the phenomena around them for their better understanding of the world. The course synopses under study here do have learner-centered approaches as one of the topics on which STs should be trained and their active involvement in their learning to teach one would take to be the means for them to discover what teaching entails.
In planning for their teaching and specifically how they intended to make their teaching learner-centered which they seemed to appreciate even before they went on practice, the indicators used to explore their considerations in the students’ activities they reflected were: high/fair/no active student involvement reflected and tasks fairly related/well aligned to lesson objectives. Most STs seemed to have planned to involve students mainly through answering teacher questions. The limited tasks they would be involved in would reflect minimal relationship to the lesson objectives, as that would not be so obvious. In some other cases there was no relationship at all. In yet other cases there was no reference and use of the teaching aids brought to class.

The mismatch and lack of alignment with the content, teacher and students activities and the lesson stages and steps was a common occurrence. For instance, STB1 in her introduction she stated: “From the guidance of the teacher, they outline some of the infections caused by viruses.” It was not clear what was meant by outlining the infection especially when the content given was “the importance of classifying the viruses”. Probably if there was a mention of types of infections and classes of viruses there could be a possible link. In the presentation stage of the lesson the students “from the explanation of the teacher, students are expected to provide diseases caused by virus and illustrate how each spread”. Our view is that the students are giving the examples of viral diseases and the way they are spread. Again in what the students would be doing, there is no connection to “the features of the viruses which enable them to adapt to the environment” stated as content. One takes it that the bulk of the 55 minutes allotted to that stage would be teacher’s explanation of the adaptation features although under teacher’s activities she was going to “illustrate how viruses can be categorized as parasitic”. In conclusion the students were expected to “predict the possible function of a RNA/DNA strand of virus” when the teacher “explains the function of virus and that of protein coat” in relation to the content stated as “features and adaptations used in classification of viruses”. The illustration of the ST’s lesson plan material is greatly confused, not only with regard to student activities. Since in most cases the STs employed teacher talk, students’ involvement to personally drive their understanding of the content taught was constrained.

5.5.1.9 Assessment/Assignment

Because the classroom exercises or tasks have some elements of the topic/sub-topic they have been taken to be relevant though they might have a limited relationship to the lesson objectives
in some cases. However, the assignments were rarely given in the Biology group with the
dominance of reading assignments preparing for the ensuing lesson(s) while there were more
with the other group, mainly with solving the problems based on the day’s lesson. The indicators
that the assignments were checked against included: exercises/assignments related/not related to
lesson objectives and or concepts and exercises/assignments related to life experiences. The
assessment during the lesson was commonly through questioning. The wider assessment was in
the form of a quiz, exercises and tests. With the laboratory work the students were required to
write a report of the experiment done.

5.5.1.10 Lesson Reflection/Evaluation

To stress the importance of reflection in teaching, the lesson plan format in the TP Handbook
(pg18) specifically includes it and it is presented as: “Self Evaluation/Reflection: e.g. critical
incidents that happened in class regarding achievement of objectives, organization of activities,
facilitating learning, maintaining learners’ interest, effect of disciplinary measures employed,
etc.” It was checked how the ST presented her/his perception of her/his role as a teacher and
how s/he related the aspects of teaching some of which are included in the above citation.
Coupled with this daily reflection was the “How to improve/reinforce” part in which what was
checked was its connection with the reflection, how realistic it was and if the means to improve
seemed to have a potential of contributing to ST’s teacher knowledge development. The
indicators were: examination of own teaching, examination of classroom performance,
suggestions/no suggestions of modifications to improve teaching practices and student
achievement.

Although lesson reflections were written at the end of each lesson per submitted lesson plans,
most of them were vaguely stated. STs’ mainly reflected on students’ shortcomings, not
necessarily relating them to the degree to which the concept could have been understood and the
probable cause of the observed shortfall. In some cases they connected those observations to the
way they conducted the lesson still not expressed comprehensively though. Most of them did not
state how they intended to rectify or sustain the observed occurrences and the anticipated
effect(s) of the proposed measures on the subsequent lesson(s).
STB3 seemed to have taken into account a number of factors that impacted on her teaching and students’ learning. She included factors such as the content itself, students’ involvement, motivation, discipline and understanding of concepts. About herself as a teacher she considered her planning, use of teaching aids, ability to explain concepts, proficiency with English, logic with her lesson presentation, teaching methods, classroom and time management. She further suggested a number of ways to improve some of which were related to the mentioned shortcomings. She divided her reflection into three sections; what went well, what did not go well and how to improve. However, most of the intended measures to overcome the shortcomings seemed to recur throughout the practice period because it seemed she was using a checklist of the possible ways and areas for improvement simply varying their position in the list.

In a number of cases STs claimed “the lesson went very well”, or “the lesson was successful” just because the students could for instance regurgitate what they had just told them as the lesson plans portrayed. With all STs, their reflection was basically their observations of what transpired in class not actually giving a comprehensive thought of the cause and effect of the observation which could ideally inform the choice of the improvement measures. Again, there was no observable impact that the reflection on one lesson had on the subsequent one(s) to indicate change in ST’s learning. The reflection though having a great potential to help STs to improve professionally, they did not seem to take it serious just as TEB claimed.

The results of the lesson plan analysis showing the predominant indicators for each component of the lesson plan showing the number of STs from each group are presented in Table 25. Only 50% or more of the occurrences for an indicator are presented. The number marked with an asterisk (*) is a case where one ST had half of the lesson plans showing the indicator.

Table 25 Lesson plan components with the reflected predominant indicators and their incidences

<table>
<thead>
<tr>
<th>Components</th>
<th>Predominant Indicators</th>
<th># of STs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B N=10</td>
</tr>
<tr>
<td>Format</td>
<td>Logical and appropriate organization and sequencing</td>
<td>10</td>
</tr>
<tr>
<td>Timing</td>
<td>Appropriate timing of lesson</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Reasonable timing of lesson</td>
<td></td>
</tr>
<tr>
<td>Objectives</td>
<td>Appropriately/reasonably stated and pitched at the level of students, related to syllabus learning outcome(s) and the objective(s) and</td>
<td>8</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Score 1</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Presumed knowledge</td>
<td>Appropriately/reasonably stated and pitched at the level of students, related to syllabus learning outcome(s) and the objective(s) and achievable within the given time</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Reasonably stated not pitched at the level of students, related to syllabus learning outcome(s) and the objective(s) and achievable within the given time</td>
<td>6</td>
</tr>
<tr>
<td>Materials</td>
<td>No materials/resources other than textbook</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Appropriate materials/resources</td>
<td>7</td>
</tr>
<tr>
<td>Environment</td>
<td>No other than normal classroom despite possibilities</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Appropriate choice</td>
<td>8</td>
</tr>
<tr>
<td>Content</td>
<td>School content but not at appropriate level,</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>School content at appropriate level, inappropriately stated, reasonable amount within given time</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>School content at appropriate level, appropriately stated, reasonable amount within given time</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>School content at appropriate level, fairly stated, inadequate amount within given time</td>
<td>5</td>
</tr>
<tr>
<td>Teacher Activities</td>
<td>Limited variety of methods</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Inadequately stated with limited relation to lesson objectives</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Fairly stated with limited relation to lesson objectives</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Variety of methods, clearly stated and related to lesson objectives</td>
<td></td>
</tr>
<tr>
<td>Student Activities</td>
<td>No active involvement reflected,</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Fair active involvement reflected. tasks not related to lesson objectives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fair active involvement reflected, tasks fairly related to lesson objectives</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>High active involvement reflected, tasks well aligned to lesson objectives</td>
<td></td>
</tr>
<tr>
<td>Assessment/Assignment</td>
<td>Tasks/assignments related to lesson objectives/concepts</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Tasks/assignments not related to lesson objectives/concepts</td>
<td></td>
</tr>
<tr>
<td>Lesson Reflection/Evaluation</td>
<td>Examination of own teaching and classroom performance</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Examination of classroom performance</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>No suggestion of modifications to improve</td>
<td>7</td>
</tr>
</tbody>
</table>
5.5.2 Summary of the findings on STs’ lesson plans

Lesson planning seems to be a challenging and therefore not an easy skill for the student teachers. The varied presentations of the information in the parts of their plans reflects inadequacy regarding comprehensiveness and alignment of the lesson components which could lead to the inability for one to attain the set objectives which in many cases would themselves be not so clearly articulated. More information about how STs perceived their training was further pursued through the analysis of their TP reports the discussion of which follows in the next section.

5.6 Student Teachers’ Teaching Practice reports

In an attempt to establish the probable cause(s) of the reported limitations with STs’ classroom practice, STs themselves were among the important sources of information as the directly involved subjects around which the whole endeavor revolved. One additional means of getting information was through their Teaching Practice reports that they normally submit at the end of the practice. As a common procedure, at the end of Teaching Practice the STs are expected to have compiled a file in which they keep all the relevant documents that they have been producing in the course of the practice. Of the documents included therein, the lesson plans that have been discussed in the preceding Section 5.5 and the TP reports being currently discussed in this section were selected.

In presenting and discussing the STs’ reports the focal five areas around which the discussion of issues has been revolving were looked into viz: - the content related to STs’ learning to teach as they revealed it themselves, the how that content was conveyed for their consumption, the employment of the acquired knowledge which was based on how they reported their enactment during TP. The discussion further looks into how from the reports the training and knowledge acquired from campus were linked to the practice they underwent in the ten weeks. The general views they expressed in connection with teaching practice as they experienced it in totality are also discussed. At the end the summary of the findings concludes the section. The table that
follows gives the main issues that guide the writing of the TP report according to the TP Handbook.

Table 26 Sections in the guidelines for the Science Education Students Teaching Practice report

<table>
<thead>
<tr>
<th>Main sections</th>
<th>Section components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks on preparation and organization of TP</td>
<td>About TP, schools and Student Teachers and their expectations</td>
</tr>
<tr>
<td>School organization</td>
<td>Administration, subject department, facilities and their maintenance</td>
</tr>
<tr>
<td></td>
<td>Relationship between TP preparation and ST’s expectations</td>
</tr>
<tr>
<td></td>
<td>Relationship between Student Teacher, school staff and students</td>
</tr>
<tr>
<td></td>
<td>Extra-curricular activities</td>
</tr>
<tr>
<td></td>
<td>Personal experiences within the school structure</td>
</tr>
<tr>
<td>Personal evaluation</td>
<td>Effective lesson introduction</td>
</tr>
<tr>
<td></td>
<td>Motivation strategies</td>
</tr>
<tr>
<td></td>
<td>Choice of teaching methods</td>
</tr>
<tr>
<td></td>
<td>Classroom organization</td>
</tr>
<tr>
<td></td>
<td>Discipline and its impact</td>
</tr>
<tr>
<td></td>
<td>Lesson evaluation and its effect on subsequent lessons</td>
</tr>
</tbody>
</table>

The information required through this report brings together the theoretical preparation for TP, the connection with practice, the school as the learning environment the actual practice and the effect of the practice on the ST’s professional development in the opinion of the incumbent consumer of the training. Even though the guidelines that inform the STs on what issues to report on were briefly presented to the ST before they went on TP during the Orientation Workshop and also provided a copy of Teaching Practice handbook, one ST did not follow the outline at all with the few others partially following it. But the information related to the research question could still be identified. However, there were a number of cases especially with the Biology group where the STs seemed to have shared the same information, thus making it difficult to know the original source. Again with many STs, they gave conceptual information about issues such as lesson introduction, motivation and classroom management other than relating it in their actual experiences. The sub-section that follows discusses the content the STs revealed in their reports.
5.6.1 The content for teacher development from the STs’ reports

With the reporting of their experiences with teaching practice, it included what they gathered from both their preparation for TP and experiences from practice. The content thus included the conceptual and practical knowledge that they reported to have acquired. The content was gathered from the three sections of the report. Before the STs went for TP they were informed about how TP was going to run and what was expected of them during practice. All of them pointed out that they were oriented on the contents of the Teaching Practice Handbook. The prominent issues they all mentioned were how they should conduct themselves in respect of their relationship with the people they were going to work with, their execution of their activities in and outside classroom, visits by the FED staff and their general behaviour and dress code. Thus the focus was on teacher conduct and qualities, and TP procedures.

From the experiences in the practice school, most of the knowledge they acquired and enhanced was through their interactions with the TPTs and other members of the school community. Among the areas in which they learned anew and/or extended their knowledge included handling students and their learning and interacting with people of different characters thus enhancing the qualities they needed as teachers. From their teaching experiences they learned reflecting in and on their teaching and its impact on students, deciding on the necessary steps to take during teaching such as changing the method of teaching, identifying their own shortcomings with explanation of concepts, the importance of the appropriate learning environment, managing time, and proficiency in English and they finally made their conclusions about what teaching and learning involved.

STB3, for instance reported, “I realized that being a teacher does not only involve teaching or achieving the objectives, it also involves parenting and being a friend to students. ...I have discovered that all different backgrounds enhance learning”. STP12 also reported on her realization of the importance of involving students and she stated, “Students understand better if they are engaged in activities... I would think that they understand as I was teaching only to find that they are just looking at me”. More elaborately, STP2 mentioned a number of issues he learned in the process of practice and reported them in these words:

Some of the challenges encountered made me realize the importance of facilities during teaching and learning as the school had no laboratory and the library. The absence of these brought a
negative impact on teaching. My experiences at the school also made me appreciate the importance of learners’ behaviour in teaching. It is on account of the learners’ cooperative behaviour that I gained confidence in teaching. I also observed that motivation plays an important role in learning, and that teaching and learning take place in and out of the class.

A number of them proclaimed that the choice of the method depended on the availability of materials, the subject matter and the kind of students. Basically, STs reported on their pedagogical and pedagogical content knowledge and teacher qualities. The content knowledge was implied in their noting their failure to comprehensively explain some concepts so that the students could understand, and in the use of subject technical terms. Any aspect of what STs reported and sounded relevant to the research question and they claimed to have learned was considered pragmatic content of this particular phase of the training, still comprising conceptual and practical facets. The next sub-section discusses the how STs were prepared and assisted to learn during TP.

5.6.2 The preparations for TP and assistance offered STs during practice in schools

The TP Coordinator had secured a place in advance in practice schools for all STs who in turn appreciated that effort. Only two STs in particular were unhappy that they were placed in schools they had not identified. The STs attended a half day Orientation Workshop where they were informed about TP based on the contents of the TP Handbook and all were provided a copy for further reference.

Although the focus of all STs except for two was on preparation for TP through the Orientation Workshop, who extended their preparation to their training in EDF and Curriculum Studies courses. One of them stated his view about the preparation other than through that workshop, also relating it to his expectations in these words:

In preparation for the teaching practice at the university, we did micro-teaching [peer teaching], which for me was not reaching my demands as it was given a short time. Also this was done in relatively fewer times than expected because I viewed it as to give us exposure of how the actual teaching at secondary level should be done. Again this wasn’t fair enough for me in terms of content deliverance since the micro-teaching was done with and to my colleagues who already knew the content... it forced me to cover the content that could comparably be done in 40 minutes only in fewer minutes... the time was fairly not enough for student teachers to practice for actual teaching at secondary schools). (STP8)

The ST appreciated that practicing teaching during coursework training was vital. He however raised a concern about its duration and frequency, and its being out of school context.
In schools, the STs got a welcoming reception by the school administration, Heads of Department, TPTs, students and the whole school staff all of whom the STs had good relations with. Their relations with FED staff were also good and they learned further about lesson planning from their comments which are normally made in the discussion before the observation in class. The school facilities, constituting part of the learning environment, which the STs could use freely, included the science laboratories in 18 of the 20 schools. The state of the laboratories varied greatly. Most of them were under equipped, poorly managed and materials not kept in order. The two schools without the laboratory building (SB3 and SB10) at least had some science materials that the STs took to the classroom for use.

Besides the science laboratory the schools had the library (except for two) though in some schools they were just a building with a collection of books some of which were obsolete. SB8 as a ‘new’ school that started in 2010 had neither a library building nor a collection of books. SB2 library was the highly commended for a variety and recent editions of books which were of great help to the ST. The assistance by the TPT was underscored by all STs in areas such as lesson planning, provision of teaching materials, helping in dealing with classroom situation, questioning, student discipline and time management.

Among the four schools that had computer laboratories, one of them, SB9, was non-functional due to lack of electricity while in three others (SB1, SB2 and SP10) STs managed to enhance their knowledge and teaching through the use of the internet. From the internet they downloaded experimental activities, questions and simulations, also assigning students to search information. The STs thus contributed to their professional development by engaging in self-directed learning activities. The next sub-section reveals how the STs enacted the acquired knowledge from the two phases of the pre-service stage of their professional development.

5.6.3 The enactment of the “what and how” knowledge acquired as reported by the STs

The practice schools had created the learning environment conducive for the STs in which they reported to have felt accepted as teachers. They as a result readily taught and participated in all school activities in line with what was reported to have also been emphasized in the Orientation Workshop. It was only in one school where the principal was most of the time absent. Since the keys to some rooms such as the science laboratory, and the storeroom where things such as the
chalk were kept would be locked in his office, some activities were therefore negatively impacted.

