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Original Article

The probable causes for the espoused inadequacies in science student teachers' practice teaching in schools at the National University of Lesotho

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Abstract

The observed and reported 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. This study has been conducted in Lesotho, a small mountainous landlocked country in the Republic of South Africa with a population of about 2 million. In Lesotho there are currently only two teacher training institutions, the National University of Lesotho and the Lesotho College of Education. The purpose of this study was to explore where the shortfall might lie in the pre-service teacher training that led to science student teachers' reported inadequacies in classroom teaching. The data were collected through the semi-structured interviews of the directly involved people comprising 20 student teachers 20 teaching practice tutors, 2 teacher educators and 2 regular practicing teachers. The Data from the interviews were complemented with the analysis of the documents using template analysis strategy and constant comparison method. The main findings of the study revealed that the courses and the procedures for teacher preparation embraced the development of the pre-service teachers' professional knowledge and qualities. However, the major constraints for attainment of the aspired teacher product were time and procedures. It was hoped that the context in which it was conducted would inform and influence policy and practice in education at various levels, extending into the general field of research.

Keywords*: pre/in-service teacher education, student teachers, teaching practice*

Introduction

Teaching is a complex, multitasking and multidimensional process that deals with varied intertwined factors that requires deep knowledge and understanding (Ball & Forzani, 2009); Göran, 2009; Hollins, 2011). The complexity of teacher education is not only with pre-service teacher education but transects all levels (Morine-Dershimer & Kent, 1999; Perrot, 1982; Pollard, 2002; Ravanis, Balias, Komis & Karalis, 2011). This certainly calls

for a sound foundation in the professional development of pre-service teachers that would produce a teacher with aspired capabilities and qualities. The observed and reported 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 (Darling - Hammond, 2000; Zeichner, 2010).

The proliferation of research into teacher knowledge as expressed by Connelly, Clandinin & He (1997, p. 666) "is part of a revolution in how educators think about classroom practice". One would therefore argue that it should not only be with prospective teachers that research be concerned, but there is a dire need to research into teacher educators' work also, which Berry (2007) cited in Berry and Van Driel (2012) points out that it is limited resulting in little knowledge about teacher educators' pedagogy of teaching specific subject matter.

Ben-Peretz (2011) observes from the research analysis of internationally conducted studies mostly done in the West on teacher professional knowledge that there is none that considers what is entailed in the teacher training curriculum and pedagogies employed to teach the student teachers to teach, as well as the observing and documenting of the implementation by student teachers of the acquired knowledge. On the same note, Cochran-Smith and Fries (2005) attest that in studying causes and effects in teacher preparation, the two-causal links in preparation [training] and classroom practice should be considered.

This study on teacher knowledge has been conducted in a different context and culture, seeking the perceptions and views of the concerned people in the two phases of the pre-service stage. They include teacher educators (TEs) responsible for coursework training, student teachers (STs), teaching practice tutors (TPTs) who are experienced teachers in support of the STs during practice, and regular practicing teachers (RPTs) who are already teaching. Getting participants' perspective in this case was reacting to Korthagen, Loughran, & Russel quoted in Allen & Peach (2007, p. 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".

The teacher training program at the National University of Lesotho (NUL) follows a traditional 4-year model, with 3.5 yrs coursework training on campus offered through intra/inter departments and faculties. Basically, the training program comprises subject content, general and specific pedagogies, and educational theories embracing issues such as general aspects of philosophy, psychology, history and sociology of education. The terminal 10 weeks practice in schools comes in the last semester of the final year with no specific content but the guideline for practice and roles for all taking part. The Curriculum Studies (methods) courses start in the 3rd year extending into the 4th year during which student teachers practice teaching through micro/peer teaching sessions in the two teaching subjects.

Allen and Peach (2007) in response to the same criticism, in their study of the connection between on-campus and in-field components and their impact on STs' learning to teach sought their views and opinions as a way of getting their voice. Martin & Dismuke (2015) too, sought STs' perceptions of their learning and engagement in a writing Methods Course. In this study the exploration was taken further to include more stakeholders, thus getting even more voices. The intent was to investigate the science teacher training curriculum, the methodologies and pedagogies employed in the training and the nature of STs' classroom practice to establish the probable shortcomings that might lead to the re-

ported inadequacies. It was hoped that the context in which it was conducted would inform and influence policy and practice in education at various levels, extending into the general field of research.

Theoretical background

Over the years, there has been a concern raised about the National University of Lesotho (NUL) STs' inadequacy in classroom teaching during teaching practice (National University of Lesotho, 2007). The insufficiency manifested itself in various areas and to varying degree. The areas included subject content knowledge, pedagogical knowledge, pedagogical content knowledge with their entailed components and general handling of the teaching-learning environment. The same sentiment is shared by Lewin (2004) about the STs on TP 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 Lewin attests, "... dynamic linking of College/University based learning to its application is the exception rather than the rule" (Lewin, 2004, p. 11). This implies that there is a discernible gap between what is done and learned during coursework training and practice in schools which has also been observed in other parts of the world.

In Lesotho as elsewhere, science teachers do not perform as expected (Ayadin & Boz, 2012; Government of Lesotho, 2006; Loughran, Mulhall & Berry, 2008; UNESCO, 2013). That triggered a desire to consider helping pre-service teachers learn to teach effectively (Grossman, 1990; Magnusson, Krajcik & Borko, 1999; Ravanis, Balias, Karalis & Komis, 2010). This study explored the learning of the student teachers who study in a dual status that according to Caena, 2014, p. 2) makes it "an intensive experience that requires student teachers to be both learners and teachers simultaneously". Furthermore, the content they learn is in itself complex in that it comprises theoretical and practical knowledge that needs to be thought about, learned to be known and understood, and enacted (Lee & Schallert, 2016) for personal benefit and that of the students to be taught thereafter. The STs' learning to teach entails the amalgam of content knowledge (CK) and pedagogical knowledge (PK), which is pedagogical content knowledge (PCK) that is manifested in practice (Koliopoulos & Ravanis, 2000; Mtika, Robson & Fitzpatrick, 2014; Van Driel & Berry, 2012; Van Driel, Verloop & De Vos, 1998). These domains are dynamic and therefore require continuing reflection for their ongoing development.

Considering the nature of the requirements for teacher preparation, this study was underpinned by three notions:

(1) PCK as the specialist knowledge for teachers (Shulman, 1986), - the effect of which has been underscored. It is a teacher knowledge domain crucial for teacher professional development (Abell, 2008; Aydin & Boz, 2012; Magnuson 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 directed by planning. The components of PCK considered were based on those presented by Magnuson et al. (1999).

(2) Practice and theory - the associated features of teaching and learning. But the disparity between them has been alluded to as far back as early 1900s, Dewey (1904, 1964) cited in Ball (2000).

(3) Reflective practice - a goal for teacher preparation programs and a vehicle for ongoing professional development (Korthagen & Vasalos, 2005; Zeichner & Liston, 1996). It is regarded a crucial aspect in teacher development programs 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) thus ensuring ongoing professional growth. The Handbook guiding NUL student teachers' practice in schools advocates learning from experience (National University of Lesotho, 2015).

The teacher training programs at NUL as elsewhere, offer theoretical subject content, pedagogical studies and educational theories courses on campus and teaching practice in schools (Allen, Ambrosetti & Turner, 2007; Ozdemir & Yildrim, 2012; Shuls & Ritter, 2013). The general pedagogies and subject content are offered by the sister department and another faculty respectively; and the "contextualization" (Kirk, 1986) into subject specific pedagogical approaches is by the Science Education department in the Curriculum Studies courses. This situation portrays one facet of the fragmentation that Ball (2000, p. 242) notes, saying "… teacher education throughout the 20th century has consistently been structured across a persistent divide between subject matter and pedagogy".

The need for and importance of practice teaching as part of teacher education programs has been emphasized in literature (Allen & Peach, 2007; Ben-Peretz & Rumney, 1991; Gùrsoy, 2013) though not divorced from challenges (Ozdemir & Yildirim, 2012; Sariçoban, 2010). Since the learning environment and activities in the two phases differ, there is a need for different forms of support (Niemi & Jakku-Sihvonen, 2009). The collaboration between the training institution and practice schools for concerted support to the STs is inevitable, also with reported benefits and challenges (Allen, Ambrosetti & Turner, 2013; Gùrsoy, 2013).