Most STs were aware of the importance to activate students’ prior knowledge when introducing the lessons. However a number of them found that stage quite challenging. For instance, STB3 felt: “To come up with the stimulating and motivating introduction is not an easy task” corroborated by STB1 who said, “My lesson introductions during the first weeks of teaching practice were not very effective as they did not manage to stimulate students much...” However, a few STs could display creativity in introducing their lessons such as STP2 who reported on his introduction of the concept through the use of a Biblical story, in which he said:

When introducing the first and the second lesson ... to give the rationale of the lessons I related system of measurement in the story of Noah’s Ark in the Great Flood... The meaning of a cubit was discussed and then learners discussed the shortcomings of this system of measurement. From this learners were able to appreciate the use of international system of units. (STP2)

Most STs for various reasons resorted to the lecture method. For some it was a matter of not being able to choose the appropriate methods as STB11 confessed, “It was challenging to choose which method to use for which topic, of which I would so many times recognize after the lesson that I should have used another method...” This could be saying that the ST did not give himself enough time to think for, before planning for the lesson. The reasons furnished for teacher being the main actor in class were those such as limited/dysfunctional/no science materials, lack of students’ textbooks, students not responding to ST’s questions and large classes where other methods seemed to be time consuming and creating problems in controlling students who made noise. For STB4, “I used the lecture method in order to clarify the abstract concepts that students did not have prior knowledge about them...it [method] did not engage students actively in the classroom teaching and learning. That is, students were just passive”. If well thought out, it might still be possible to come up with a representation such as an analogy to deal with an abstract phenomenon which STs did not seem to have considered. However, the ST acknowledged the shortfall with the lecture method she employed just as the few others reported. The commonly used methods were discussion, group work, lecturing/explanation, question and answer and in some cases, teacher demonstrations and students experimentation. Although Physics STs and their educator took teacher talk as the major teaching approach they were encouraged to employ, only STB2 reported on it. He reported thus:
In physics lessons learning mainly relied on classroom talk. For instance, in kinematics lesson ... the talk is at classroom level at the introduction. During presentation the talk is at group level and it is here that learners socially construct knowledge of the necessary concepts, with the help of their textbooks. (STP2)

All STs acknowledged the positive impact that motivating students had on their attitude hence increasing their participation in class. They commonly provided verbal, written and material motivation. STP2 related the reinforcement to their performance in learning the content which is more meaningful and has a potential of motivating, changing attitude and enhancing more understanding the impact of which was to improve students’ presentation skill. He explained his motivation approach thus:

In my lessons I always commended learners who used alternative approaches or representations and made them present solutions to the whole class. Even in lesson conclusions I used learners’ presentations to recapitulate the important aspects ... to make them appreciate the integrity of what they could accomplish. (STP2)

Reporting on lesson reflection, STs wrote it in broad terms indicating that they could identify their strengths and weaknesses which they rectified in the subsequent lessons which could not be noticed in reading the succeeding lesson plans. They however reported to have repeated the lessons upon realizing that the students had not quite understood the concept. With STs such as STP7 and STB3 that confirmed what was reflected in their lesson plans. The reporting on their enacting the acquired knowledge, STs touched on a number of the components of the pedagogical content knowledge and the development of qualities such as confidence with content and being in control. Their actual practice with teaching is related with the acquired theoretical and practical knowledge in the sub-section below.

5.6.4 Linking theoretical and practical knowledge with actual practice

The best linking of the acquired knowledge from the university could be discerned in STs’ reference to that knowledge in relation to the encountered episode which was however limited in their reports. One would detect the learned issues in their explanation of some educational themes. Of the few, STB3, who referred to the course content, wrote: “While at NUL we learned different ways of introducing the lesson in SCE 442 [Curriculum Studies in Chemistry] and SCE 412 [Curriculum Studies in Biology] such as analogies and reviewing students’ prior knowledge. However ... this was the most challenging part of the lesson plan”. Although she acknowledged coursework content as the source of the knowledge she did not specifically indicate how she
applied that knowledge in her teaching. One would expect that for those STs who managed to observe their TPTs’ lessons at least, could have referred to what they found intriguing that they tried out at some point in their own teaching as a sign that they were learning in that phase of their training or even relating it to what they learned during coursework training. Also, there was no reference to the effect of the TP Handbook in informing them on better practice. The STs’ reporting on issues even as directed by the guidelines in the Handbook lacked much logic and coherence, so has been the case in their linking issues to sense their practicalising the multi-faceted theoretical knowledge they had acquired. Their general views are the subject of discussion in the following sub-section.

5.6.5 The reported views of the STs about their practice experiences

The views that the STs expressed were integrated with other issues already discussed in other sub-sections. They were connected to the three sections of the report guidelines. Their opinions were expressed in relation to various issues depending on their feelings about them. The issues were about the TP allowance, TP duration, ST-TPT interactions, FED staff visits and the teaching profession. Some of their views are captured in the following citations:

The field of teaching is more than just standing in front of learners and presenting the objectives. Therefore I suggest that there should be workshops that are held by the faculty of education at NUL to train tutors that will be responsible in guiding the student teachers in becoming better facilitators in learning. This is because some of the tasks accounted for my tutors like allowing me to observe them when teaching and giving feedback after they have observed me, made them feel uncomfortable and it was hard for me to convince them of the importance of their feedback. (STB3)

I think extending TP duration will provide enough space for us to be visited more than once by FOE [Faculty of Education] staff for observation. True, the TP tutors are doing a great job but observation by FOE staff is very necessary as they know what kind of teachers they want to produce. (STB6)

TP period has been a very vital part of my learning as it helped me to experience the actual teaching, and exercise my responsibilities in the field of teaching. (STP7)

5.6.6 Summary of the findings from the STs’ Teaching Practice report

The STs in their reports which were guided by the guidelines in the Teaching Practice Handbook were presented to varying degrees of comprehensiveness which could be taken to mark their ability to reflect on their teaching. However, they reported to have learned and acquired
especially the practicalities of pedagogical content knowledge and qualities that enabled their better performance respectively, as teachers. In particular, they highlighted the influence of students’ characters as one of the factors that greatly affects teacher’s choice of methods of teaching and facilitation of the lesson thus confirming the need to practice in context (Ball & Forzani, 2008; Grossman et al. 2009). They underscored teaching practice as a crucial experience in learning to teach. The exploration of STs’ learning experiences during TP is pursued further through the perceptions reported by their TPTs in the ensuing section.

5.7 Teaching Practice Tutor reports on TP

To supplement the interview data on TPTs’ perceptions on the TP stage in the STs’ professional development, they submitted the written reports as well. The reporting that TPTs were requested to provide was about their experiences with TP activities and they were left open with no guidelines. That was done to enable them to highlight areas of importance to them with regard to STs’ professional learning at that point in their training. That was done with a hope that one could discern their focus with the professional development of the STs in relation to the five areas guiding the research questions. Since FED had TP Handbook as a guiding support tool for all people playing a role in the development of the STs, its contribution in the view of the TPTs was explored. There was no mention of the Handbook by any of the TPTs confirming that they had not had a copy of it as revealed in the interviews. It was anticipated that the TPTs’ reports would explicitly indicate how the STs enacted the knowledge and employed the skills they had acquired and their further development through their support and guidance in collaboration with the FED staff as stipulated in the TP Handbook. The following sub-section presents and discusses the content that the STs were afforded during TP as perceived by the TPTs.

5.7.1 The content provided STs during TP as perceived and reported by TPTs

From TPTs’ reports the content identified was closely related to the guidance and support that the school through the TPTs provided the STs. The STs were enabled to learn about planning (drawing the scheme of work and lesson planning), identifying the appropriate subject matter to teach, appropriate methods for particular topics, dealing with students’ learning and disciplinary challenges, and assessing students’ learning. The teacher knowledge domains and components clearly embodied were: content knowledge, pedagogical knowledge and pedagogical content knowledge and its components. Thus STs’ exposure to the actual school situation extended the
theoretical knowledge they acquired from coursework training and created a new learning opportunity in which they learned from reality with the assistance of the experienced practitioners. Besides acquiring and developing the elements of teacher knowledge the STs also acquired and enhanced the essential teacher qualities through their interactions with the school community especially the students. The next sub-section discusses how STs’ learning in the various areas was guided and supported.

5.7.2 How STs’ learning was guided and supported as perceived and reported by TPTs

The TPTs were the main and intimate guides to the STs in the process of their learning to teach. The guidance was to the varying degrees with individual TPTs although one would not necessarily take it that when there was no explicit mention of what the tutor actually did it meant nothing was done at all along those lines. For those TPTs who mentioned the visits by FED staff to the STs, they expressed their assumption that the visiting staff member was extending the training they had provided the STs, also assessing the progress since they, themselves were not involved during such visits. The mentioned issues are presented in the table that follows with the number and percentage (rounded up) of TPTs who mentioned them in explicit terms and the significant number with implied expressions from the two groups.

Table 27 Areas and the ways in which STs were guided and supported as perceived and reported by TPTs

<table>
<thead>
<tr>
<th>TPTs’ expressions</th>
<th>Biology: N=9</th>
<th>Physics N=8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td>ST orientation and provision of teaching material</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Guiding in scheming and lesson planning</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Assisting/checking the lesson plan</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Joined lesson planning</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Assisting ST with questioning</td>
<td>3</td>
<td>33</td>
</tr>
<tr>
<td>Assisting ST with test marking guide</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Assisting ST with writing the notes</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Observing ST</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>68</td>
</tr>
<tr>
<td>ST observing TPT</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Shared teaching</td>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>
It is obvious that even though TPTs assisted STs to varying degrees, they were there for them and did provide some support. They set the ground for STs for their getting accustomed to the school environment and getting ready for teaching. As outlined in the TP Handbook there was that gradual but random induction which ended up with STs carrying out the teaching on their own with the guidance of the tutor. Explaining the process of their interactions TPTB1 said, “During the first week, we planned lessons and attended them together. I taught those lessons and hers was to observe. I observed her lessons and gave remarks afterwards. For the subsequent lessons, she prepared and taught lessons on her own with minimal assistance from the mentor”.

It was however, in a very few cases that the TPTs were intimately there throughout the practice period, to work in a clear collaboration with the ST. That could be assumed with TPTP10 from his declaration: “We used to discuss the concept before each lesson and plan it together. Team-teaching was practiced once every week, where we would share some concepts and skills to deliver to students”. The proposed post-observation discussion proved effective as reported by TPTP1 who wrote, “After every class we sat down discussing the lesson, we talked about where to improve, in controlling the classroom, so that he can finish the content he was prepared to teach,…that boosted his confidence and management skill, it made him a better person”.

Some TPTs genuinely confessed that they did not give the STs the attention, support and guidance they deserved as TPTB6 pointed out, “I could not give him the best of my time due to lots of responsibilities I am engaged in... This could be a disadvantage for them because we tend to give them little attention”. The next issue was to explore how TPTs’ perceived STs’ display of teacher knowledge that becomes the subject of the next sub-section.
5.7.3 How the STs enacted the knowledge they had acquired and learning in and from teaching experience as perceived and reported by TPTs

Without the guidelines to the TPTs on what issues to include in the report, one was expecting to get the authentic information especially that they were to be submitted before the interview to avoid influencing their opinions. Their perceptions are presented in Table 28 giving their expressions of the observations they made and the numbers of their incidences.

Table 28 Teaching Practice Tutors’ expressions of their observations with the number of their incidences

<table>
<thead>
<tr>
<th>TPTs’ expressions</th>
<th>Biology (N=9)</th>
<th>Physics (N=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td>Daily lesson planning</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Good command of the subject content</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>‘Learner-centered methods’/ learner involvement</td>
<td>5</td>
<td>55.6</td>
</tr>
<tr>
<td>Teacher-centered</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Different teaching methods</td>
<td>6</td>
<td>67</td>
</tr>
<tr>
<td>Reference to and use of local materials</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Group and class discussion</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Question and answer</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Class work/exercises, assignments, tests</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Timely feedback to students on written work</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>Varied modes of interesting lesson introduction</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Introduction linking to previous lesson</td>
<td>8</td>
<td>89</td>
</tr>
<tr>
<td>Assisting students beyond classroom teaching</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Reference to the syllabus</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>Sourcing information from</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• different textbooks</td>
<td>6</td>
<td>67</td>
</tr>
<tr>
<td>• TPT and other teachers</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>• The internet</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Involvement in extra-curricular activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• sports</td>
<td>8</td>
<td>89</td>
</tr>
<tr>
<td>• Departmental meetings</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>• Science lab organization</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>• Science club</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>• Study supervision</td>
<td>6</td>
<td>67</td>
</tr>
<tr>
<td>• Cleaning campaign</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Challenges with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• lesson introduction and conclusion</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>• Managing time</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>• Use of chalkboard</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>• Pitching content to the level of students</td>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>
The TPTs acknowledged STs’ preparing and drawing lesson plans for all their lessons which with some, they worked together and others checked them once they were drawn, or discussed the content and how its teaching could be planned. Some TPTs pointed out some challenges met by their STs in drawing the lesson plan. For instance, TPTP1 attested, “It was a bit challenging for him to make a lesson plan, had to learn a proper way of doing it and get familiar with the format. He had to get used to it”. The sentiment was shared by TPTP2 who had an observation from another angle with the lesson plan. He wrote, “Lesson preparation process has been improved with inquiries from the subject teacher. He always consulted on the interpretation of the curriculum objectives to be delivered into the syllabus objectives and on to classroom objectives”. Just as TPTB4 observed that with her ST saying, “…it was difficult for her to change learning outcomes into instructional objectives in which learners are involved fully in their learning”. The challenge with lesson planning was observed mainly with writing appropriate information in its different sections or formulating the lesson objectives in relation to those in the syllabus, there was nothing mentioned about the plan being comprehensive, coherent or logical.

From the observed lessons, all TPTs were pleased about the good command of the subject matter the STs exhibited. There was however a shortfall mainly with pitching the content at the level of the students as expressed by TPTB11, “Giving learners content is still a problem, … they have too much content but lack methodology” the view that was also shared by TPTB8 who had observed that the ST “…struggled in giving learners content appropriate for them… taught Form A content that is beyond their understanding”. They identified the common teaching methods that the STs employed which were discussion (with undertone of lecturing), group work and question and answer which involved students hence TPTs’ view was that the STs employed learner-centered approaches. Of the other methods such as experimentation, TPTP10 wrote, “Most concepts were experimental, and experiments were conducted in the lab. She showed a very good competence in using lab instruments”.

TPTs appreciated the assessment work the STs gave students in different modes which was
marked and students given feedback in time despite that the questions would be of low order and had to be assisted to improve the skill. The STs played an observable role in their improvement in sourcing information and assistance from various sources. That could be taken to have been one of the contributing factors to the reported gradual improvement with the STs in their teaching. The STs extended their performance beyond the classroom with students’ learning and being involved in extra-curricular activities. Generally, TPTs considered some elements of teacher knowledge exhibited by the STs, with a few of them with PGDE qualification taking a closer look at certain specific areas of that teaching from which they identified some strengths and limitations. For instance TPTB1 explicitly indicated in his report that the ST was:

… able to construct good oral questions, properly distribute them amongst her students … most of her questions were of lower order (mainly knowledge with understanding). Before the practical, she would prepare her work-sheets that are integrated with practical questions and also assign students to prepare lab reports. These were marked and feedback provided on time… able to assign her students class work and assignments regularly, marked and provided feedback on time. (TPTB1)

On the ST’s shortcomings he reported:

I focused on the Introduction and Conclusion … not impressive at the beginning but gradually improved. She was lacking skills on how to deal with incorrect responses. She would spend most of her teaching time discussing student's response…. not very fluent at the beginning gradually improved… tone and pace not satisfactory improved with time…scientific terminology and body movements were also not satisfactory they also improved with time. She also struggled with proper use of the board. Initially she was not able to separate the important points from those that are being provided by students during brainstorming sessions. (TPTB1)

The TPTs had observed STs in various areas identifying their strengths and weaknesses which they helped them to rectify though in most cases it was in the form of advice as to what to do and how to do it more than letting them work out the better means to improve.

5.7.4 The link between the theoretical knowledge and practice as perceived and reported by the TPTs

The FED staff through their visits and the designed TP Handbook could be the observable tools linking the coursework and practical training and learning of STs. It could have been even more effective if the visiting TE would be the subject educator who had afforded the STs the knowledge they were exhibiting. However, their non detectable existence, therefore lack of their
impact on TPTs’ role with STs has been reiterated by study subjects and echoed once more in the
reports. TPTB11 wrote, “Lecturers visited … but they did not say something about his teaching.
Lecturers from NUL do not consult all the teachers for further information in order to help them
after they left.” This marks a significant gap in the operations of the training of STs in their
learning to teach. But, with that inadequacy, the TPTs played a role to some extent in the
professional development of the STs who also managed to learn under such circumstances.

5.7.5 The views of the Teaching Practice Tutors reflected in their reports

The thrust of the TPTs’ reporting on STs’ performance was viewed in their conduct and selfless
involvement in general school activities. The views captured were based on their perceptions of
STs’ conduct and the value of teaching practice which are presented in Table 29. The table lists
their expressed observations with the number of instances and their percentages in which the
expressions were made by the two groups, notwithstanding the fact that not mentioning the
observation actually meant that there could have been no opinion or observation made.

Table 29: The reported views of TPTs in connection with the practice phase and STs’
dispositions

<table>
<thead>
<tr>
<th>TPTs’ expressions</th>
<th>Biology N=9</th>
<th></th>
<th>Physics N=8</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td>TP essential for ST exposure</td>
<td>2</td>
<td>22</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>TP duration too short</td>
<td>6</td>
<td>57</td>
<td>5</td>
<td>63</td>
</tr>
<tr>
<td>Learning opportunity for TPT</td>
<td>5</td>
<td>57</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>First experience with ST supervision</td>
<td>3</td>
<td>33</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Disciplined</td>
<td>9</td>
<td>100</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>Punctual</td>
<td>8</td>
<td>89</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>Cooperative</td>
<td>9</td>
<td>100</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>Good relations</td>
<td>9</td>
<td>100</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>Devoted</td>
<td>5</td>
<td>56</td>
<td>6</td>
<td>75</td>
</tr>
<tr>
<td>Presentable</td>
<td>5</td>
<td>56</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Respectful</td>
<td>5</td>
<td>56</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>Passionate</td>
<td>2</td>
<td>22</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Accepting criticism positively</td>
<td>2</td>
<td>22</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Humble</td>
<td>3</td>
<td>33</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Care for students</td>
<td>4</td>
<td>44</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Shyness</td>
<td>2</td>
<td>22</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Low confidence</td>
<td>3</td>
<td>33</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Obedience</td>
<td>3</td>
<td>33</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Passionate</td>
<td>2</td>
<td>22</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>Assertive</td>
<td>3</td>
<td>33</td>
<td>1</td>
<td>13</td>
</tr>
</tbody>
</table>
Teaching practice is acknowledged as a crucial phase for the professional development of the prospective teachers for their exposure to the realities of teaching though it was strongly expressed that the time was short for STs’ better development. Some TPTs also noted its reciprocal nature from which they also learned. Expressing that reciprocity of the interactions TPTB5 uttered:

The department has learned a lot from him… he helped us to create activities matching lesson plan which includes multiple-intelligence. He created different activities in the Science Club which were new to us but very relevant to the subject matter… the spirit has passed to some teachers in our department. (TPTB5)

TPTB10 described it in these words, “I also learned more from him, the way he was introducing his lessons, using lovely jokes, songs and stories to arouse students' interest to the topic”.

TPTs found STs to possess a number of good qualities which could enhance their performance as they could motivate students thus enticing them to participate in their learning and finally developing the essential knowledge, skills and attitudes.

5.8 Summary of the findings from the TPTs’ Teaching Practice report

It is inevitable from the results drawn from TPTs’ reports that teaching practice is essential for STs’ professional development. The STs enhanced and acquired knowledge in relation to the content to teach, the pertinent pedagogies and pedagogical content knowledge and its components from which the TPTs also learned. The STs with the help of the TPTs and other school teachers and through their own initiative improved on teacher knowledge and some personal qualities though they mostly displayed the qualities that TPTs appreciated. There are however some areas of the teaching practice procedures that seem to be lacking especially the collaboration between the university staff and the practice schools tutors which could be one of the causes for the random guidance by the TPTs.