In as much as 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; Anthopoulou & Ravanis, 2016), Ball (2000) warns of the problems facing teacher education programs in offering STs what is suitable for them to learn for teaching. The implication being that 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 practice

Methodological framework

The main research question sought the perceptions and opinions of TEs, STs, TPTs and RPTs based on their experiences with the preparation that the science pre-service teachers were afforded in learning to teach in the selected science subjects, and how they exhibited that professional knowledge during TP. Those perceptions served as a window through which the researcher could better understand the situation from which to establish the probable cause(s) for the reported shortfall.

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, 2015). According to Cohen, Manion & Morrison (2011) a case study observes effect in real context and context determines causes and effects. The reported shortcomings with STs' classroom teaching during teaching practice (TP) could be viewed as effects of the training. Cochran-Smith and Fries (2005) have this to say about studying causes and effects in teacher preparation:

> 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 (Cochran-Smith & Fries, 2005, p. 51).

The interest here did not essentially extent to the impact of STs' teaching on students' learning, rather, the impact of the training they underwent on them, that then formed the basis for their practice. The interactions within the site of investigation are illustrated in Fig. 1 covering the two-links referred to.

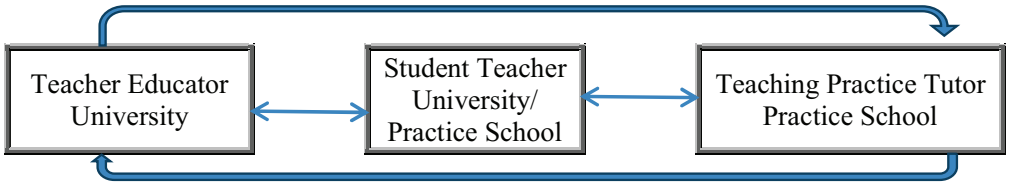

Figure 1. Links between teacher educator, student teacher and teaching Practice Tutor

The study participants

The study participants were the directly involved people at NUL and practice schools. The purposive sampling to obtain rich information from which the data were collected through the semi-structured interviews comprised 20 student teachers 20 teaching practice tutors, 2 teacher educators and 2 regular practicing teachers for whom pseudonyms were used. The STs were drawn from Year IV Biology and Physics Curriculum Studies courses coupled with the concerned TEs and the resultant TPTs. The RPTs within five years of teaching, who had gone through the same training were involved to verify the view about STs' limitations. It was believed that they would provide their training experiences in relation to the practicalities they were observing.

Research methods

The associated research tools in a qualitative study include observation, interview, survey, and document analysis (Mouton, 2001). In this study the interviews were employed for all targeted participants between December 2014 and January 2016. Except for STs who were involved in pre- and post-TP interviews, the rest had one interview, all ran one-on-one. The observation of STs' teaching was done by TPTs who provided the written reports which were complemented with other related documents. Those comprised already existing (course synopses, course outlines and TP Handbook) and STs' produced TP reports with the lesson plans ranging from 5 to 10 for all 20 STs.

The interview schedules derived from the research questions were designed to suit each category of participants, and they targeted five areas with the following questions:

1) What content was offered to STs for their learning to teach?
2) What *methodologies and pedagogical approaches* were employed to help STs learn to teach?
3) How did the STs *enact* the acquired knowledge?
4) How did the *theoretical coursework link with classroom practice*?
5) What were the general *views* of the study participants about the training?

Data analysis

The Data from the interviews were complemented with the analysis of the documents using template analysis which is a particular way of thematic analysis that follows the basic steps in content analysis (Brooks & King, 2012) in conjunction with constant comparison method (Miles & Huberman, 1984). The data were collected from individual events and documents and analyzed at that level and later related to others in relation to the five areas. In the final analysis all data were consolidated to make a comprehensive picture of the whole situation.

Results presentation and discussion

The results from various sources were presented and discussed on the basis of the five areas incorporating the prominent themes derived from the data. Those were: teacher knowledge, teacher qualities, practice teaching and training procedures which are integrated in the focal areas. The quotes used have been drawn from all sources used to collect the data conveying the pertinent message.