5.9 Conclusion

The secondary source of data from existing and produced documents which had information that related to the research question complemented that obtained from the interviews conducted. The course synopses which in this case were the same provided the training course content for the
two selected Curriculum Studies courses. The topics therein seemed relevant for teacher professional knowledge comprising the main teacher knowledge domains; knowledge of the content to be taught, pedagogical knowledge and pedagogical content knowledge and its components omitting assessment though, which was just as crucial.

The transformation of the content through the course outlines by the TEs indicated the specific content they used to develop STs’ pedagogical and pedagogical content knowledge. Although they differed in their detailing and expressing their transformed teaching curriculum, they based their focus on the training course content. Even the assessment was included though it was for the purposes of evaluating their trainees not necessarily teaching them the skill for their use of it later in their career. In addition to the teacher knowledge they developed the STs in, they included teacher qualities and the school context in which the STs would be operating as teachers.

The lesson planning proved to be a great challenge to the STs from the way they had written the lesson plans. The lesson plan as the conceptual presentation of ST’s pedagogical content knowledge guided their teaching during teaching practice during which they were guided by the Handbook designed by the Faculty of Education. Although the Handbook could help to link the two phases of the pre-service stage, it was not used to the extent that it did not quite serve its intended purpose. Without collaboration between the university and the school staff together with no use of the Handbook to guide their interactions with the STs entrusted to them, there was that obvious gap which resulted in the random implementation of the supportive and guiding roles. Generally, the documents proved beneficial to the study in that the results from the analysis made it possible for the researcher to identify some areas that could possibly lead to STs’ notable limitations in their practice teaching as they could still be observed with the study group. The chapter that follows consolidates the results from the interviews discussed in Chapter 4 and those from the document analysis discussed in the current chapter.
CHAPTER 6
ANALYSES AND REFLECTIONS

6.1 Introduction
In attempting to establish through this qualitative study the probable cause(s) that led to the reported limitations with STs’ classroom teaching during teaching practice, the directly involved people in the two phases of the pre-service stage provided their experiences and views through the interviews and written reports which were coupled with the already existing documents. In this chapter the findings from the analyses are consolidated and discussed to portray the picture of the undergraduate science student teachers’ training. The discussion takes into account the observed relationships between the issues from all researched sources. The issues are so closely linked that the discussion of one inevitably touches on the other, especially because with the work of a teacher it is not easy to talk of one aspect in isolation. The presentation follows the five areas that have guided the presentations and discussions of the preceding chapters 4 and 5, the interviews and document analysis respectively. The areas are: (1) teacher training content, (2) training methodologies and pedagogies, (3) enactment of the acquired knowledge by the STs, (4) linking theory and practice and (5) participants’ general views. In discussing the findings under those areas the prominent themes derived from the findings are incorporated. The themes were teacher knowledge comprising the main domains and their components, teacher qualities, practice teaching, reflective practice and training procedures.

6.2 The content of the Curriculum Studies courses
Basically the teacher training content constituted conceptual and practical knowledge targeting the Lesotho high school curriculum that the STs were going to teach considering also some prevailing circumstances therein that they were equipped to cope with, and the methods to teach the subject matter underpinned by the learning theories. The STs’ study and use of the contemporary school syllabuses and textbooks as part of the school curriculum were highly appreciated by STs as the factors that contributed effectively for their successful teaching during TP. A look into the prevailing circumstances in the schools in Lesotho for which some propositions were made as a means to meet the encountered challenges contributed to STs’ awareness and knowledge of the essential qualities and skills they would require.
The origin of the content that the STs were trained on was the course synopsis which could be equated to a standard syllabus and was the same for both courses. The similar content for the two selected courses exposed the STs to the same training content. The building of the training content around high school syllabus presented part of the context and also made it appropriate for the STs for their teaching during TP and afterwards. The topics listed in the synopses though stated in broad terms embodied the main domains of teacher knowledge and their components with the omission of assessment.

TEs in turn developed course outlines which were used as the teaching curriculum based on the synopsis. That could be considered reasonable for the teachers who would be serving the same nation. The different presentations and expressions reflected in the course outlines manifested the ‘open and flexible’ curriculum frameworks (Vellopoulo & Ravanis, 2012) influenced by their longstanding execution of the synopsis, interactions with schools and STs’ reflections from TP developing their practical personal perspectives (Vanassche & Kelchtermans, 2014). The content therein incorporated the topics that seemed essential to form a base for teacher knowledge comprising the domains CK, PK and PCK and their components with assessment for STs and its various modes stated.

To make the content accessible to the STs, the concerned subject TE interpreted and transformed the synopsis content into course outline to benefit STs’ learning to teach in the respective subjects. In general, the basis for the training content was thus the synopsis and the course outline. The course outlines though based on the similar synopses, and the course outlines guided by the same institutional format, they were expressed and presented differently still bearing the essence of the standard content borne in the synopses. One would take that apparent variation to be one aspect of fragmentation (Ball & Forzani, 2009; Grossman et al. 2009) of departmental effort in developing the prospective teachers. In such a situation, one would wonder if it was a practice that STs were paired in their placement for practice (Sorensen, 2014) that would enable STs to effectively support one another in the specific subject matters except in general issues. The kind of support they already obtained from STs from other subject areas as well as those from the Lesotho College of Education regarding general issues in teaching.

Although TEs said they included assessment in their course outlines (not reflected though), they both admitted to have not given it the consideration and handling it deserved as a topic in their
teaching for STs’ to learn it. But for their teaching as their course outlines indicated, they themselves in their courses employed various assessment techniques to gauge their students’ learning progress and evaluating the overall attainment. Assessment is not only a crucial skill for the teacher but a powerful teaching-learning tool if properly and purposefully handled in collaboration with feedback directed to students’ learning (Voerman et al., 2012). Its omission in the course synopsis resulted in the oversight by TEs on developing course outlines. It perpetuated into their teaching despite their awareness and approval of its importance to the teacher as one TE attested: “I haven’t managed to create time for doing that, setting different test items and so on. I haven’t had time to do that ... but it’s an important aspect of testing for students’ understanding. So I have left it too much to EDF ... but I think I have to go back to it”.

The impact of that missing component of PCK was revealed in STs’ enactment of what they had learned which they themselves witnessed just as did the TPTs and TEs. It was picked up by the TPTs through assisting STs in designing test items which could help their learning part of that vital skill. The crucial effect of assessment in teaching was focused on students’ knowledge of the technical subject matter that would be required in the national external examinations. The other learning area that TPTs assisted the STs in was with the practicalities of handling the classroom environment with the focus on time management, the actual content to teach in a topic for inclusion in the lesson plan and students discipline.

The TP Orientation Workshop held a week before the start of teaching practice according to the STs’ reports basically highlighted the content in the TP Handbook, mainly the methodologies, their assessment on classroom teaching and the report guidelines. The Handbook with its inspirational content considered the qualities of a teacher and the role for the ST who would be adopting the stance of a teacher then for the benefit of the students. The assessment form which seemed to be the attractive part of the Handbook to the STs was the area specifically presenting the expected aspects of practice required from them, hence why some STs who looked into it probably picked on it. The areas covered therein included the domains of teacher knowledge but rather limited and a bit vague in the checklist of the components of those domains. As TEB observed about the assessment form, the presentation section could have been the focal point following on the lesson plan which the researcher here considers as teacher's conceptual PCK. The other issue that was emphasized in the workshop was teacher conduct and the intimate
interaction expected of them with the TPTs. The TPTs likewise seemed to concentrate more on
teacher qualities as revealed in the interviews and their reports and with no elaboration though.
They appreciated STs’ command of subject content despite some shortcomings with some of
them.

The TEs, STs and RPTs generally acknowledged that the content was appropriate for teacher
preparation, setting a foundation for teacher’s knowledge and practices. The forethought for the
implementation of the training content inevitably influenced the decision on the process of
teaching the course. One could be fairly reasonable to imagine that the process for the individual
TEs would not necessarily be absolutely the same though again one would not expect too wide
gap. With the content generally appreciated, then how it was handled becomes the next issue for
discussion.

6.3 The Methodologies and pedagogies employed for the training content

The general methodology employed by the TEs was to create learning opportunities for STs’
through theoretical discourse and practical engagement. There was no common ground for how
those constituents would be operated hence each TE employed what s/he deemed appropriate as
a means to achieve the anticipated teacher product. Since science has always been claimed a
practical subject, the expectation could be that the main approach the TEs would employ would
depict that. But to the contrary, that became an advocacy while didactic approach dominated
their instruction. Although one TE said the main teaching approach used was discussion while
the other said it was classroom talk, the methods had similar aspects. In executing their teaching
they both engaged STs in discussing in groups and as a whole class. Even the strategy they used
resembled each other in that as TEB explained the procedure followed; “I pose a question, they
talk about it, we talk about it then I supplement their ideas”; TEP in the similar vein declared: “I
come up with the exercise where they talk ... it is them talking at group level and then at
classroom level... there is a time when some authority or authoritative discourse comes in”.

One could argue that with that sequence of events, if there was a balance, there could have not
been an inclination to more teacher talk which in that case was reported predominating by both
TEs and their STs. The major constraint reported for employment of that approach was the
poorly equipped departmental laboratories. However, TEs decided on the means within the
confinements of the teaching-learning environment and created the learning opportunities for the STs. Institutional structures and their organization, together with facilities clearly do impact on faculty, departmental and individuals’ operations.

In the theoretical discourse mode the common strategy the TEs followed was that of them setting the ground and letting the STs deliberate on the issues after which they would research more and present on them either revealing their understanding and view or practicing a skill. In that manner, learner involvement was at the heart of TEs’ teaching, developing the sense of responsibility for STs’ own learning as well. The STs to some extent appreciated the approach which they used in their own teaching though in their case exposition turned out to be a major teaching strategy, learners coming in sporadically. TEs being more vocal than the STs could have been a cause for some STs claiming that they could not observe the constructivist teaching. They could not even notice group work as depicting socio-culturist learning advocated. It might be a proof that it is essential that the modeled strategy should be made explicit for STs to be aware of and understand (Berry & Van Driel, 2013).

With the outcry from TEs and STs about the unrealistic duration for the course, one might take it that TEs did a lot of talking because they had to touch on a lot of training material in order to deal with the issues to be covered in their teaching. Moreover, that could have been the appropriate approach particularly considering that the second semester was out for teaching as STs would be in schools practicing teaching. That lot of information imparted with limited practice with the learned issues was likely to result in STs leaving for field experience with some uncertainties as reported by the RPTs and the rest of the study participants in connection with the actual content to teach to students, the strategies that would best make students understand and assessing that understanding. Of particular concern was also the actual handling of students which STs anticipated and found to be challenging. On the basis of that observation, they strongly indicated a need for creating opportunities for them to interact with students in schools prior to going on TP since practice with peers did not give sufficient “approximation” (Grossman et al. 2009) to the school teaching experience. That was yet another fragmentation of teaching (Ball & Forzani, 2009) in the case where the practice settings and procedures were totally different.
The very fact that the STs gained their knowledge from various departments and faculties within NUL marked the fragments within which they learned. STs were expected to later draw from the knowledge gathered from the fragments, integrate and transform in teaching. TEs paid attention to STs’ existing knowledge from their high school learning and the sister department (EDF) and service faculty (FOST) upon which they based their contextualization in the specific subject areas. As a means to achieve the training objectives within the restricted time and organizational principles and procedures, TE identified the topics they claimed had proved to be problematic to both prospective and regular teachers for the STs’ practice teaching. That in itself was restricting the development of STs’ PCK since one of its attributes is that it is content-bound (Magnusson et al., 1999; Shulman, 1986/1987). The topics treated during coursework training were not necessarily those that were taught during TP for most STs. Only 3 of 8 Biology and 2 of 10 physics STs (about 28%) taught similar topics to those they dealt with on campus, 3 of whom were teaching it even at a different level.

The manifestation of the limited time could be realized when the Curriculum Studies courses in the specific subjects were only offered in the final year of training which reasonably could not allow for thorough treatment of what would be required for STs’ development of teacher knowledge. Those yearlong courses were practically offered in a semester while concurrently the STs were pursuing other courses as well leaving no room for creation of extra time even if TEs could find it possible for them. But the STs appreciated the contribution of their studying the syllabus and planning for the lessons to their ability to deal with such topics.

For practice teaching, STs did peer teaching which impacted positively on STs’ qualities the most frequently mentioned by all groups of study participants being confidence with standing before people, imparting information and improving subject matter knowledge which was also noticed having further developed on their return from TP. Nevertheless, the duration and frequency of the sessions were a major constraint alluded to by TEs, STs and RPTs. With their analysis of the prevailing circumstances, TE engaged or not engaged STs in that practice and other matters pertaining to it were left for her/his discretion. With no practice teaching inevitably there was no lesson planning done as with the Physics group in 2011. One would consider that a significant miscalculation since a number of teacher knowledge components and teacher qualities come into play in the preparation for and execution of that practice, despite the inherent
limitations and impinging factors such as scarcity or unavailability of science materials. Again, that was a sign of disparity in the training courses within a program with regard to conduction of practice teaching sessions as was revealed with time allocated per ST and the frequency of doing it.

Another notable difference came in what was entailed in the educational project in each group. In one course the STs did an intensive planning of their chosen topic in which they worked out the methods they deemed appropriate for the sub-topics, the materials that could be used, the possible pertinent activities and the assessment strategies. In the other, the STs observed either the attitudes or misconceptions the students in the school showed in the course of teaching during TP for which they produced a report. However, only one ST and no TPT alluded to those investigations. With that same group again the STs had to produce a video clip in which they employed classroom talk in their teaching which only one ST alluded to and it sounded to have not been a successful undertaking due to the malfunctioning of the device she used. Furthermore, the concerned TE attested that he had not worked out the clear means of how such clips could be used to benefit the STs especially because the teaching time was very short after the completion of TP. The analysis and reflection on such material if well planned and utilized have been proved to have a positive impact on STs’ learning and skill development (Delamarter, 2015; Santagata & Angelici, 2010).

As a means to expose STs to facilitation of students’ laboratory experimentation, STs in the Physics group were to observe its running with the first year students in the Faculty of Science and Technology. In as much as that could be one move to enlighten STs in that regard as well as their observing the students in action, one could argue that the context could not be equated to what could transpire in the high school science laboratory in respect of the nature of the activity, the materials used, the procedures followed and the caliber of students involved. But on the other hand if well thought out and executed, it could help with the development of certain important areas in doing experiments, such as the appropriate and safe way of manipulating the pieces of apparatus and chemicals even learning about some equipment that was not there in the Science Education laboratories. A number of good ideas which if shared and discussed with colleagues might open areas for provision of a wider learning spectrum for STs and even for TEs themselves, learning from one another.
The orientation workshop held just before TP started came as a once off opportunity in half a day during which the contents of the TP Handbook were highlighted giving limited time for STs to grasp the intent. The provision of the Handbook on the same occasion might have led to its unproductive use by STs. If the Handbook had reached the TPTs, and they were well informed about it, they could enforce its purpose. Although the Handbook encouraged STs’ peer meetings, none were organized for 2015 in which the study was in progress. In spite of that, the Physics group with its initiative of setting a social media interaction created a means of supporting one another which they highly appreciated. But one is of the opinion that if it was formerly organized with clear guidelines it might have gone a long way in helping STs to develop professionally as such peer interactions have proved effective (Fox & Wilson, 2015).

During TP, the random and idiosyncratic guidance by the TPTs did not offer the STs that much of the anticipated extension of their learning as there was obvious lack of communication and collaboration between the concerned parties from the university and the TPTs in schools. That marked even a greater chasm since it was then between the two phases in the stage of teacher professional development, the preparation on campus and practice in schools. One believes that if they could be clearly connected that might result in a beneficial and reciprocal continuity. With TPTs guidance of STs in some skills such as classroom management, lesson planning and assessment one would say TP could serve as a learning opportunity for STs in other areas as well.

However, the drawback with TPTs’ assistance with assessment was that it was mostly influenced by external examinations which put a great pressure on teachers from the public domain that expects good student performance. Teachers’ efforts were exerted to ensure that the students would perform well in the national examinations so could be the type of assessment questions the STs were helped to design and use. In that manner, the form of assessment driven by the examinations one is tempted to imagine the teaching to be just as influenced and less focused on students’ learning. Sarivan (2011:195) attests that such a situation “formalizes teaching and blocks learning” which one believes due to their long experience TPTs suggested what to include and leave out in planning and teaching. The effect of formative assessment during teaching seemed not to be recognized by the STs and TPTs as there was no mention of what for instance, the asking of questions in the course of teaching was intended to achieve, neither was there any
of how the STs were assisted with asking purposeful questions to guide and direct students’ learning. That was overlooking its potential to optimize teaching and learning (Yan, Chi, & Cheng, 2015). That therefore leaves one wondering if the assistance with assessment techniques was indeed in the best interest of STs’ learning. How the STs applied what they had acquired is the issue discussed in the next sub-section.

6.4 Student teachers’ enactment of the acquired knowledge

To a significant extent, STs applied what they learned from the learning opportunities they were offered in the two phases. All of them sought help from TPTs and other teachers as they found necessary. They conducted themselves well, taking part in school activities and helping students beyond the teaching time and helping even those from the classes they were not allocated for practice. That showed that they could relate well with the school community hence increasing their chances to learn.

In their teaching they basically emulated their TEs in mostly talking to impart subject matter and explaining concepts. That marked the influence of modeling by TEs. The STs however, from their reporting employed the approach because they appreciated the manner their TEs taught them. But also it was the better means to cover much content in a given time as well as curbing discipline challenges with students. On employing the advocated approaches, they were challenged by being unable to keep the students focused. That challenge with controlling students eventually led to them not covering the intended work especially doing it within the allocated time. In addition to that experience effect, the expectation of the TPTs regarding what should be completed which resulted in them telling the STs how they could go about treating certain topics led to having to basically dispense the technical information. The teaching strategies that STs reported to have been the main ones they employed included discussion, their explanation of the concepts, giving students some reading assignments and their demonstrating to students. From the results, those were the strategies the TEs employed in their teaching depicting the features of didactic approach according to Magnusson et al. (1999). The modeling by TEs and TPTs’ induced the notion that a teacher is a dispenser of information (Gess-Newsome, (1999) which the TEs witnessed in STs’ teaching, TEB proclaiming STs were “lecturing even where they are not supposed to be lecturing”.
Fortunately for the Physics STs, the topic they taught required students to do calculations which then enabled their involvement. In the cases where students were to find information in connection with the topic being taught, it was merely reading about it in advance or after being taught, in both cases the teacher still explaining everything. Whichever representations the STs used in their teaching, it seemed that the bottom line was them playing the major role of telling students. The lecturing by STs as the main method during which they asked students some questions, with those STs who were either uncertain with the content, inadequate in facilitation, not proficient in English or not creative for instance, their teaching would definitely portray some form of shortfall to the observer. That could justify STs in their earning for more practical learning, to have a feel of the advocated strategies.

In their lessons, as gathered from their lesson plans, verbal and written reports, TEs’ verbal reports and TPTs’ verbal and written reports STs facilitated the lessons to varying degrees of competence. Having learned the use of the syllabus and planning the lessons, they could teach the topics they did not practice with during coursework training. Their lesson plans displayed significant insufficiency in almost all respects which was also confirmed by the TEs, some TPTs and some STs themselves. The weakness confirmed by TEs who noted the vague nature of the content presented in its stages. If as part of the lesson plan, STs could not write meaningful reflections on the lessons and the means to improve, even showing no impact in the subsequent lessons, one would take it that the aspired reflective practice (National University of Lesotho, 2015) and its pronounced effect in enhancing professional development by increasing STs’ repertoire of teacher knowledge components might have been jeopardized, confirming the superficial nature of the STs’ reflection (Halim, Buang & Meerah, 2011). That could be implying a great need for significant guidance for STs’ reflective skill development (Ben-Peretz & Rumney, 1991; Halim, Buang & Meerah, 2011; Kaasila & Lauriala, 2012; Korkkö, Kyrö-Ämmälä, &Turunen, 2016; Leavy & Hourigan 2016; Majzub, 2013) in order for the reflection to make a desirable contribution in the professional growth of the prospective teachers, also linking theory and practice (Orland-Barak & Yinon, 2007).

It could be expected that STs would in their practice follow the example set by their TEs as they indicated their applicability at high school before going on TP. Whether TEs were consciously modeling what they were preaching or not, STs were learning from their example. One would
take it that as the discussion method, group work, students searching for information and presenting on it, and TEs’ demonstration of some issues were the commonly employed teaching strategies by TEs so did STs in turn. However, teacher rather than classroom talk was dominant hence why some STs could realize that they could not explain some concepts well enough for the students to understand them, even leading to students’ poor performance in tests. In such explanations the STs were not quite conversant with either the concepts, the technical terms or it was a problem of expressing themselves clearly. In some cases the STs could not pitch the content at the level of the students, therefore not being able to teach what was to be taught, a flaw therefore in teacher’s PCK. However, all of them improved in different areas of their teaching with time.

Generally, STs followed the practices in their teaching and dispositions that they acquired from coursework training, orientation workshop and TPTs and other teachers in the practice school and as a result played their learner role reasonably at that level. The reported limitations in some areas could probably improve with more exposure, evident and directed support. The sub-section that follows looks into the apparent ways in which the theoretical and practical phases were linked.

6.5 Linking coursework and teaching practice

The opportunity that TEs created for STs to practice teaching through peer teaching incorporated extensive planning and preparation using the school curriculum materials already set a ground for the field experience The value of that experience has been underscored by both TEs and STs who acknowledged its contribution during their actual practice despite the limited time it was done in and being done out of context, not in actual schools with actual students, yet another fragmentation facet. Moreover, the general practice by the Faculty of Education (FED) was that TEs follow the STs into practice schools.

Usually only two visits were made per ST, one for observation and the other for assessment. The seemingly unbinding TE-TPT collaboration had given a leeway for solitary support with no common goal for the professional development of their shared trainee. To add to the already limited TE-ST visits, it was not the concerned TE who necessarily followed the STs into practice, but any allocated TE. The study TEs however, had created communication means with
their STs through e-mail and telephoning which was not utilized that much. Furthermore, there was no form of interaction between the visiting TE and the TPT in connection with their shared trainee. It might have been fair and reasonable for the TE who set the ground and knew what was expected of the STs to follow them through especially in that situation where the TPTs were operating in the dark. The procedure created doubtful and uncertain feeling especially with some TPTs. They all expressed a need for communication between them and visiting TEs. They expressed a wish that there could be joint observations of STs’ classroom teaching and post-observation conference which could inform the three parties about the progress and the means to take it further. That would enlighten them on what was expected of them in assisting STs to further learn, how they were to do it and in which specific areas to focus their support which would unify their efforts to achieve the goal. That would also enhance the expectations about the whole enterprise expressed in the TP Handbook which TPTs could not refer to since they did not have a copy of it.

Those visits normally started in the third week of TP, which for some STs was their first week of teaching. The report by the visiting TE would definitely reveal alarming observations. Also, when STs were made to plan lessons, seek time to teach and do the teaching on the spot when a visiting TE arrived at the school, one might not expect good performance by the ST considering what the process involves. The timing and the way things were done could be creating a problem for the STs hence the reported inadequate performance in their classroom teaching. The general views gathered from the findings follow

6.6 General views

All participants acknowledged the importance of the conceptual and practical knowledge that the training afforded the STs. TPTs acknowledged that STs knew the subject matter even though in some cases they could not decipher that appropriate for students. All groups of participants valued the opportunity for practice offered. STs did show some degree of professional growth in practice with some limitations in some areas. They also appreciated the effort that STs exerted in making students take part in the lesson. Their disposition in class in most cases portrayed confidence partly reducing students’ misbehavior and in some cases raising their admiration of the female Physics STs. TEs too had observed STs’ development of confidence from peer teaching sessions especially when they did it more than once. For all of them, the reported
limitations in a number of areas with STs’ teaching gradually improved which was echoed by the STs themselves. TPTB1 for instance who observed a number of shortcomings with the ST explicitly mentioned some such areas saying, “Introduction and conclusion gradually improved, employed some tips from post-lesson discussions…cut on lesson objectives, managed a balance between learner- and teacher-centered methods. Gradually improved fluency, improved tone and pace…improved scientific terminology and body movements … improved usage of board”.

But again they expressed the need for practice in context with actual school students which TEs did not mention, probably noting the circumstances surrounding their work, especially the reported disheartening workloads for them and their STs. There was a further concern about limited time for the Curriculum Studies courses, practice teaching during coursework training and the extended one in schools, and the almost non-existent collaboration between the subject TEs and TPTs leaving the latter in a dilemma of not knowing what was expected of them. One would conclude that the training courses on campus and practice opportunities could be fine, but the organization and timing of the activities to ensure effective learning, and the general procedures followed throughout the whole process need to be looked into.

6.7. Conclusion

The content and procedures for the training of prospective science teachers at NUL seem to cater for the development of teacher knowledge and qualities through creating the learning opportunities for student teachers’ acquisition and development of theoretical and practical knowledge. However, there were significant impinging factors that possibly perpetrated the continuing limitations observed and reported in student teachers’ classroom teaching which could be observed even with the study group of student teachers. The main factors in which the identified themes were subsumed were time and procedures of the training program and courses which could have inhibited the desired professional development impact. Those had the attributes such as omission of assessment as part of the training content, the frequency and duration of and out of context peer teaching sessions, organization and running of TP, FED staff visits, TE-TPT collaboration, and lack of meaningful guidance of and by TPTs. The underlying factors could be the fragmentation that leads to chasms, idiosyncratic practices and uncoordinated operations at different levels. In the last chapter that follows, the conclusions on the whole study and recommendations thereof are presented.
Chapter 7

CONCLUSIONS AND DISCUSSIONS

7.1 Introduction

This qualitative study was carried out in an attempt to establish the probable cause(s) that could be leading to the consistent reported limitations of the National University of Lesotho undergraduate science education student teachers in their classroom teaching during teaching practice. In order to understand the situation, the study site was identified premised on the model followed for teacher training comprising two phases, the training and practice, both playing a vital role in the professional development of the prospective teachers. Consequently, the study participants were drawn from both phases including the teacher educators as the major guides in the coursework training phase with their counterparts in the practice schools, the teaching practice tutors, both directing their efforts to the student teachers’ professional development who were the core participants.

In the introduction of this thesis the background to the study highlighted the urge behind the endeavor and the purpose and rationale fueled by the reported shortfall with the teacher knowledge domains which in our opinion form the basis for successful teacher’s work. In chapter two the relevant literature revolved around the pertinent issues in teacher education. Those included teacher training the main purpose of which was believed to be the development of teacher knowledge that embraces content, pedagogical and pedagogical content knowledge with their components. Since teacher knowledge is mainly portrayed in practice, theory-practice notion became an inevitable issue and reflection as a vehicle for ongoing professional development.

The main underpinning theoretical notions to this study were the pedagogical content knowledge, theory and practice, and reflective practice in teacher education. Chapter three related the methodology employed for the eliciting of the information from the study subjects the main method being the one-on-one semi-structured interviews coupled with the analysis of the already existing and participants’ produced documents reporting on their experiences in connection with the science student teachers’ learning and practice. The data collected from the various sources were analyzed using template analysis as one form of thematic analysis coupled
with constant comparison method. The results from the analyses were presented and discussed in chapters 4 and 5 respectively; followed by their consolidated discussions in chapter 6.

In this chapter the consolidated overview of the study is presented. It first discusses the obtained answers to the general research questions and correlates the study findings with the relevant literature. The study limitations and the effort taken to guard against the validity of the findings are discussed followed by the propositions of the implications for further research and recommendations for the beneficial utilization of this study research results.

7.2 Answering the General Research Questions

The goal of the main research question was to seek the answers pertaining to the nature of the training afforded the science student teachers through their learning in the selected courses. The data source being the perceptions of the directly involved people in the study site which served as the lens through which the researcher developed an insight into the situation. The general questions derived from the main one focused on five areas that formed their basis. The areas were: (1) the training content, (2) the methodologies and pedagogies employed in handling the training content, (3) how student teachers enacted the acquired knowledge, (4) the linking of theory and practice, and (5) the general views of the participants.

7.2.1 The Major Findings From the Study

Since the purpose of this study was to establish the probable cause(s) of the reported shortcomings with student teachers’ classroom teaching, the findings discussed here revolve around the identified issues that had a notable impact which could result in a view that it could be a sign of inadequacy. That does not in any way rule out that there were noteworthy achievements in the training, learning and practice in this case. The four findings that distinctly had a perceptible bearing on the learning and practice of the student teachers though interrelated and influencing one another to some extent were:

(1) the exclusion of assessment as a topic in the course content for training.

(2) the cross-cutting fragmentation in institutional structure, faculty/departmental operations and practices, university and practice schools partnership that markedly resulted in lack of coherence and collaboration in the training program.
(3) limited time in relation to the program, the courses and the involved teaching-learning activities, and practice teaching.

(4) teacher educators’ modeling.

As the questions are discussed individually in the sub-section that follows to disclose what emerged in response to them, the main findings are incorporated as they fit in each.

7.2.2 The Content in the Training

Basically, the teacher training content constituted conceptual and practical knowledge targeting the Lesotho high school curriculum that the STs were going to teach considering also some prevailing circumstances therein that they were equipped to cope with, and the methods to teach it underpinned by the learning theories. The content to be taught to student teachers originated from the course synopses which were the same for the selected Year IV Biology and Physics Curriculum Studies courses. Those topics were stated as a list of broad topics which were driven by the contemporary Lesotho high school science curriculum. The synopsis content was in turn transformed into teaching curriculum by each teacher educator in the form of the course outline basically stating the course objectives, learning outcomes, content, the pedagogical approaches they intended employing embracing their pedagogical content knowledge. Although the teacher educators followed the institutional format, the content was presented and expressed differently indicating varying foci for the individuals. That marked the disparity in the way the teacher educators interpreted the course content and their understanding of how it could benefit the student teachers. That had the implication of a different teacher product through the same program. That marked some form of fragmentation.

From the topics and their unraveled version the a priori theme, teacher knowledge, comprising the main domains and their components, and the emergent ones that were prominent were teacher qualities, school context and reflection. Teacher knowledge was chosen as a predetermined theme because it was considered a compelling factor for teacher’s work. However, assessment as a concept to be learned by the student teachers was not explicitly reflected in the course synopsis and outlines despite it being a vital component of pedagogical content knowledge. It only formed part of the teacher educators’ outline for the assessment of student teachers not as an essential learning skill for them.
During teaching practice in schools no specific content was designed, rather the guidance by teaching practice tutors was prompted by the practical requirements for which the STs were advised, and assisted as was necessary. The areas in which student teachers were guided that came out distinctly were lesson planning, setting test items which could be considered part of assessment, and the selection of the suitable subject matter. One would take it that assessment was not given the consideration it deserved in the two phases of the pre-service training stage, therefore increasing the likelihood of student teachers’ limited knowledge of it.

The Teaching Practice Handbook that was meant to guide the activities in the practice phase specifically informed the concerned parties about the expectations with the roles they were to play. The roles in turn were however not comprehensively presented in that they did not provide finer details of how exactly they were to be executed, such that they created room for idiosyncratic practice. That is, for instance, it did not state the frequency and the nature of the interactions between the practice tutor and the student teacher. That is, what areas in particular should be considered in lesson observations, and how such observations were to be discussed in order to enhance student teachers’ learning to teach. One takes it that in the coursework training there ought to have been specific learning areas targeted which were to be extended in practice. Assessment might have probably been treated differently by the tutors for student teachers’ learning the skill. That was yet another significant discrepancy in connection with the content offered the shared learners.

In the final analysis, there seemed to be a grave lack of distinct and coherent content offered in the two phases of one stage of prospective teacher development making them fragments of a whole. The next question considered how the content was treated to benefit the student teachers and it is the subject of the sub-section that follows.

7.2.3 The Methodologies and Procedures in the Training Process

Generally, the learning opportunities created for student teachers to learn to teach afforded them time and means to acquire and develop the conceptual and practical aspects of teaching. The teacher educators employed the didactic approach through which they imparted the essential knowledge for student teachers to learn to teach. Though teacher educators advocated the use of experimental work and strategies that encouraged learner active involvement, they were not
notably employed by the educators as well as their trainees in the course of coursework training. The orientation for teaching science as stated in the course synopsis was learner-centered, and teacher educators engaged student teachers in a lot of discussion at different levels, in pairs, groups and as a whole class. Student teachers were further engaged in self study where they were to research on the discussed issues for their better understanding and to present their work in class.

However, the instruction was basically designed and directed by the educator and there was no indication that even with the employed pedagogical approach the student teachers were guided in its appropriate use for their subsequent teaching. The practical work, another topic in the synopsis was limited due to the alleged short time in which the courses had to be completed and unavailability and/or inadequacy of resources. They had to teach a year course in a semester because in the second semester the student teachers were out in schools practicing teaching. That could have been a possible reason behind teacher educators’ employment of the didactic approach in which they did a lot of talking. Teacher educators thus employed the teaching approaches which the student teachers could take example from and they also advocated those that they deemed appropriate, relating their effectiveness and limitations.

The educators further organized sessions for student teachers to practice teaching. In those short sessions (as short as 7 minutes) student teachers taught their peers. In preparing for peer teaching, student teachers did a lot of planning which involved consideration of the elements of teacher knowledge during which teacher educator was able to deal with individuals, which was crowned with actual teaching. In those practices, the presenting one got feedback from the peers and teacher educator in a collaborative reflective manner. The topics from the school science syllabuses used were chosen by teacher educators on the ground that they proved challenging to student teachers either from high school or on campus learning, and to regular teachers as well. The student teachers were allowed to choose a topic on which to present from those. But still, that would not enable the student teacher to touch on every concept within the selected topic just as they could not cover all the topics in the syllabus. That was happening with a group which could do peer teaching at least twice due to an occurrence of the small number of student teachers in that course, but still not taking the normal 40 minutes allocated for a single lesson in schools.
In another course, only one topic and its sub-topics were used for a one 7 minutes peer teaching session still followed by class reflection and feedback. The time at which the courses were offered in the training programme (last year of training) might not be appropriate and sufficient when one considers what goes into the teacher knowledge required for learning that encompasses theoretical and practical knowledge. Although they were designed to run for the academic year, they were practically half year courses. In both ways, the time was limited, hence the likely cause for the short one allocated for course activities.

Although the teaching in the courses was expected to resume after teaching practice, time was also short since the end-of-year examinations were due in about a month. However, the teacher educators ran the reflection lessons in which student teachers shared their experiences from that practical exposure. Also, the educational projects designed in the first semester for use during teaching practice were looked into at that stage. The projects were different for the two groups. One group had prepared a plan of the entire topic with the possible materials, methods, activities and assessments while in the other it was the studying of students’ attitudes or misconceptions during teaching practice.

Clearly, the focus with the project was different. One would say one teacher educator focused on the conceptual development of the components of teacher knowledge while the other considered students’ conceptual development where student teachers were to identify and deal with those misconceptions. Both issues are equally important for the professional knowledge of student teachers. That disparity again would lead to student teachers gaining knowledge in different areas from the same program which might show in their teaching. In that group where students’ misconceptions or attitudes were studied, student teachers were to produce a video clip of their teaching in a lesson where they employed classroom talk. In both group cases there were no set guidelines for reflecting on the practices and assessment of the projects. Nonetheless, in assessing student teachers’ progress and achievement both teacher educators used formative and summative modes the design and use of which was left to teacher educator’s discretion.

With the teaching practice tutors, their operations in assisting student teachers were supposed to be guided by the Handbook which none of them had. They functioned pragmatically and one might suspect that even if they had used the Handbook, since the roles were expressed as expectations not necessarily the must do, their assistance to student teachers would be random
and inadequate. Where there were some observations and discussions done, there was no mention of their impact on student teachers’ learning especially that there were no reports provided to indicate that even though there was an observation form that had to be filled which was hardly done. Where tutors got involved, they mostly instilled their beliefs about necessary practices influenced by their own experiences and the requirements of the national examinations. Although there was no obvious concerted and shared procedure in how the student teachers were helped to learn to teach, in both phases there was some effort to contribute to their professional growth. Following the guidance the student teachers were offered, we next look into how they actually portrayed what they had learned and were learning in the training process.

7.2.4 The Student Teachers’ Enactment of the Acquired Knowledge in the Training Process

The student teachers in their enacting the acquired theoretical and practical knowledge they considered what was furnished by teacher educators and teaching practice tutors. The discussion method that the teacher educators mostly modeled was also mostly employed by the student teachers with a lot of teacher talk. That indicated that the observed practice had a greater influence than what they were told to do. In that exposition approach, the problem with some student teachers was their poor command of English, subject matter or limited creativity in their pedagogical knowledge which resulted in inadequacy to make students understand the concepts. The inadequacy was revealed in students’ poor performance in the administered tests, passiveness in class and misbehavior during the lessons. The missing assessment in their coursework training impacted significantly during practice where they asked recall questions for students to regurgitate what they had been taught. The tutors’ intervention at that point was not necessarily aimed at helping student teachers to learn the skill, rather to prepare students for the external examinations.