The training content

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 basis for the content that the STs were trained on was the course synopsis which was the same for both courses from which TEs developed course outlines used as their teaching curriculum. The different presentation and expression reflected could be manifested as the 'open and flexible' curriculum frameworks (Vellopoulou & Ravanis, 2012) influenced by their longstanding execution of the synopsis, interactions with schools and STs' reflections from TP. The content incorporated the topics that seemed essential to form a base for teacher knowledge comprising the domains of teacher knowledge, CK, PK and PCK and their components with the omission of assessment. TEs posited:

> 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).

The exclusion of assessment was recognized by all STs some already indicating their feeling of its impact even before going on TP. For instance, STB5 said, "...assessment ... we didn't do it, I am still not comfortable … no practice". TEs too acknowledged that they did not treat assessment as a topic for training which they felt could have a negative impact on STs' performance. It surfaced during STs' practice, aired by some STs themselves

during post-TP interview and in their reports, TPTs interview and reports and TEs interview. The questions they asked were simple recall questions merely requiring regurgitation of what had been taught. Some TPTs had to help STs to develop the skill which was expected to extend their learning.

The selected courses were to be done over an academic year. But since they were done in the final year in which STs were going on TP in the second semester, they were actually done in the first semester and that created a great challenge as attested by one TE saying:

> 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... A semester is too short to prepare for the whole curriculum ...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 (TEB).

This implies the strain the TE and STs were bearing on account of workload and time allocation within the institutional organization and procedures. That could be one of the reasons why TEs identified those topics that they deemed challenging for use in preparing STs. However, those were not necessarily the topics that the STs were going to teach during TP. For instance, only 3 of 8 Biology and 2 of 10 physics STs (about 28%) taught similar topics to those they dealt with on campus.

With the available time for coursework training, it is obvious that it could not be possible for STs to develop PCK for all high school subject topics, that then confirming the feeling expressed by Magnusson et al., (1999, p. 126) that "pre-service teachers would only be able to develop a fraction of the pedagogical content knowledge they will need to be effective". Some of the issues such as interpretation of the syllabus, lesson planning, reflection and learning from others that STs identified as the factors anticipated would contribute to their teaching with competence, almost all of them acknowledged their having played part in their teaching such topics.

Echoing the limited time in which the courses were done and the heavy workload that TEB already pointed out which ultimately led to the feeling of uncertainty with the STs, RPTP and STB3 attested:

> 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 (RPTP).

> 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... 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 It is not enough to do them for three hours a week...If we did the Curriculum Studies only the whole semester, we should, from 8 o'clock till 5 (STB3).

There is definitely no specific content designed by the Faculty of Education (FED) or the Science Education Department 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. The information provided by the TP Handbook however, despite probable limitations in detailing the content issues, which is the case with the manuals designed for a similar purpose such as the Faculty-School Cooperation Booklet used in Turkey, it has been designed to provide support to the ST in addition to that provided by the TPT and the TEs. The Handbook was hardly used by those who had a copy (STs and TEs) which they only got a week before TP started while TPTs did not have it at all. It offers the conceptual knowledge that could help the concerned people and with concerted effort and clear goals could develop STs in professional teacher knowledge and dispositions. It gives inspiring words to one as a teacher and her/his work of teaching as the introduction presents:

> 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, p. 1).

TPTs as co-educators with assumed practitioners' expertise were to assist with the practicalities of classroom teaching, embracing the elements of teacher knowledge.

Methodologies and pedagogical approaches

In the context of this study, methodologies are the overall procedures and the pedagogies the methods and strategies employed in teaching. Basically, TEs in the coursework training employed didactic approach, the goal of which according to Magnusson et al. (1999, p. 101) is to transmit the facts of the subject in this case being those 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 held accountable for knowing the facts produced by the subject. In explaining how they executed their work TEs declared:

> 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 enacted and advocated teaching strategies they considered appropriate for the

specific subjects/topics. That could be making their pedagogical approaches accessible to STs, who might be learning from the practical example, giving them concrete pointers for their teaching practice (Koster et al., 2016).

From STs' perspective, TEs' methodologies and pedagogical approaches included provision of information coupled with them working with it to practice. Some explanations 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 (truly) he was telling us what to do … 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).

The STs were aware of the mode of teaching their TEs employed which aligned for both groups.

For STs to practice teaching, TEs engaged them in peer teaching which they all appreciated. One TE however, doubted its benefit to the STs, the sentiment shared by RPTs and some TPTs. He stated:

> 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).

The other TE had a different view and articulated:

> ...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 both TEs 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. They thus not only learned how to teach but also to critique and accept criticism provided through the feedback by TE and peers, developing necessary qualities in a supportive environment. Collaborative group reflection (Miller & Shifflet, 2016) during peer teaching and after TP created an opportunity for learning from one another. TEs claimed that the information gathered from such reflections informed their

teaching of subsequent groups of student teachers. STs appreciated having been afforded an opportunity to prepare for and do practice teaching with their peers that helped them to develop confidence and some personal traits such as combating stammering (STB11). However, implying that practice in context and in reasonable time could be more beneficial, some STs uttered:

> 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).

> Micro [peer] teaching, we are doing it minimally and what I see about it is, we teach people who already know. To me I feel like we should maybe micro teach smaller children, the people that we are going to meet when we get to the field. The whole classroom experience I find it not giving me the whole classroom experience that I need. We teach a 40 minutes lesson in 7 minutes (STP9).

The uncertainty with handling students with their diverse background could influence the way the teacher conducts her/his teaching as Cohen and Grossman (2016) confirm that students have a great influence on the manner in which a teacher facilitates the teaching. The RPTs talked of students' influence from experience when they were STs and the observations made with STs practicing in their schools just as some TPTs also indicated.

In general, although TEs essentially taught through telling the expected, they involved STs in various ways and mostly engaging them in collaborative learning and searching for information, and then discussing and presenting on the issues. The STs found that involvement applicable for high school students. Nonetheless, STs earned for more practical learning to have a feel of the advocated strategies thus in line with a view expressed by Magnusson et al. (1999, p. 124) in saying, "Simply telling teachers…, does not provide sufficient information or support to enable them to successfully put those ideas into practice".

TPTs in practice schools were expected to serve as co-educators, professional friends, guides and supervisors to the STs during TP. The Handbook outlines the roles of the TPT which bear the effective supportive elements for the holistic development of the student teachers. This consideration of the overall welfare of the ST is legitimate as the endeavor itself involves thoughts, feelings, knowledge and actions of the novice who definitely requires professional support.

In all cases regarding the assistance and support to ST seemed to have been left to the discretion of individuals. The quotations that follow, in particular indicate how TPTs' could instill their beliefs about and practices in teaching and learning into STs. TPTs posited:

> 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).

Echoing the same view differently another TPT uttered:

> If he had problems in presenting certain topics … I remember he said, how am I supposed to present this? I told him that you should do this, do this, and do this. At the end, the notes, I gave him my notebook where I had made the last preparation last year (TPTB9).

According to the Handbook, the TPT is regarded as a pivot of support and guidance to the ST, not providing the recipe tactics. 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 (National University of Lesotho, 2015, p. 7).

Despite TPTs relating in the interview that practice in the school was a platform for further learning and reflection for the STs, where they related their learning and the practices of the veteran teachers to what was learned during coursework training, picking the new ideas and skills; their assistance was provided to varying degree in different areas of teaching. They considered some elements of teacher knowledge while mostly focusing on STs' qualities as revealed in the reports they provided for which they were not given guidelines. Generally, few of them observed STs' teaching to a significant extent. Of the 5 Biology and 5 Physics TPTs who explicitly talked of observations, some even let STs observe their teaching and shared the teaching. 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. The missing assessment component was noted hence signifying the importance of the practice phase. One of the TPTs in her report explained her assistance saying, "Before she could give a test to students she would come to me and we discuss it and allocate marks thoroughly" (TPTP7).

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. Confidence is one of the attributes of expertise in teaching (Smith & Strahan, 2004) and it was acknowledged by all. The issues that TPTs considered important included: daily lesson planning, active learner involvement and motivation, regular assessment with timely feedback and good command of the subject matter.