Student teachers conducted themselves well as was encouraged in the Orientation Workshop. They also drew the lesson plan for every lesson, but the skill was very insufficient despite the tutors’ look into them. If for the submitted lesson plans there were those significant shortcomings some of which were reported by very few tutors and student teachers, one wonders what the tutors considered when they checked them, in line with what could be the intended focus when STs were trained on lesson planning. That marked another level of inconsistency in the training process.
The reflection part at the end of the lesson in the same manner was limited. That was stated as a description of what transpired in class focusing on students’ shortcomings without getting to the root cause for the observations. The reflections did not display a deeper look into the various factors involved in teaching to set ground for the appropriate reaction. In general, the lesson reflections were superficial. In addition, the proposed means to improve were either omitted, not related to the stated observations or irrational when related to the recorded observations or almost the same throughout, hence not indicating their impact leading to improved practice and knowledge. Teaching practice tutors did not know what reflecting on the lesson entailed hence they could not be expected to have assisted the student teachers in their reflection therefore. That was another sign of a knowledge gap between them and their educator counterparts. Generally, the student teachers did portray promising teacher knowledge despite the reported shortcomings. They did not employ the advocated teaching strategies to a significant extent.

7.2.5 The Linking of the Coursework and Practice in the Training Process

Basing the training content on the school curriculum and considering the prevailing circumstances in Lesotho high schools in which student teachers practiced and would eventually teach brought in the work context, and linked what was being learned then with the practice environment. With the content used for practice teaching, it was only with 5 student teachers of the 20 who taught the topic they practiced with, and with 3 of the 5, they were teaching at a level they were not being prepared for then. That was a discrepancy between the content the student teachers handled with that taught during teaching practice. The practice done with peers did develop a number of essential skills in student teachers, the mostly appreciated its contribution in developing their confidence to stand before people, teaching them. For some it helped with the enhancement of their personal traits such as the projecting of one’s voice for better communication.

The teacher educators followed the student teachers into the practice phase as indicated in the Teaching Practice Handbook. The expectation was that each student teacher was to be visited twice which was considered insufficient by all participants. The first time was for observation and then assessment in the second one. The visiting teacher educator was not necessarily the one who taught the student teacher in the coursework, but it was any Faculty of Education staff
member. Again, the visiting educator for observation was not essentially the same one that followed up for assessment, resulting in a series of disconnected operations.

The visits to schools started in the third week of teaching practice when some student teachers were just beginning to teach and therefore one could anticipate significant inadequacy which would be reported as incompetence with the student teacher as they would still be grappling with many issues associated with teaching as a complex enterprise. In the case where on the day of visit the student teacher might have already taught when the teacher educators arrived, or there were no lessons to be taught on that day, student teachers had to make arrangements to teach in at least one teaching subject if the second visit for observation was feasible. That also had a bearing on student teachers’ performance in their teaching with no time for them to assimilate what they intended doing in the lesson.

Teacher educators involved in the study made special arrangements to visit some of their student teachers while they had also opened room for communication with all of them through the phone or e-mail as the student teacher found convenient in case they needed assistance with regard to their teaching or with any matter they reckoned pertinent. The visiting teacher educator who was not concerned with coursework training would not know the specific requirements in the courses s/he had not handled therefore the assistance offered and the focal issues would not be the same as those of the one who offered coursework training.

On those visits, teacher educators did not in any way interact with the tutors in schools either to get it from them how the student teachers were progressing or sharing with them the observations they themselves had made then together forging the way forward to help the student teachers in their learning to teach. Inevitably, there were no joint observations after which three of them could have discussed the lessons. Those discussions could have formed the platform for ongoing reflection for the student teachers which might improve those done individually, which were insufficient as already indicated. Neither did they indicate what was generally expected of the tutors in relation to what the student teachers had learned and the core areas in which they were to focus their assistance. That lack of collaboration disturbed the tutors grossly.

The Teaching Practice Handbook indicated that the student teachers should hold peer meetings which in the year of research were not arranged. The Physics group made an initiative to form a
social media forum through which they intended to support one another in their practice matters. Their interactions were however not guided hence there was no specific focus and clear purpose beyond basically encouraging each other and merely sharing experiences as there was hardly a mention of their reminding each other of the learned issues that could then be used for better performance. In general, although one would say there were some mechanisms which could link theory and practice, there was no methodical and potent mode of operation. The participants expressed their general views which are reported in the ensuing sub-section.

7.2.6 The Participants’ General Perceptions of the Training Process

The study participants appreciated the training model. Student teachers claimed they were equipped with the essential knowledge in content and pedagogy as well as teacher dispositions and confidence. But they raised a concern about not having been taught and given an opportunity to develop the assessment skill. They also appreciated the practice teaching through peer teaching during coursework training. They found the practice limited though, with regard to the duration and frequency of the sessions. They further indicated that it could be more beneficial and meaningful if they had practiced with actual students in schools as they discovered that teaching students was more challenging than it was with their peers. Student teachers and the teacher educators found the time for the course unreasonably short.

Although all student teachers acknowledged lesson planning as one crucial tool that helped them to teach even the topics they did not deal with in the coursework lessons, one student teacher adamantly discredited lesson planning, and also believed strongly that it was through corporal punishment that students learned. In addition, all participants found teaching practice period too short for student teachers to reasonably learn to teach. In particular, teaching practice tutors expressed the need for collaboration between them and their counterparts from the university. They thus realized the dissonance which could be the source of divergent perceptions about and practices in support of student teachers in their learning to teach. The findings are related to the relevant literature in the section that follows.

7.3 Research Findings in Relation to Literature

The exploration of the two links, preparation and practice pointed out by Cochran-Smith and Fries in Cochran-Smith and Zeichner (2005) provided a number of results with regard to the
knowledge, skills and dispositions that student teachers acquired and employed in teaching. The findings revealed the strong points and some shortfalls in the two phases and about the training stage as a whole. The model for the undergraduate pre-service teacher training at NUL falls in the traditional mode which still operates in other parts of the world (Allen & Peach, 2007; Allen, Ambrossetti and Turner, 2013; Shuls & Ritter, 2013; Lewin, 2004; Mtika, Robson, & Fitzpatrick, 2014; Nilsson & Van Driel, 2010; Ozdemir & Yildrim, 2012). In this section, the findings are also discussed on the basis of the five areas entailed in the general research questions starting with the content in the two phases in the sub-section that follows.

7.3.1 The Course Content for Training

The content for training presented in the course synopses and outlines entailed both theoretical and procedural knowledge (Gess-Newsome, 1999) that is required in a teacher training program. However, the omission of assessment as one crucial component of pedagogical content knowledge (Magnusson et al., 1999) had a significant impact on student teachers’ practice in schools. The oversight resulting in the omissions of some components of pedagogical content knowledge was reported from the reviewed curriculum materials of the Lesotho College of Education, the negative impact of which was revealed in student teachers’ practice in schools (Lewin, 2004).

For the student teachers and teaching practice tutors, their idea of assessment was mainly testing students’ factual knowledge of what had been taught which could not be taken as having learned, but mere regurgitation of the learned content which clearly indicated the shortfall with their understanding of what assessment entailed. Their stance therefore failed to meet the requirements for assessment which according to Edwards, (2013) for science teachers’ assessment capability “includes their understanding and application of generic assessment concepts, as well as science-specific assessment knowledge” (p 215). With the student teachers, one would say that the limitation has been observed with the novice teachers (Gess-Newsome, 1999) which in the case of the study student teachers was compounded by having not been exposed to the assessment tools and modes appropriate in their specific subject areas. It was a critical oversight when assessment is considered one of the vehicles for learning (Edwards, 2013; Sariva, 2011).
The teacher educators’ transformation and use of the content from the synopsis putting it in the context of the student teachers’ teaching subjects in the Curriculum Studies (Kirk, 1986), enabled their development of teacher knowledge therefore acting as a pillar attested in research (Ball, Thames & Phelps 2008; Loughran, Berry & Mulhall, 2012; Shuls & Ritter, 2013). However, there was that observable disparity in the interpretation and transformation exhibited in the manner in which teacher educators presented and expressed the content in their course outlines which inevitably set ground for instruction. Those differences reflected could be manifesting the ‘open and flexible’ curriculum frameworks (Vellopoulo & Ravanis, 2012) influenced by their longstanding execution of the synopsis, interactions with schools and student teachers’ reflections on teaching practice experiences. They also marked their understanding and perception of the situation and how they ought to act within it (Berry & Van Driel, 2013; Vanassche & Kelchtermans, 2014) what Vanassche & Kelchtermans term “subjective educational theory”. That showed no apparent sharing of ideas about teacher educators’ purpose and approaches which is one of the benefits that Berry and Van Driel, (2013) envisage through the study of teacher educators’ practices. Shared knowledge and perception between teacher educators would lead to a common understanding of how best to carry out their training activities to pursue a common vision of the aspired vibrant teacher.

That divergence was further exhibited in the focus of teacher educators and tutors’ in their consideration of what the prospective teachers had to know and be able to do and the kind of support required. Those chasms marked the fragmentation within the training program (Ball, 2000; Berry & Van Driel, 2013; Darling-Hammond, 2000; Feiman-Nemser, 2001). That fragmented nature of the continuum in that stage of teacher development lacked the necessary distinct, coherent and common base (Caena, 2014) to effectively guide the operations.

The on-campus coursework training was basically theory laden with some practice in the form of peer teaching to prepare student teachers for actual practice in the school, the major impact of which was developing confidence, one area of teacher’s expertise (Smith & Strahan, 2004) and drawing lesson plans. With some countries, practice teaching is spread throughout the years of training (Körkko, et al. 2016; Zeichner, 2010), with the extended one at the end of the training which is referred to as field or professional experience. The student teachers are exposed to the school situations and classroom observations and short practices throughout the years of training,
providing repeated opportunities for practice in context (Ball & Forzani, 2009). Ball (2000) asserts that the preparation of teachers in context should be grounded in practice and we take it that that would make practice and theory dialectic.

As research shows that student teachers’ prior beliefs about and experiences with teaching and learning influence their acquisition and interpretation of what they learn in teacher training courses (Kagan, 1992; Miller & Shifflet, 2016) even training on campus influenced their practice in schools. That could be observed with student teachers mostly employing the discussion method and assigning students to find more information on the concepts dealt with. With the reported insufficiency with student teachers’ assessment, one attribute of which is asking questions, then one would wonder how well they could facilitate the discussion that is considered a complex task that requires time to learn to do (Grossman et al. 2009).

Ball, (2000) warns of the problems facing teacher education programs in offering student teachers what is suitable for them to learn for teaching. We could say a look into only certain parts of what had to be taught and how, some of which was not even taught during teaching practice could not meet that end fully though the training formed a basis for teaching throughout one’s career. In his introduction of pedagogical content knowledge, Shulman (1986) argued that that specialized knowledge is content-bound, echoed by Magnusson et al., (1999) who point out that a teacher who is not conversant in a topic or subject cannot perform as well as the one who has the knowledge and has had practice with its teaching. The implication being that it is not just a matter for teachers knowing what content to teach as may be given in course synopsis for teacher educator or the school syllabus for the student teacher and how to teach it. But it should be teaching what should be taught and how to beneficially handle that very knowledge in learning and practice for the benefit of the students taught.

In this study it was not necessarily studying how teacher knowledge was developed rather its recognition and employment. That was also due to the fact that the STs handled a range of topics as the schools decided on what had to be taught then, while the development of pedagogical content knowledge is content specific (Abell, 2008; Loughran, Berry & Mulhall, 2008; Shulman, 1986, 1987; Van Driel & Berry, 2012). Since there is a strong feeling that what prospective teachers ought to know and be able to do is crucial (Ball, Thames & Phelps, 2008; Darling-
Hammond, 2005), in the next sub-section how the content was handled in the course of student teachers’ training is looked into.

7.3.2 The Methodologies and Procedures in the Training Process

Teacher educators provided opportunities for student teachers to learn through the discussion of concepts and practice through peer teaching. That offered varied and essential learning opportunities within which there were multiple activity settings (Martin & Dismuke, 2015) in which student teachers were involved to develop their professional knowledge. For instance, with the commonly employed discussion method, student teachers were engaged in pairs, small groups and whole class interactions for deliberation on an issue or presentation during or after which they discussed the observations. Since teaching is a social activity (Edwards, 2013) that practical experience could help in the development of interpersonal skills that prepared STs for beneficial interactions with the students later in their teaching to facilitate learning.

However, there was no apparent indication that teacher educators consciously and formerly guided student teachers on the specific procedures to be followed in conducting a discussion/classroom talk in teaching, directing their attention to what the method actually involved either through theoretical discourse or practical involvement. Arguing for the need for student teachers’ engagement with the actual task, Ball & Forzani (2009:503) attest: “Learning to set up the task and to orchestrate a brief discussion of the children’s work on it is different from designing or talking about the activity”. If it had been done with the peers, to some extent it could have provided an experience with learning the method though it would still be lacking since it would not be in the context in which the student teachers were going to teach which was alluded to in the discussions above. The same could be said about the advocated experimental work which would not be the same doing it with peers as it could be with students in schools.

The practice teaching that the teacher educators arranged for student teachers and conducted helped with the development of teaching capabilities and confidence as it has been proved to have that potential through the views of teacher educators, student teachers and researchers’ observations (Ghanaguru, Nair, & Yong, 2013; Lederman & Guess-Newsome, 1999). However, it was not done in the meaningful context Magnusson et al., (1999) which could have enhanced the acquisition of the essential knowledge, skills and attitudes though one would consider the
context afforded in that situation as supportive with the teacher educators facilitating and together with student teachers giving the feedback on the presentation. Collaborative group reflection (Miller and Shifflet, 2016) during peer teaching and after teaching practice created an opportunity for learning from one another. Practicing teaching on peers on campus rather than in schools with actual students lends the exercise to fragmented practice experiences which in themselves according to Ball, (2000) fragment teaching.

The brief, once-off Orientation Workshop at the last moment defeats the notion of repeated opportunities for activities (Ball & Forzani, 2009) to give more time for student teachers’ learning. In this case that was not the direct responsibility of teacher educators but TP Coordinator. If TP Handbook was distributed to student teachers and teacher educators earlier, the latter presenting on some information therein during the event, they could have probably included not only the lesson plan format that was used in planning for peer teaching but the aspirations for the endeavor.

In following student teachers in practice schools, teacher educators extended their training providing the necessary support. The teaching practice procedures sounded lax therefore creating a likely cause of challenges (Allen, Ambrosetti & Turner, 2013; Gürsoy, 2013) such as those discussed in the preceding section boiling down to random, diverse and uncoordinated practices ultimately not benefitting the student teachers in their learning to teach. The nature of the assistance the teaching practice tutors who acted as “Nellie” has to some extent confirmed the assertion by Kirk, (1986:16.) that “sitting with Nellie” has proved to be “an extremely inefficient and wasteful method of training, haphazard, and lacking the capacity for the systematic development of teaching skills”. In the next sub-section we relate student teachers’ enactment of the acquired knowledge with some literature.

7.3.3 The Student Teachers’ Enactment of the Acquired Knowledge in the Training Process

Teaching as a complex multitasking and multidimensional process that deals with varied intertwined factors requires deep knowledge and understanding (Ball & Forzani, 2009; Göran, 2009; Grossman et al. 2009; Hollins 2011). Although the student teachers in this study performed reasonably well during teaching practice following the limited and out-of-context practice during coursework training, their outstanding shortfalls were with the lesson planning,
reflecting on the lesson taught and working the means for improvement, and limited proficiency and employment of a variety of teaching strategies and handling the content. The inadequacies were observed in the analysis of literature on teachers’ use of PCK in Turkey with both pre-service and in-service teachers (Aydin & Boz, 2012). The reported shortcomings in this study could be portraying the weakness in linking the learned theory with practice hence aligning with the attested limitation with the traditional mode of training in which student teachers are expected to effectively transform and incorporate the acquired knowledge (Korthagen & Kessels, 1999).

The lesson plan reflects an abstract cognitive version of one’s pedagogical content knowledge. It is a crucial but difficult skill for student teachers to grasp (Gafoor & Farooque, 2010; Liyanage & Barlett, 2010; Thornbury, 1999). The observed inadequacy with lesson planning in the study group could be a sign that the skill had not been developed to an adequate level. Since teaching puts that abstract thought into action, if already insufficient so might be its implementation. One would argue that the limited practice with lesson planning in the specific subject and topics on campus could have been one of the contributing factors. That could be confirmed by the study done by Schmidt, Cogan & Houang, (2011) referred to in Youngs & Qian, (2013) who discovered that the intensity of subject matter and practical experiences on campus have a direct bearing on teacher knowledge reflected in teaching.

Considering the insufficiency of the practice through peer teaching sessions and the limited number of topics the student teachers had been exposed to, there were chances for inadequacy in some areas of student teachers’ knowledge as teachers. Ball & Forzani, (2009) share the same sentiment in their advocacy for practice-based curriculum which they characterize as the one that “would emphasize repeated opportunities for novices to practice carrying out the interactive work of teaching and not just to talk about that work” (p503). They go further to indicate the need for support in the learning of the aspects of the complex practices. The limited time for coursework leading to snap practice teaching and the uninformed tutors in practice schools gave no room for repeated opportunities and clinical support.

Planning for students in schools presents a different context and would not in any way be a replica of what was done for and with peers since pedagogical content knowledge has been proved to be context-bound (Van Driel & Berry, 2012). That confirms the need for practice in
context (Ball & Forzani, 2009) other than hoping that the ‘propositional’ knowledge (Theissen, 2000) would be readily and competently applied. The astonishing case was that of a student teacher who discredited lesson planning coupling it with the use of corporal punishment as reinforcement to make students learn. Since that student teacher was placed in a school she attended, one might suspect the influence of her experiences as a student (Lee & Schallet, 2016).

The inclusion of lesson reflection at the end of every lesson (National University of Lesotho, 2015) enhances the aspiration and encouragement for reflective practice which confirms the assertion that reflection in teacher education is a key element for professional growth and a tool for improved teaching and learning (Collier, 1999; Korthagen & Vasalos, 2005; Leavy & Hourigan, 2016; Zeichner & Liston, 1996). Merely listing probable issues that student teachers could consider in their reflection without finer details of how that could actually be done could denote insufficiency of the necessary guidance for learning that complex skill (Leavy & Hourigan, 2016).

The descriptive nature of the reflections by the student teachers have been noted as common in the early stages of embarking on the reflection process in the case where practice teaching is spread throughout the training period (Körkko et al. 2016). It is said to eventually improve with time and repeated opportunities for practice. But again that improvement came as a result of the activities being guided by clear checklist focusing on definite issues. That implies the need for thoughtful reflection on instructional checklist suggested in literature (Park & Oliver, 2008; Van Driel, 2010). That is saying, effective reflection could be better developed through regular, organized, guided and comprehensive practice (Ben-Pertz & Rumney, 1991; Halim, Buang, & Meerah, 2011; Orland-Barak & Yinon, 2007) which could have gone beyond the “broad reflection” that considers oneself and others (Korthagen et al. 2001) as observed with this study group.

The reporting on teaching practice as a reflection on one’s professional development might again be due to sketchy guidelines. On one hand, it could be argued that it could be impractical to be thorough in every piece of written guidelines while on the other, suggesting the inclusion of finer procedural details in the process of teaching and learning, both conceptually and practically would be beneficial. The findings suggest that with inadequate reflection, manifested for instance in the case where a student teacher repeatedly reports the lesson having been successful that it
was quite unlikely to suggest the effective means to improve. That would be taking reflection from the lowest technical level, merely considering specific actions to a higher one of reflecting in and on actions (Collier, 1999). Several studies suggest that teaching experience needs to be coupled with thoughtful reflection on instructional practice (Park & Oliver, 2008; Van Driel, 2010). As Leavy & Hourigan, 2016:162 attest, “Reflecting on practice is a complex task requiring observation and reflective skills” which therefore reasonably require guidance for one’s successful engagement with it. Any form of skill is better developed through regular, organized, guided and comprehensive practice.

Student teachers’ employment of the discussion method which was the main one they observed in their educators’ modeling confirms the impact of experiences in one’s learning which seem to have given them concrete pointers for their teaching practice (Koster et al. 2016). Having not observed and practiced the use of the advocated teaching methods or strategies confirms Magnusson et al. (1999) in saying that telling student teachers what to do and not to do does not help their learning to teach and employing the methods they are told about. Even though they used some of the encouraged teaching strategies, it was quite unlikely that they used them appropriately to serve the purpose of making students understand what was taught one indicator being students’ poor performance in tests. That could also be due to having not acquired the assessment skill since the recall questions that they used to ensure that the students could remember what they taught confirmed what Gess-Newsome, (1999) asserts about novice teachers that they equate learning with remembering information. Theory and practice as the associated features of teaching and learning are discussed in the sub-section that follows.

7.3.4 The Linking of the Coursework and Practice in the Training Process

In this case the means to ensure the interrelationship between on-campus and in-school learning for student teachers were through the content taught in the Curriculum Studies courses and the learning opportunities offered. The school context seemed to be greatly considered regarding the curriculum and experiences which one could consider to be a step towards making theory and practice “dialectic” (Kirk, 1986). The major drawback was, however, making the whole process at that point theoretical by being more explanatory with limited experience with learned issues for student teachers. That was therefore defeating the case for making practice core for teacher-learning (Ball, 2000; Ball & Forzani, 2009, Grossman et al. 2009) as well as leaving no room for
their learning in and from practice during coursework training. The practical experiences could enhance the training content knowledge base. The contextual practice in schools could enable student teachers to know the diverse characteristics of the almost all Basotho students coming from different home and economic backgrounds and develop the ability to understand their conceptions thus perceiving what was taught from the stance of those taught (Berry & Van Driel, 2013; Darling-Hammond, 2000).

One would take even the peer teaching to have been an out-of-context remote undertaking done out of the actual work environment despite its reported effects by the study subjects in line with literature as discussed earlier. The Teaching Practice Handbook and its message though quite essential, probably the timing and a once off nature of the Orientation Workshop lacked the intensity, practicality and regularity that have been proven to impact positively in student teachers’ learning as already alluded to. If TP Handbook was consciously considered a linking tool between theory and practice it could have been disseminated at the right time and to all concerned people for them to act from and on a common ground.

Another mechanism of bridging the theoretically acquired knowledge with practice in the ten weeks of practice in schools was through the visits by the Faculty of Education staff that reasonably had to follow-up on what they had offered the student teachers in their courses. In that case the arrangement of who should visit which student teacher was the discretion of the Coordinator. The concerned course educators were left to work out their own ways of visiting some of their student teachers. The two visits stated in the Handbook were far too few to be of much benefit to the student teachers. The scarce interactions could not possibly meet the requirements of the clinical supervision that requires time before and after the observation for discussing the steps to be followed between the observer and the one observed (National University of Lesotho, 2015). As a result, fulfilling the value of guided field experiences emphasized in literature (Allen et al. 2013; Benedict-Chambers, 2016, Güsoy, 2013). However, aggravating the already insufficient visits, the arrangement was such that the teacher educators outside the subject area who could be equated to “casual observer” according to Lewin, (2007) referred to in Ball & Forzani (2009:501) understandably could observe general issues pertaining to classroom teaching, but the subject specific issues might not be obvious as though they were “invisible” (ibid).
The consideration of the “practitioner expertise” (Zeichner, 2010) was a step that could almost complement the forms of the necessary support required for the holistic development of the student teacher as the roles of the teaching practice tutor stated in the TP Handbook portrayed. The teaching practice tutors though expected to serve as co-educators, professional friends, guides and supervisors to the STs, without the provision of the Handbook and non-existent interaction with teacher educators and the terminated training that was offered in the previous years (National University of Lesotho, 2015) were left operating in the dark. That therefore resulted in the idiosyncratic operations with no common ground and goal to benefit student teachers in the otherwise complex endeavor (Grossman et al. 2009; Wilson, Floden, & Ferrini-Mundy, 2001) that required clear and meaningful support to nurture their thoughts, feelings, knowledge and actions involved in learning to teach (Lee & Schallet, 2016).

Even with the basic and crucial tool for the teacher, the lesson plan, and reflection which is considered one of the means to link theory and practice (Korthagen, 2001) the tutors were not conversant with them hence rendering their insufficiency in their random and undirected support. That could indicate a dire need for tutors to be well informed about what is expected of their involvement at all levels, for them to possess the essential information and the know how in relation to supporting the student teachers (Hoffman et al. 2015, Villiers & Markisack, 2011). Unfortunately, NUL stopped running the workshops for tutors due to lack of funds., hence creating room for disparity between theory and practice and thus again fragmenting teaching experience (Ball, 2000).

7.3.5 The Participants’ General Perceptions of the Training Process

The confirmation of the impact of the training program in developing student teachers in teacher professional knowledge by the study participants is in line with the view expressed by Darling-Hammond (2000) that teacher training is important. However, the time and procedures came out as the major constraints which impinged on specific activities that ultimately jeopardized the desired outcomes. In particular, the four year duration for teacher training was considered insufficient just as pointed out by Darling Hammond, (ibid) who indicated that that makes it hard to learn enough about the essential aspects of teacher knowledge. Although peer teaching was appreciated, again duration and frequency inhibited the effect that was hoped for. Moreover,
practicing teaching with peers put it out of context thus divorcing the practice from the potentially effective experience when done in context and avoiding fragmentation (Ball & Forzani, 2009; Darling-Hammond, 2000; Grossman et al. 2009).

The acknowledgement by the study participants of teaching practice in schools as a crucial experience for teacher professional development (Allen and Peach, 2007; Ball, 2000; Ben-Peretz & Rumney, 1991; Gürsoy, 2013; Kapesi 2013; Kourieos, 2012) with challenges (Ozdemir & Yildrim, 2012; Sariçoğan, 2010) is confirmed in literature. The main challenges in this study seemed to be the organization of the visits by TEs which were very limited and not necessarily made by the concerned subject educators to follow on their STs for further assistance in their learning. More seriously was lack of collaboration between TEs and TPTs which could otherwise help to continuously offer STs the effective learning opportunities. That inevitably omitted effective partnership (Villiers & Mackisack, 2011) and the triad interaction between student teachers and their educators in the two phases which have been proved to be effective (Goodnough, et al. 2009; Mason, 1999; Mtika et al. 2014). The study participants’ feeling that teaching practice was too short, is contested by Le Cornu & Ewing, (2008:1800) attesting that “…it is practicum quality that is most important in teacher preparation than its duration”. However, the issue of duration cannot be divorced from quality in that to be thorough in training, there is need for sufficient time to enable the design, implementation, reflection, modification and application of what is learned and enacted. One would argue that there needs to be a balance of these crucial issues.

7.4 The Study Limitations

The researcher was the only person directly conducting the study and some issues were identified as possible limitations in the study for which some means to curb them were put to effect. Most of the research participants had been involved with the researcher in varying capacities and levels and researcher effect surfaced despite the thought that prior interactions would have laid foundation for relations and paved a way for smooth change of ideas. With some of them, it could be sensed that the researcher was considered a figure with some authority hence their being considerate in what they said which could have influenced the information they provided. To control the situation the atmosphere was eased by letting them to deliberate using both English and Sesotho as they deemed convenient for them and they appeared and sensed relaxed.
The simple language, guided by the respondents’ expressions was used when probing a matter. In a few extreme cases where the participants could not show that calm demeanor, their case was either used as a pilot episode or left out in the case where the targeted number of the sample was met.

There was limited/no reference point for the researcher since the local research on teacher education in connection with the training of the science education student teachers could not be accessed. Also the limited documented information on the performance of the student teachers during teaching practice was a challenge. As a result, the researcher used the obtained information from available sources to inform the study and sourced information from the regular practicing teachers who had gone through the same training system to elicit their experiences and opinions on student teachers’ learning to teach and its impact the training had on them. Furthermore, the searched literature covered the studies from a wide spectrum of countries.

With the researcher not observing the participants in action, the final data source was textual from the reports by teaching practice tutors and student teachers themselves which admittedly, were an abstract version of the actual occurrence and also likely to have flaws (Blömeke et al. 2016). One would argue that if clear guidelines were provided and the issues to report on had been part of training probably that might enhance authenticity. But the presentation of the texts from multiple sources and varied for the same participants was considered a precaution against the possible distortion of the situation since that enabled cross checking.

7.5 Issues for Further Research

The scarcity of research on teacher training programs at NUL probably as elsewhere in other parts of the world, and that which critically looks into what constitutes the training content and how it is exactly handled by teacher educators and tutors in practice schools; and how student teachers in turn utilize it opens a lot of research avenues. On the basis of this study those could include a further look into areas such as:

- Replication of the study extending into other science Curriculum Studies courses and other subject areas in order to improve the teacher training programs. In order to produce the aspired teacher for the general benefit of the teachers and students that could ultimately lead to the attainment of the anticipated national goals from education.
• The study of the idiosyncratic practices of individuals in the two links of the pre-service stage of teacher professional development in order to inform one another for the better performance of teacher educators, student teachers and tutors in schools.

• The formation of professional learning communities and the effect they might have for the improvement of teacher training.

• The impact of the aspects of coursework training on student teachers’ classroom teaching during teaching practice.

• The focal issues considered by the teacher educators during school visits.

• The modes and impact of interactions between teaching practice tutors and student teachers.

• Getting the voice of the students during student teachers’ practice in schools to further and continuously inform teacher educators.

• Investigating the modes of effective partnership mechanisms between the teacher training institutions and the practice schools to enhance beneficial collaboration.

• The implementation of policies and their impact.

7.6 Recommendations

Since the constraints that emerged from this study were mainly in respect of time and procedures the major attribute of the latter being fragmentation, the recommendations are made based on the two issues. The fragmentation in this study traverses all levels from national to individual. With the educational policy development underway in Lesotho, there is clearly no guidance to teacher education hence no possible dialogue between the stakeholders. The fact that science student teachers are offered content by the Faculty of Science and Technology does not in itself mean there is synchrony in the operations of the two divisions. In the similar manner, the offerings by the Educational Foundation department of the Faculty of Education do not essentially meet the needs of the Science education Department on the ground that they offer general pedagogical courses and educational theories which do not directly correlate with specific subject courses. Within the Science Education Department, the individuals serve the student teachers as they deem appropriate. The teacher training institution and practice schools exist as cooperating entities rather than the dialectic partners.
In such a situation, teacher educators who are considered linchpins in all kinds of educational reforms (Cochran-Smith, 2003) ought to act responsively; engage in introspection and dialogue with colleagues to start with. Then we could learn from the collaborative study that Peercy & Troyan, (2017) engaged in with a colleague teacher educator, from which it was evidenced that “collaborative learning with colleagues with the aim of rethinking and reframing practice … takes on significant importance for the continued development of TEs” (pg29) echoing the advocacy made by Berry & Van Driel, (2013). Hopefully from that learning, change of practice and clear insight into the whole teacher education situation negotiate the line of transformative move in order to avoid/redress the situation that Fullan quoted in Cochran-Smith, 2003:25 describes saying:

The way that teachers are trained, the way that schools are organized, the way that the educational hierarchy operates, and the way that education is treated by political decision-makers results in a system that is more likely to retain the status quo than change. (p3)

The feeling is that there needs to be clear and comprehensive intra and inter liaison. Time controls the design and implementation of the teacher training programs therefore influencing their success or failure. The observed pervasive shortcomings with both pre-service and in-service teachers in classroom teaching abounding despite the various efforts made (Ball, 2000; Darling-Hammond, 2000; Zeichner, 2010) imply the need for critical look and ongoing research into the prevailing circumstances at all points of teacher training to meet the unique situations. It is therefore recommended that:

- The duration of teacher training programs should be reconsidered in line with surrounding circumstances. That could either be with the increase of the training years as the common four year duration has proved to impede the inherent activities for beneficial execution and impact or the increase of the time for the Curriculum Studies courses. That could include the preparation year for the incumbent candidates engaging in preliminary activities in their local schools where they could with the guiding tools observe teaching on the ground through the eye of a prospective teacher before the actual training.
- As practice is the core of teaching, more time should be spent on practice teaching for student teachers both during coursework training and teaching practice in schools.
• The increase in time should be aligned to clearly set core content, practices and guidance to guard against quality of services and product.

• For improved learning to teach, practice teaching should be meaningful, exposing the student teachers to actual work environment with students. It should be progressive to enable transformative learning, in and from that practice.

• The extended teaching practice should be linked to the induction period which should form an integral part of teacher training programs. For instance, in the case of NUL, instead of terminating teaching practice in the last week of March or first week of April, student teachers could be given a chance to practice to the end of the year with the Induction Program together with the mentors in schools taking over, but still in close collaboration with the pre-service staff and their counterparts in schools.

Induction of novice teachers is gaining much attention worldwide for quality professional performance and teacher retention which could be portraying the result or sign of job satisfaction in line with one of the aims of the Induction Program at NUL that intends “to, help the Beginning Teachers to...gain job satisfaction, expressed as a wish to remaining in the teaching profession” (National University of Lesotho, 2006) conforming with Achenskin & Fogo, (2015).

The procedures in teacher training in this particular study are entrenched in fragmentation at all levels. It is reasonable that the amalgamation of those fragments could never be so easy, but there should be a move to gradually closing the chasms. Otherwise, the idiosyncratic procedures are destined to produce a teacher who might be ‘half-done’ in almost all areas required for a teacher. The figure below presents a simple amalgam through establishment of clear comprehensive and widely known liaison mechanisms that could be considered in order to improve the teacher training program.

The best means could be cooperation and collaboration at all levels guided by clear policies. It is therefore recommended that:

• The structural fragmentation should be harnessed through creating collaborative links with the service faculties/departments and departmental courses in an attempt to harmonize the activities, that could enhance the acquisition of the intact required content, pedagogical and pedagogical content knowledge for the student teacher.
• The practice teaching in the two phases should be linked through creation of opportunities for student teachers to practice in schools throughout their training period and practice tutors also being trained in preparation for their anticipated and desired support.

Figure 6 Teacher training amalgam links

• The fragmentation observed with the coursework training and teaching practice should commence with sharing of the content and jointly working out the means of operation between the directly concerned educators on campus and in practice
schools which has the implications of time and resources – clear cooperation and collaborative means directed towards a shared common goal.

- There should be a Teaching Practice Unit that works on all matters pertaining to practice teaching throughout the whole training process at all times that would keep all stakeholders informed, updated and in motion.

It is maintained that the three main notions guiding this study – pedagogical content knowledge, theory-practice and reflective practice have stood out to be of utmost importance in teacher learning teaching. With reflection as one area in which student teachers in this study were lacking, there is a great need for intensive guidance with the use of any possible tool, ranging from portfolio, lesson study, journal entries and video analysis to mention a few. It is therefore recommended that:

- Comprehensive curriculum on reflection with guidelines for its implementation and the required support should be laid down and be widely disseminated to the concerned people.
- The identified mode of reflection should be progressively and rigorously enforced with regular revision.

To effect the propositions highlighted here, there is definitely a need for finely tuned policies at all levels as the needed resources such as personnel, infrastructure, funds and time transect all levels from national to individuals. The basic source for the requirements for development is the government of each country which provides the bulk of the funding therefore there is a need for a political will to ensure success and sustainability. The following recommendations are made in relation to policies:

- The well known, comprehensive, and harmoniously interlinking policies should be put in place – where they already exist, they should be regularly revised to meet the dynamic nature of teacher education, teacher preparation, teaching and learning; where they are being developed the process must be sped up; and where there are none yet, they are long overdue therefore should be designed and implemented as a matter of urgency
- The Ministry of Education and Training should develop clear liaison links embraced in policy with the teacher training institutions and schools to enforce the effective and
efficient implementation of the policies which should be informed by practitioner knowledge. That might curb the random and insufficient operations with teacher training programs long pointed out by Ntoi and Lefoka, (2002) in reference to the then National Teacher Training College, now the Lesotho College of Education.

• The Ministry of Education and Training should enforce the notion of Professional Learning Communities by setting a ground from which communities within the education system could develop and run them to suit their unique situations in order to improve teaching and learning at any level which are impacted by the effect of teacher training. That might guard against the common thought of knowledge transplanting from the well off nations which this far has not worked effectively for its recipients.

• The policies should set clear orientations for teacher education, teacher training, teacher learning and practice teaching; for instance, should teacher education be research-, reflective- or practice-based; or should it be all encompassing?

7.7 Concluding Remarks

The observed pervasive inadequacy with pre-service teachers’ classroom teaching has been proved to endure into in-service practice hence the outcry of poor student performance trickling down to weak workforce that does not help in emancipating the nation from challenges such as unemployment and poverty. The various efforts have been and are being made in many countries to improve teacher education and teacher preparation programs. One would take it that the dynamic nature and uncertainties with teaching and learning compel the ongoing research in teacher education and reference to and implementation of the research results in the teacher preparation programs. The well informed support and supervision mechanisms in all the links in the initial teacher professional training stage are crucial throughout the process, safeguarding against the identified sources of insufficiency with teacher training, learning and practice. Taking note and acting accordingly would hopefully gradually bridge the gaps.