Student teachers' enactment of the acquired knowledge

The "enactment involves the planning and carrying out of new practices" (Magnusson et al., 1999, p. 125). One believes that with the training the STs were afforded in their teaching subjects during the Curriculum Studies courses, they could exhibit their ability to teach drawing from the learned subject content and the pedagogies including planning for their teaching. Lesson planning, as having a potential for positive impact for successful teaching, all STs drew their daily lesson plans. All of them except one acknowledged that lesson planning helped in guiding their teaching even though again they all struggled at the beginning and gradually improved the skill. According to one ST, it was not the planning

that was a problem, the claim that could be observed from the analysis of her lesson plans, but it was the timing. She pronounced:

> ... 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).

Of those TPTs who worked in close association with the STs one of them made this observation:

> 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. For the first two lessons teaching on his own the confidence was still low but improved as time goes on (TPTP1).

The gradual improvement with the teaching skills and disposition could be inevitable with the beginner. The training methodologies also impact on STs' performance.

The exceptional 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).

One might conclude that this ST acted on impulse therefore leaving little room for the learned theories and pedagogies to help her develop.

From analysis, lesson planning proved to be generally a great challenge to them. There was very limited alignment of the content in the sections of the plan. For instance, STB1 basically throughout the lesson explained the content whereas the lesson objectives were: "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" with no room for students engagement geared towards their attainment. With almost all STs, the content was vaguely stated. Similar limitations were observed by TEs, despite TPTs' claim that they checked the lesson plans before STs went to teach. TEP said, "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". Even with the lesson evaluation that they ought to do for every lesson, the vague descriptive statements revolved around students' weaknesses not reflecting their relationship to other pertinent factors. TP Handbook considers reflective practice a crucial element for professional growth just as Leavy and Hourigan (2016) declared.

The means to improve as part of the lesson plan in most cases were not related to the observations presented neither did they reflect any impact on the subsequent lessons both from their lesson plans and reports. Some expressions for a number of lessons by a ST included those such as "the lesson went very well", or "the lesson was successful" despite some indicated challenges. The challenge with reflection was also alluded to by TEs while TPTs had no idea of what was meant when asked about lesson reflection by

STs and hence there was no mention of it in the reports.

The methods that STs commonly used were discussion/classroom talk, group work, question and answer, students search for information and presenting their work, and lecturing. The latter being the dominant one despite TEs' discouragement and demonstration and advocacy for the appropriate ones. Some STs justifying their resorting to lecturing claimed:

> 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… this forced me to use, most of the times, methods that are more teacher centered" (STB11).

> 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" (STB4).

> 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).

The desired learner involvement though STs themselves were afforded during coursework training and appreciated, it posed classroom management and lesson facilitation challenges according to the STs as revealed in the preceding and ensuing quotes from TEs:

> 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 (TEP).

> 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. … 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 (TEB).

RPTP confirmed:

> 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 (RPTP).

Here the root of STs' challenge is to involve students in active learning. Consequently, they employed cheating tactics which the RPTP felt could be combated by frequent TEs' visits.

TPTs were satisfied with STs' content knowledge though in a few cases limitations

were reported. TPTB11 and TPTB8 had this to say respectively, “Giving learners content is still a problem … they have too much content but lack methodology”, and “…struggled in giving learners content appropriate for them… taught Form A [first year of secondary] content that is beyond their understanding”. And TEB expressed dissatisfaction saying:

> 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. 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-m (slowly shaking her head and frowning).

There was clear sense of discontent with the TE from her remarks and gesture.

STs consulted TPTs and other teachers on a number of issues as encouraged during TP orientation workshop held before they left for TP, revealed in all their TP reports. They consulted their peers as in the case of the Physics group that had formed a social media group. The remnants of the omitted assessment skill endured to this stage. The ST who declared his uncertainty before leaving for TP further confirmed the impact:

> I wasn’t quite sure of assessment strategies. Upon arriving in class, we review content of previous day, what we learned, with questions - simple questions for recalling (STB5).

The similar view expressed by another ST:

> 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).

In general, there were still those observable and worth noting limitations reflected by STs, also witnessed by their tutors and TEs, some of which could give a cue to the probable cause(s) of the shortfall.

Linking Coursework and practice teaching

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. That portrayed yet another fragmentation facet. Moreover, the general practice by the Faculty of Education (FED) was that TEs followed the STs into practice schools stating in the TP Handbook:

> The staff of the Faculty of Education 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, p. 4).

Usually only two visits are made per ST, one for observation and the other for assess-

ment in their two teaching subjects. The seemingly unbinding TE-TPT collaboration has 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 is not the concerned TE who necessarily follows the STs into practice, but any allocated TE. The procedure that created doubtful feeling with some counterparts such as the TPT who expressed this opinion:

> …you find that the observers or the supervisors who came to the school usually they were just people from the Faculty of Education. Sometimes … they are not people who are specialists in the science subjects. One feels … being observed by someone maybe from totally different field… a person might not be familiar with the appropriate strategies and methods of teaching science (TPTB1).

One is tempted to think that it would be even worse in the case where the ST had a challenge with the meaning and use of the scientific technical terms which one ST attached to this TPT had and even acknowledged her inadequacy in that regard.

Almost all the participants in interviews and some reports complained that the duration of TP was limited. That might have been one of the probable reasons for TEs leaving out TPTs upon visiting STs also them not being the subject specialist. The apparent lack of communication, collaboration and their effect left TPTs overwhelmed about the operation and the training institution's expectations. One of them proclaimed:

> One thing that I think should be done is, if we want to help this person, we should have a discussion. … when you have come, try to tell me what it is you have found from the student teacher so that... I should follow up. As the educator you may have seen things that I have not seen. 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 … talk about it. 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 (TPTB11).

With this apparent dissonance and without the TP Handbook, the desired support mechanisms to enable continuity in STs' learning are close to non-existence. Nonetheless, STs have in the random fashion been assisted in their professional development to varying degree and proficiency. But the feeling was that that was not a product that was aspired for, there still being some apparent limitations reported.

General views

The TEs' rationale for teaching the courses was for STs' understanding and familiarization with teaching what they would be teaching and their coping within the school context. The participants acknowledged that the training was worthwhile and did prepare STs academically, professionally and personally for teaching. However, the prominent concern was in respect of the procedures and the limited time which seemed to be an enduring challenge as expressed by RPTP who completed his studies in 2011, saying:

> 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).

On the institutional procedures TEB pointed out:

> 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. 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 (TEB).

Although teaching practice was considered an integral part of teacher training, TPTs were unhappy with lack of collaboration between them and the TEs to ensure a concerted effort for the benefit of the STs. In addition, the duration of TP was found by all participants to be short, therefore not quite meeting the assumption that it was an extension of learning for STs.

Conclusions

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 professional development of science student teachers at NUL in learning to teach in order to establish the cause(s) of the reported inadequacies, all participants acknowledged the conceptual and practical knowledge that the STs were afforded. The main findings of the study revealed that the courses and the procedures for teacher preparation embraced the development of the pre-service teachers' professional knowledge and qualities the most prominent being confidence. However, the major constraints for attainment of the aspired teacher product were time and procedures which jeopardized the desired professional development. Those had the attributes such as omission of assessment as part of the training content, the frequency and duration of peer teaching sessions, out of context practice teaching, TP methodologies, FED staff visits, TE-TPT collaboration and lack of meaningful observations of STs' teaching by TPTs.

In particular, without clear collaboration and shared goal(s) at all levels, and well informed and prepared TPTs, efforts could not be geared in the same direction resulting in STs' suffering the consequences of the divergent perceptions about their learning to teach. It is maintained that if there could be some evident concerted and strong support, guidance and supervisory systems which keep the trainees, trainers and TPTs interactively engaged, time might be utilized in a manner that there could be a decline in limitations reported on STs' classroom practice during TP.

It is therefore recommended that the fragmentation that leads to chasms, idiosyncratic practices and uncoordinated procedures, be reconsidered in relation to institutional structures and policies guided by the teacher educational ones at the national level. This would open avenues for further research directed to specific areas within teacher education extending into the general education system and policy design.

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