In particular, without clear collaboration and shared goal(s) at all levels, and well informed and prepared teaching practice tutors, efforts could not be geared in the same direction, resulting in student teachers suffering the consequences of the divergent perceptions about their learning to teach. It is maintained that if there could be some evident concerted strong and ongoing support, guidance and supervisory systems which keep the student teachers, teacher educators and
teaching practice tutors interactively engaged, time might be utilized in a manner that could lead to a decline in limitations reported on student teachers’ classroom practice during teaching practice. Clear policies at all levels of teacher education could facilitate the enforcement of the procedures leading to attainment of shared and clear goals embracing the coherent core curriculum with explicit orientations which might curb the undesirable situation in which student teachers fail to apply the acquired teacher knowledge in actual classroom teaching.

For teacher education to be of benefit to teachers, students and ultimately the nation, cooperation, collaboration and dialogue between stakeholders is compelling. This certainly calls for a sound foundation in the training of prospective teachers looking into various aspects that would produce a teacher with aspired abilities and qualities. The program courses, practices and the whole training program should be more formalized, comprehensive, intensive and purposeful to enable student teachers to competently synthesize, integrate, and apply the acquired knowledge and skills in different situations, under varying conditions in which they handle students with diverse backgrounds. Thus in teacher education, in addition to time, personnel and funds, the quality of the program course content and proficiency in its handling and the entire process are of utmost importance. Thus the amalgamation of issues and phases in the pre-service teacher training should be worked out such that it benefits all stakeholders in the scene which would definitely filter out to the whole nation to meet the national aspirations. The issue of fragmentation that cuts across all levels of teacher education is a grave concern and it is therefore emphasized that it should be considered seriously. The consideration could hopefully bring to fruition the requirements for coherence, collaboration, teacher educator modeling of innovative teaching, inclusion of core issues for teacher knowledge and practice, and the realistic time for teacher training.

This study on teacher knowledge has been conducted in a different context and culture from those conducted in the West, seeking the perceptions and views of teacher educators, student teachers, teaching practice tutors and regular practicing teachers concerning the two phases of the pre-service stage of teacher professional development. Thus, it sought participants’ perspective grounding the findings in the voice of the directly involved people. Also, studying the preparation and practice in this stage involved a look into what the training content entailed,
how it was handled by those who offered it and the reception and use by the recipients of the training. The findings as intended answered the research question through the data gathered from which it has been found that the shortfalls revolved mainly around time and procedures followed. With consideration of time and procedures, the need for more and improved resources is inevitable, all of which require financial backing. The study was done with a hope that the context in which it was conducted would inform and influence policy and practice in teacher education at various levels, extending into the general field of research in education. In the final analysis, it takes what is put into the undertaking to reap the aspired outcomes and outputs.

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Dear Sir/Madam

‘Maseqao Regina Mabejane is a PhD student in the Department of Educational Sciences and Early Childhood Education of the University of Patras in Greece. Her research area is science teacher knowledge and as part of her studies she should collect data from teacher educators, undergraduate science student teachers, teaching practice tutors and regular teachers in the National University of Lesotho and Secondary/High Schools in Lesotho. We would like to request you to afford her the necessary assistance she needs to carry out the tasks pertaining to this endeavour.

Thank you in anticipation of your valued consideration.

Best regards,

Konstantinos Ravanis
Appendix B

Letter of Request

To the Head of Science Education Department

(i). For Student Teachers’ Involvement

Memo

To: HoD – Science Education Department

From: ‘Maseqao Mabejane Ext: 3477

Date: 09/10/2014

Re: Student Teachers’ Participation in my Research Study

I have attached a letter of introduction from my study supervisor, a consent form and covering letter to 4th year B Sc Ed student teachers for your information and request to go ahead with my interactions with them.

I Thank you in anticipation for your valued consideration.

‘Maseqao R. Mabejane
(ii) For Teacher Educators’ Involvement

Science Education Department
National University of Lesotho
P.O. Roma 180
19th November 2015

Head of Department
Science Education
NUL

Re: Participation in the Research Study by ‘Maseqao R. Mabejane

My greetings to you.

I am enclosing herein, my communication to Teacher Educators for Curriculum Studies courses, Biology and Physics the copies of which are provided for your office. I humbly request your assistance to enable our interaction.

___________________
November 2015
(iii) To the Practice School Principal

Science Education Department
National University of Lesotho
P.O. Roma 180
20th January 2015

Dear Principal

________________________________________

Re: Participation in the Research Study by ‘Maseqao R. Mabejane

My greetings.

I am enclosing herein, the letter of introduction from my supervisor and the consent form which I humbly request you to fill to enable our further communication in relation to this endeavor.

Please note the following:

- your interactions in professional development tasks and related discussions are required as you are the overseer of all that goes on in your school
- in this particular case you are the gatekeeper who would see to the smooth progress of the exercise in your school on which your views are highly valued
- you are not the subject of the research per se, thus you would not be interviewed on the theme of the study
- the collected data will be analyzed to help the researcher to reflect on and improve educational professional development programs
- you, therefore, authorize the interactions of the researcher and your involved staff (Science Education teacher trainee and the concerned Teaching Practice Tutor to provide the necessary information to inform the research scientific and educational purposes
- as the researcher, I promise that data obtained as a result of this study will be maintained in password-protected computer and Internet files; not revealing the names in any report or publication resulting from this study
- during this study the participants are free to withdraw their consent and decline to be interviewed or provide information at any time, and no penalty or prejudice shall result thereof.

‘Maseqao R. Mabejane
Email: mrmbabezane@gmail.com
Contacts: 58986334/62986334/28350334
Office: BJO 210/211Phone: 52223477/22213478

________________________________________

January 2015
(iv) To the Regular Practicing Teacher

Science Education Department
National University of Lesotho
P.O. Roma 180
29th November 2014

Dear Teacher

Re: Participating in the Research Study by ‘Maseqao R. Mabejane

My greetings. I wish to sincerely apologize for the delayed interaction with you in connection with your involvement in the intended study.

I am enclosing herein, the letter of introduction from my supervisor and the consent form which I humbly request you to fill and give back to enable our further communication in relation to this endeavor.

Please note the following:

- your interactions in professional development tasks and related discussions may be observed and captured by digital recording devices
- you may be asked to comment on your training course(s)/programme in order to ascertain your learning and opinion through discussions and/or interviews
- the collected data will be analyzed to help the researcher to reflect on and improve educational professional development programs
- the transcribed recordings of your contribution may be made accessible to educational groups for the purpose of training teachers and other educational specialists, and conducting research on teacher learning
- you, therefore, authorize the use of such data and recordings as described above, only for these specified scientific and educational purposes
- as the researcher, I promise that data obtained as a result of this study will be maintained in password-protected computer and Internet files; not revealing your name in any report or publication resulting from this study
- during this study you are free to withdraw your consent and decline to be interviewed or recorded at any time, and no penalty or prejudice shall result thereof.

‘Maseqao R. Mabejane
Email: mrmabejane@gmail.com
Contacts: 58986334/62986334/28350334
Office: BJO 210/211 Phone: 52223477/22213478

November 2014
Dear Student Teacher

Re: Participating in the Research Study by ‘Maseqao R. Mabejane

My greetings. I wish to sincerely apologize for the much delayed interaction with you in connection with your involvement in the intended study.

I am enclosing herein, the letter of introduction from my supervisor and the consent form which I humbly request you to fill and give back before you leave please; to enable our further communication to work on our plan of action.

Please note the following:

- your interactions in professional development tasks and related discussions may be observed and captured by digital recording devices
- you may be asked to comment on your training course(s)/programme in order to ascertain your learning and opinion through discussions and/or interviews
- the collected data will be analyzed to help the researcher to reflect on and improve educational professional development programs
- the transcribed recordings of your contribution may be made accessible to educational groups for the purpose of training teachers and other educational specialists, and conducting research on teacher learning
- you, therefore, authorize the use of such data and recordings as described above, only for these specified scientific and educational purposes
- as the researcher, I promise that data obtained as a result of this study will be maintained in password-protected computer and Internet files; not revealing your name in any report or publication resulting from this study
- during this study you are free to withdraw your consent and decline to be interviewed or recorded at any time, and no penalty or prejudice shall result thereof.

‘Maseqao R. Mabejane
Email: mrmabejane@gmail.com
Contacts: 58986334/62986334/28350334
Office: BJO 210/211 Phone: 52223477/22213478

November 2014

Cc: Dr. Thabiso Nyabanyaba (Head of Science Education department)
Dear Teacher

Re: Participating in the Research Study by ‘Maseqao R. Mabejane

My greetings to you.

I am enclosing herein, a letter of introduction from my supervisor and the consent form which I humbly request you to fill and give back the soonest possible to enable our further communication in relation to this endeavor.

Please note the following:

- your interactions in professional development tasks and related discussions may be observed and captured by digital recording devices through an interview (you will neither be observed in class nor during your interactions with the Student Teacher (ST) you are supervising)
- your views on the ST are training course/program and your perceptions and opinions of her/his performance during TP will be requested through 1. as usual NUL Observation Forms the copy of which is normally given to the ST; 2. a detailed written report on your experiences with the supervision of the ST during TP; and 3. a one-on-one post-TP interview (all expected at the end of TP in April/May)
- you might be requested to be one of the very few TPTs who will be involved in piloting the interview schedule (provisionally planned for the second week of March)
- the collected data will be analyzed to help the researcher to reflect on and improve educational professional development programs
- the transcribed recordings of your contribution may be made accessible to educational groups for the purpose of training teachers and other educational specialists, and conducting research on teacher learning
- you, therefore, authorize the use of such data and recordings as described above, only for these specified scientific and educational purposes
- as the researcher, I promise that data obtained as a result of this study will be maintained in password-protected computer and Internet files; not revealing your name and that of your school in any report or publication resulting from this study
- during this study you are free to withdraw your consent and decline to be interviewed or recorded at any time, and no penalty or prejudice shall result thereof.

‘Maseqao R. Mabejane
Email: nrmabejane@gmail.com
Contacts: 58986334/62986334/28350334
Office: BJO 210/211 Phone: 52223477/22213478

January 2015
Dear Teacher Educator
Science Education Department
NUL

Re: Participating in the Research Study by ‘Maseqao R. Mabejane

My greetings to you.

I am enclosing herein, a letter of introduction from my supervisor and the consent form which I humbly request you to fill and give back to enable our further communication in relation to this endeavor.

Please note the following:

- your interactions in professional development tasks and related discussions will be captured by digital recording devices through an interview
- your views will be sought on the Student Teachers’ training course/programme and your perceptions and opinions of their participation and performance
- the collected data will be analyzed to help the researcher to reflect on and improve educational professional development programs
- the transcribed recordings of your contribution may be made accessible to educational groups for the purpose of training teachers and other educational specialists, and conducting research on teacher learning
- you, therefore, authorize the use of such data and recordings as described above, only for these specified scientific and educational purposes
- as the researcher, I promise that data obtained as a result of this study will be maintained in password-protected computer and Internet files; not revealing your name in any report or publication resulting from this study

Kind regards

‘Maseqao R. Mabejane
Email: mrmabejane@gmail.com
Contacts: 58986334/62986334/28350334
Office: BJO 210/211Phone: 52223477/22213478

November 2015
Appendix C

Consent Form

(i) To the Practice School Principal

In signing this document I agree to participate in a study of instruction and professional development being conducted by Mrs. ‘Maseqao Regina Mabejane in connection with her PhD research study titled “Working Towards a Beneficial Teacher Professional Development Continuum: Amalgamation of Pre-service Training Phases for Science Education Student Teachers.” I understand that my interactions in professional development tasks are mainly to enable the smooth running of the exercise that involves some members of my staff in the school. I am aware that I may be asked to comment on some issues which do not make a subject of the research per se, but which would contribute in helping the researcher to reflect on and improve educational professional development programs. I authorize the interactions of the researcher and the involved staff (Science Education teacher trainee and the concerned Teaching Practice Tutor) to provide the necessary information to inform the research scientific and educational purposes. I have been made aware that data obtained as a result of this study will be maintained in password-protected computer and Internet files, not revealing the names in any report or publication resulting from this study. In addition, I have been informed that during this study the participants are free to withdraw their consent and decline to be interviewed or provide information at any time, and no penalty or prejudice shall result thereof.

Signature: _______________________

Surname & Names: ___________________________________________________________________

Email Address: _____________________________________________________________

Contacts: (Personal) ___________________________________________ School: ___________

School Address: ______________________________________________________________________

Date: ______________________________________

Further questions about this study are welcome and should be addressed to:

‘Maseqao R. Mabejane _______________
20th January 2015

Email: mrmabejane@gmail.com
Contacts: 58986334/62986334/28350334
Office: BJO 210/211 (52223477/22213478)
(ii) To the Regular Practicing Teacher

In signing this document I agree to participate in a study of instruction and professional development being conducted by Mrs. ‘Maseqao Regina Mabejane in connection with her PhD research study titled “Working Towards a Beneficial Teacher Professional Development Continuum: Amalgamation of Preservice Training Phases for Science Education Student Teachers.” I understand that my interactions in professional development tasks and related discussions may be observed and captured by digital recording devices. I know that I may be asked to comment on my training course(s)/programme in order to ascertain my learning and opinion through the interviews. I understand these data will be analyzed to help the researcher to reflect on and improve educational professional development programs. In addition, I understand that the transcribed recordings of my contribution may be made accessible to educational groups for the purpose of training teachers and other educational specialists, and conducting research on teacher learning. I authorize the use of such data and recordings as described above only for the scientific and educational purposes specified above. I have been told that data obtained as a result of this study will be maintained in password-protected computer and Internet files and that my name will not appear in any report or publication resulting from this study. I know that during this study I am free to withdraw my consent and decline to be interviewed or recorded at any time, and that no penalty or prejudice shall result.

Signature: ______________________________
Surname & Names: __________________________________________________________
Subject Majors During Training: ________________________________________________
Gender: ___________________ Year of Completing Training: __________________________
Subjects Taught and Level: _____________________________________________________
Email Address: _______________________________________________________________
Contacts: ____________________________ Home Place: _____________________________
Teaching School: ______________________ Teaching Experience Yrs):_________________
Date: _________________________________

Further questions about this study are welcome and should be addressed to:

‘Maseqao R. Mabejane ________________
29th November 2014

Email: mrmabejane@gmail.com
Contacts: 58986334/62986334/28350334
Office: BJO 210/211 (52223477/22213478)
(iii) To the Student Teacher

In signing this document I agree to participate in a study of instruction and professional development being conducted by Mrs. ‘Maseqao Regina Mabejane in connection with her PhD research study titled “Working Towards a Beneficial Teacher Professional Development Continuum: Amalgamation of Pre-service Training Phases for Science Education Student Teachers.” I understand that my interactions in professional development tasks and related discussions may be observed and captured by digital recording devices. I know that I may be asked to comment on my training course(s)/programme in order to ascertain my learning and opinion through the interviews. I understand these data will be analyzed to help the researcher to reflect on and improve educational professional development programs. In addition, I understand that the transcribed recordings of my contribution may be made accessible to educational groups for the purpose of training teachers and other educational specialists, and conducting research on teacher learning. I authorize the use of such data and recordings as described above only for the scientific and educational purposes specified above. I have been told that data obtained as a result of this study will be maintained in password-protected computer and Internet files and that my name will not appear in any report or publication resulting from this study. I know that during this study I am free to withdraw my consent and decline to be interviewed or recorded at any time, and that no penalty or prejudice shall result.

Signature: ______________________________
Surname & Names: ___________________________________________________________________
Teaching Subjects: ______________________ Gender:_____________________
Email Address: _____________________________________________________________________
Contacts: ______________________ Home:__________________________
Teaching Practice School: __________________________
Date: ___________________________________________________________________________

Further questions about this study are welcome and should be addressed to:

‘Maseqao R. Mabejane _______________
9th November 2014

Email: mrmabejane@gmail.com
Contacts: 58986334/62986334/28350334
Office: BJO 210/211 (52223477/22213478)

Cc: Dr. Thabiso Nyabanyaba (Head of Science Education Department)
(iv) To the Teaching Practice Tutor

In signing this document I agree to participate in a study of instruction and professional development being conducted by Mrs. ‘Maseqao Regina Mabejane in connection with her PhD research study titled “Working Towards a Beneficial Teacher Professional Development Continuum: Amalgamation of Pre-service Training Phases for Science Education Student Teachers.” I understand that my interactions in professional development tasks and related discussions may be captured by digital recording devices. I know that I will be asked to comment on ST’s training course/program and their participation and performance. I understand these data will be analyzed to help the researcher to reflect on and improve educational professional development programs. In addition, I understand that the transcribed recordings of my contribution may be made accessible to educational groups for the purpose of training teachers and other educational specialists, and conducting research on teacher learning. I authorize the use of such data and recordings as described above only for the scientific and educational purposes specified above. I have been told that data obtained as a result of this study will be maintained in password-protected computer and Internet files and that my name will not appear in any report or publication resulting from this study.

Signature: ____________________________________________

Surname & Names: ___________________________________________________________

Curriculum Studies Course Offered (yr 4): __________________________________________

Course Code: __________________________ Contact Hours: ________________________

No. of Years Teaching the Course: ____________________________________________

Email Address: _____________________________________________________________

Contacts: __________________________________________________________________

Date: _________________________________ _____________________________________

Further questions about this study are welcome.

‘Maseqao R. Mabejane __________________________
20th January 2015

Cc: Head of Department
(v) To the Teacher Educator

In signing this document I agree to participate in a study of instruction and professional development being conducted by Mrs. ‘Maseqao Regina Mabejane in connection with her PhD research study titled “Working Towards a Beneficial Teacher Professional Development Continuum: Amalgamation of Pre-service Training Phases for Science Education Student Teachers.” I understand that my interactions in professional development tasks and related discussions may be captured by digital recording devices. I know that I will be asked to comment on ST’s training course/program and their participation and performance. I understand these data will be analyzed to help the researcher to reflect on and improve educational professional development programs. In addition, I understand that the transcribed recordings of my contribution may be made accessible to educational groups for the purpose of training teachers and other educational specialists, and conducting research on teacher learning. I authorize the use of such data and recordings as described above only for the scientific and educational purposes specified above. I have been told that data obtained as a result of this study will be maintained in password-protected computer and Internet files and that my name will not appear in any report or publication resulting from this study.

Signature: ____________________________________________________________________

Surname & Names: ______________________________________________________________

Curriculum Studies Course Offered (yr 4): __________________________________________

Course Code: __________________________ Contact Hours: ___________________________

No. of Years Teaching the Course: ________________________________________________

Email Address: _________________________________________________________________

Contacts: _____________________________________________________________________

Date: _________________________________________________________________________

Further questions about this study are welcome.

‘Maseqao R. Mabejane __________________________
9th February 2015

Cc: Head of Department
Appendix D

Interview Schedules

(i) For the Regular Practicing Teacher

Q.1 What are your general views about pre-service training you underwent in the Science Education Department at NUL?

1.1 Was there anything, in your opinion, lacking with the pre-service curriculum studies courses in preparing you to teach competently during Teaching Practice and after training?

1.2 Were you able or unable to teach competently during Teaching Practice? Explain.

Q.2 What are your general views about training in the physics/biology curriculum studies course in helping you learn to teach?

2.1 What factors do you consider strong/weak/missing in the physics curriculum studies course in preparing you to teach competently during TP and afterwards?

Q. 3 What are your general views about TP as a component of pre-service training in helping you learn to teach physics/biology and its topics?

3.1 What factors do you consider strong/weak/missing in Teaching Practice that helped you learn to teach physics/biology and its topics?

(ii) For the Student Teacher

a. Pre- Teaching Practice

Q.1 What are your general views about the Curriculum Studies courses offered by the Science Education Department at NUL that you feel has prepared you for teaching competently during TP and afterwards?

1.1 What have you specifically learned in the biology/physics Curriculum Studies course that you feel has particularly made it possible for you to learn how to teach the subject?

1.2 How were the mentioned factors linked to your preparation for the upcoming TP?

Q.2 What have you learned as the best way to teach biology/physics in the Curriculum Studies course in order to achieve the purpose/goals of teaching biology/physics? Explain.

2.1 What have you been taught as the appropriate means of achieving the purpose/goals?

2.2 How were you trained on the purpose/goals and the means to achieve it/them?

Q.3 How were you taught in biology/physics Curriculum Studies lessons about the aims and objectives of teaching the subject for your better understanding as a student and a prospective teacher?
Q.4 Would you say you know all/some biology/physics topics from the Curriculum Studies course, to be taught in the junior and/or senior secondary school in Lesotho and the essential materials for the subject and topics?

4.1 How ready do you feel you are to teach the content at the level you might be allocated during the upcoming TP? Explain.

Q.5 What were you taught in your training in the biology/physics Curriculum Studies course about students and their learning and how they should be handled?

5.1 Were you trained/not trained on choosing the appropriate content, methods, activities, materials and assessment modes for students at a particular level? Explain.

5.2 Have you learned about how you can recognise students’ learning challenges/problems and how to deal with them? Explain.

Q.6 How were you trained in the biology/physics Curriculum Studies course on appropriate general and specific teaching strategies/methods for the subject and its topics to prepare you for the upcoming TP and teaching afterwards?

6.1 How were the training pedagogies employed in the biology/physics Curriculum Studies course linked to the methods you might use to teach specific subject topics in the upcoming TP and afterwards?

6.2 Which factors were you taught to consider in teaching you to align content with the teaching methods?

6.3 Do you feel well/not so well prepared to align content with the methods considering the involved factors in teaching for the upcoming TP and afterwards? Explain.

6.4 How ready do you feel you are to decide and use the appropriate methods to teach the biology/physics content at the level you might be allocated during the upcoming TP? Explain.

Q.7 How were you trained on how to assess students’ learning in biology/physics?

7.1 Have you been taught/not taught the forms of assessment that are appropriate for biology/physics and how they are suitable for the subject and its specific topics?

7.2 Have you been taught/not taught to discern when to use which mode of assessment and the possible reasons for the choice? Explain.

Q.8 What specific environmental, training and personal factors do you feel may have prevented your acquisition of what would help you teach competently during TP and afterwards in your learning in the biology/physics Curriculum Studies course?

Q.9 What could have contributed better to your learning in biology/physics Curriculum Studies course for teaching competently during TP and afterwards?
9.1 How would the mentioned factors specifically contribute to your better preparation for the upcoming TP?

Q.10 What have you personally done to learn to teach from the biology/physics Curriculum Studies course to prepare yourself to teach competently during the upcoming TP and afterwards?

10.1 How do you intend to contribute to your own learning to teach in biology/physics during TP?

10.2 How would these intended steps specifically contribute to your learning to better teach biology/physics?

THANK YOU

b. Post-Teaching Practice

Q.1 From your teaching experience, how did pre-service training on campus generally contribute to your knowledge of professional teaching?

1.1 What aspects of your on campus training in the program have particularly made your practice successful?

Q.2 a) How has the coursework training in biology/physics curriculum studies course contributed to your classroom teaching during teaching practice?
   2.1 How did your learning during on-campus training help you teach with success during TP about the following issues:
   purpose of teaching science and biology/physics; biology/physics school curriculum; students’ learning in biology/physics; teaching strategies; assessing students’ learning; biology/physics content; pedagogies employed by your biology/physics teacher educator; lesson reflections?
   b) What specific aspects of biology/physics curriculum studies course had positive/negative impact on your classroom teaching during teaching practice? Explain.
   2.1 Which aspects of training in the biology/physics curriculum studies course had no impact on your teaching or were missing in training? Explain.
   2.2 What specific skills/knowledge did you feel should have been included in the biology/physics curriculum studies training course?
   2.3 How could the identified skills/knowledge have helped you to teach competently?

Q.3 In what specific aspects of teaching has TP developed you? Explain.

3.1 In what ways did these aspects contribute to your learning to teach successfully?
3.2 How did you feel the following aspects particularly contributed to your professional development as a biology/physics teacher: Lesson planning; Classroom experiences; Lesson reflection; TP Handbook; Peer meetings; Support and guidance by- TPT,- Teacher educators, - Peers, - Practice school at large?

Q.4 In what specific ways has your teaching contributed to students’ learning in biology/physics?

4.1 What forms of assessment did you use to ascertain students’ understanding/misunderstanding/misconceptions? Give specific incidence(s).
4.2 What content representations and activities mostly helped you achieve the learning objectives and how did it show?

4.3 What prominent student problems and their possible sources did you notice?
4.4 How did you deal with those students’ learning problems?

Q.5 What, in your opinion do you feel needs to be sustained/improved/included in TP to enable student teachers learn to teach for students’ successful learning?

5.1 Would you say you have been fully/partially/not competent with classroom teaching during TP? Explain.

THANK YOU

(iii) For the Teaching Practice Tutor

Q.1 Is Teaching Practice, in your opinion, an essential/not essential phase in the pre-service stage of teacher professional development?

1.1 How does it contribute to student teachers’ learning to teach in their teaching subjects?

Q.2 How do NUL and your school as a practice school directly contributing to ensure student teacher’s learning to teach?

2.1 How do you view your partnership with the Science Education Department in support of student teachers’ professional development during TP?
2.2 What mechanisms are in place for this support?
2.3 What specific role do you and the biology/physics teacher educator play to ensure ST’s professional learning during TP?
2.4 To what extent does TP Handbook help you carry out your responsibilities in assisting ST to learn to teach?

Q.3. What competencies did the student teacher seem to have from training as revealed in his/her teaching in biology/physics?
3.1 In what ways did the ST show strengths, weaknesses and failure in the following aspects in his/her preparation and classroom teaching in the subject?
Lesson planning; Content knowledge; Pedagogical knowledge/methods of teaching; Pedagogical Content Knowledge/merging content and methods; Purpose of teaching science/subject; Knowledge of the curriculum – aims, objectives, learning outcomes; Students’ understanding and their learning problems; Teaching strategies; - Organizing and facilitating learning activities; Assessment of learning and providing feedback to students; Reflecting on lessons; Implementing measures to improve.

Q.4. How did student teacher’s teaching contribute to the learning of the students in the subject?

4.1 How did the ST help the students understand what s/he teaches?
4.2 What factors particularly contributed in enabling the student teacher to teach successfully?
4.3 What in your opinion did the student teacher generally need to do to make his/her teaching in the subject successful?

Q.5 What factors inhibited student teacher’s successful teaching in the subject?

5.1 In what ways did these factors particularly hinder ST’s performance in teaching the subject?
5.2 What could the ST have done to do well in those areas?

Q.6 What should the training programme do to better develop STs in the areas that you feel they need to improve/acquire?

Q.7 What did you do in the process of TP that contributed to student teachers’ professional practice in classroom teaching in the subject?

7.1 What did you specifically do to help ST in dealing with the factors that you consider crucial for learning to teach?

Q.8 What did you succeed/fail to do to help ST in her/his learning to teach in biology/physics?

8.1 How do you intent to sustain/improve your support and guidance to the ST in future?

THANK YOU

(iv) For Teacher Educator

Q.1 What is your view of the purpose for teaching the curriculum studies course you are offering to Yr 4 student teachers?

1.1 What do you consider when you train these student teachers in this subject curriculum studies course?

Q.2 What basically constitutes the subject curriculum studies course content and the rationale for it?

2.1 How does the course content contribute to student teachers’ learning to teach in the subject?
2.2 How does the curriculum studies course content relate to the school subject content?

Q.3 How do you arrange the training content for teaching and the rationale for the arrangement?

3.1 How has the arrangement impacted on student teachers’ learning to teach the subject?

Q.4 What general methodologies do you employ to prepare student teachers for teaching the subject?

4.1 What methods and procedures do you use for specific topics and the rationale for their choice?
4.2 How do you train student teachers in the choice and use of general and specific teaching methods and strategies appropriate for the subject and specific topics?
4.3 What methods/teaching strategies do student teachers specifically practice in the course of training and how?
4.4 How do you enact these particular methods/teaching strategies in your training lessons?
Q.5 How do you train student teachers to teach the school subject content?

  5.1 What specific topics do student teachers practice to teach during training in the course?
  5.2 Who chooses the topics for practice during on-campus training?
  5.3 How do the topics for practice relate to those that would be taught during teaching practice?

Q.6 How do you help student teachers with the use of the school subject syllabus?

  6.1 How do you train student teachers in drawing the lesson plan for peer/micro teaching?
   (formulating lesson objectives, establishing students’ prior knowledge, identifying teaching materials,
   teaching/learning environment, selecting content, teacher and student activities, assessment, reflecting
   on the lesson, deciding on improvement measures)
  6.2 What topics and methods do student teachers have problems with as revealed in their practice
during training lessons?
  6.3 What are the probable causes of student teachers’ difficulties?
  6.4 What measures do you usually take to help STs with these problems?

Q.7 How do you generally assess student teachers’ learning?

  7.1 What do you specifically assess during coursework training?
  7.2 How do you further assess your STs during TP?
  7.3 How do you provide assessment feedback to STs?
  7.4 What impact does the feedback have on STs’ learning to teach in the subject?
  7.5 How do you train STs on assessing students’ learning in the subject?

Q.8 What positive and negative factors impinge on your Yr 4 curriculum studies training lessons and in
what ways?

  8.1 What measures do you normally take to sustain the positive and overcome the negative factors?
  8.2 What could be done to improve the situation, in general and for your specific course?

Q.9 What is your general view of science student teachers’ performance in classroom teaching during TP?

  9.1 In which particular areas of teaching in the subject did the ST show strengths and limitations?

Q.10 How do you extend your assistance to the STs in learning to teach the subject while on TP and upon
their return?

  10.1 What do you have in place to afford guidance and support to STs in learning to teach the subject
during TP?
  10.2 How do you use TP Handbook to help STs to benefit from it during TP?
  10.3 How do you view the impact of your training lessons on STs’ performance during TP?
  10.4 How do you view the impact of TP on STs’ professional development?

THANK YOU
Appendix E

Interview Analyses

(a) Regular Practicing Teacher (i) Analysis Table (Biology and Physics)

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(a) Regular Practicing Teacher (ii) Analysis Table (Merger)

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## Appendix F

### Student Teachers’ Interview Analyses -  (i) a. Pre-Teaching Practice (Biology/Physics)

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| 6. Training on appropriate general and specific teaching strategies/methods | CK
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| 6.1 Teacher Educator’s pedagogies and their link to the methods for school students | CK
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| 6.2 Factors to consider in aligning content with the teaching methods. | CK
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| 6.3 Preparedness to align content with the methods considering the involved factors | CK
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| 6.4 Preparedness to decide and use the appropriate methods to teach | CK
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| 7. How were you trained on how to assess students’ learning in biology/physics? | CK
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| 7.1 Learned suitable assessment methods | CK
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| 7.2 Discerning when to use which mode of assessment and the rationale | CK
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| 8. Specific inhibiting environmental, training and personal factors | CK
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Pre-Teaching Practice (Merger)

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### Appendix G

(i) Teaching Practice Tutor Interview Analysis Table (Biology/Physics)

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### Appendix H

(i) Teacher Educator Interview Analysis Table (Biology and Physics)

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(ii) Teacher Educator Interview Analysis Table (Merger)

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### Appendix I

(i) Student Teacher Teaching Practice Report Analysis Table

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#### School Organization

| Administration |          |            |          |                | CK                          |
|               |          |            |          |                | PK                          |
|               |          |            |          |                | PCK Components              |
|               |          |            |          |                | Emergent Issues             |
| The relevant subject Department                                           |          |            |          |                | CK                          |
|                                                                           |          |            |          |                | PK                          |
|                                                                           |          |            |          |                | PCK Components              |
|                                                                           |          |            |          |                | Emergent Issues             |
| School Facilities (concerning subjects)                                   |          |            |          |                | CK                          |
|                                                                           |          |            |          |                | PK                          |
|                                                                           |          |            |          |                | PCK Components              |
|                                                                           |          |            |          |                | Emergent Issues             |
| Maintenance of the school                                                 |          |            |          |                | CK                          |
|                                                                           |          |            |          |                | PK                          |
|                                                                           |          |            |          |                | PCK Components              |
|                                                                           |          |            |          |                | Emergent Issues             |
| Relationship between Student Teacher, Staff and Pupils                   |          |            |          |                | CK                          |
|                                                                           |          |            |          |                | PK                          |
|                                                                           |          |            |          |                | PCK Components              |
|                                                                           |          |            |          |                | Emergent Issues             |
| Any Extra-Curricular Activities                                          |          |            |          |                | CK                          |
|                                                                           |          |            |          |                | PK                          |
|                                                                           |          |            |          |                | PCK Components              |
## Emergent Issues

### Personal Experiences within the School-Structure

### Emergent Issues

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### (ii) Student Teacher Teaching Practice Report Analysis Table (Merger)

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### Appendix J

(i) Teaching Practice Tutor Report Analysis Table (Biology/Physics)

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# Appendix K

## Lesson Plan Indicators Checklist

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### Appendix L

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## Appendix M

### Course Synopsis Analysis Table

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<td>2. Lesson planning and drawing of Scheme of work</td>
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Appendix N

(i) Course Outline Analysis Table (Biology/Physics)

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## Appendix O

(i) Teaching Practice Handbook Content Overview

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<tr>
<th>Units</th>
<th>Sub-units</th>
<th>Components of sub-units</th>
<th>Elements of the components</th>
<th>Attributes of the sub-units components</th>
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| **UNIT I:** Description of Teaching Practice | A. Introduction | 1. Aims of TP  
2. Place of TP in NUL Courses  
3. The Role of Schools in TP | | |
| | B. General Organization of TP | | | |
| | C. Learning from Experience (Reflective teaching) | | | |
| | D. TP Methodologies | 1. Observation by ST  
2. Shared Teaching (Team-Teaching)  
3. Individual Teaching  
4. Peer meetings  
5. Supervision | i. By Teaching Practice Tutor  
ii. By Faculty of Education Staff  
iii. Interruptions of Student teacher’s Lesson | |
| | E. Assessment | | | |
| **UNIT II:** The Roles of The Student Teacher and The Teaching Practice Tutors | A. Student Teacher (ST) | | | |
| | B. Teaching Practice Tutor (TPT) | | | |
| | C. Senior Teaching Practice Tutor (STPT) | | | |
| | D. Student Teacher Discipline | | | |
| **UNIT III:** Forms Used During Teaching Practice | A. Used by Student Teacher | 1. Record of Discussion of a lesson observed by a Student Teacher | General information i. Interesting (good) things observed for future teaching  
ii. Things observed, to understand better before trying out | |
| | 2. Lesson Plan | General information Objective(s) students’ pre-knowledge  
Additional materials Organizational considerations, Stages | | |
| B. Used by Teaching Practice Tutor | Record of Discussion | General information  
i. Focus of the observation  
ii. Student’s good points  
iii. Points for future attention  
iv. General remarks |
|-----------------------------------|----------------------|-------------------------------------------------|
| C. Samples of the Forms:  
(Used by FED Staff – not explicitly stated as with the ST and TPT) | 1. Record of Discussion | General information  
i. Focus of the observation  
ii. Student’s good points  
iii. Points for future attention  
iv. General remarks |
|                                   | 2. Lesson Assessment  
i. Lesson plan | a. Content objectives precise and comprehensive  
b. Content related objective(s)  
c. Steps arranged in logical sequence  
d. Content appropriate and relevant  
e. Variety in teacher and learners’ activities reflected |
|                                   |                      | ii. Lesson presentation  
i. Steps presented in logical sequence  
b. Activities are varied and related  
c. Lesson reviewed and summarized in the process  
d. Knowledge of subject matter  
e. Flexible use of teaching methods/techniques  
f. Gradual transition to new content  
g. All learners involvement |
| UNIT IV: Teaching Practice File | A. Guidelines for Teaching Practice Report | 1. All Schemes/Records of Work  
2. Lesson Plans  
3. Observation Reports  
4. Work sheets  
5. Tests, marking guides and mark sheets  
6. Teaching Practice Report |
| --- | --- | --- |
| B. Assessment of Teaching Practice | 1. Lesson assessments  
2. Teaching Practice File |
| C. Guidelines for Teaching Practice report | 1. Instructions (Format)  
2. Remarks on preparation and organization |

### iii. Communication Skills
- a. Voice audible sustaining learners’ interest
- b. Efficient questioning skills
- c. Language competence

### iv. Classroom Management
- a. Environment promoting cohesion,
- b. Interaction and cooperation
- c. Positive feedback
- d. Monitoring of class activities
- e. Effective time management

### v. Qualities of the Teacher
- a. Knowledge of learners
- b. Presentable
- c. Self confidence and maintaining positive attitude
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<th>3. School organization</th>
<th>Relationship v. Suggestions for improvement</th>
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(ii) Teaching Practice Handbook Analysis Table

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