

A COMPARATIVE STUDY OF CLASSROOM PRACTICE OF GRADUATE AND
NON GRADUATE TEACHERS OF MATHEMATICS IN SELECTED HIGH
SCHOOLS OF COPPERBELT PROVINCE.

By

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Declaration

I, Jane Maliwatu, do hereby declare that this piece of work is my own, and that all the work of other persons have been duly acknowledged, and that this work has not been previously presented at this university and indeed any other university for similar purposes.

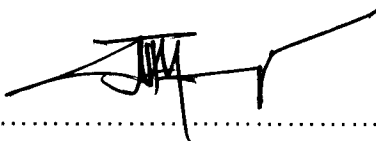
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Approval

This dissertation of Jane Maliwatu is approved as fulfilling part of the requirements for the award of the degree of Master of Education in Educational Administration by the University of Zambia.

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Abstract

In Zambia, currently, the graduate teachers for high schools (Grades 10 to 12) are trained at the University of Zambia. However, it has been observed that most of the high schools do not have adequate numbers of university graduate teachers. In the absence of sufficient graduate teachers to teach in high schools, non university graduate teachers who are trained to teach Grades 8 to 9 are teaching in high schools.

Concern has been expressed about the calibre of teachers found in high schools. The deployment of teachers with diplomas in high schools has raised some concerns in that, teachers with diplomas are inadequately prepared to teach the classes they are assigned to.

This study was set out to compare the classroom practice of graduate (degree holder) and non graduate (diploma holder) teachers of mathematics in selected high schools of the Copperbelt Province.

The data were collected through questionnaires and interviews. The key informants included: pupils, heads of department, headteachers, and the officials from the Ministry of Education. In addition to the questionnaires and interviews, observations were also conducted to verify the information given by the respondents.

The findings from the study showed that graduate teachers were better in the subject knowledge than the non graduate teachers. On the other hand, the study revealed that non graduate teachers were better in pedagogical aspects than the graduate teachers. The results also generally indicated that some graduate teachers outperformed non graduate teachers, and some non graduate teachers outperformed the graduate teachers in terms of classroom practice.

The analysis of the quantitative data revealed that there was no significant difference between the classroom performance of graduate and non graduate teachers.

In view of the research findings, the recommendations were made, inter alia, that teacher preparation be improved so that teachers in high schools get the desired training. The challenge is that the training of teachers should not emphasise either content knowledge or pedagogical aspects only but it should be noted that teachers need both.

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CHAPTER ONE

INTRODUCTION

1.0 Teacher Qualification and Classroom Performance

Education is the compilation and product of many and varied resources. Among these, teachers stand out as a key to realising the high standards that are increasingly emphasised in schools (<http://www.epinet.org/content.cfm/books-teacher-quality-execsum-intro>). The Ministry of Education in Zambia equally recognises teachers as a key to realising the goals in education. The national educational policy document, *Educating Our Future*, (MOE 1996:107) acknowledges that:

The quality and effectiveness of an education system depend heavily on the quality of its teachers. They are the key persons in determining success in meeting the system's goals.

Nichols (2005) also observes that, high quality teachers should be the priority, class size, facilities, textbooks, and curriculum all matter, but none of these rise to the level of who is teaching the children. Darling-Hammond (2000) equally contended that measures of teacher quality are more strongly related to student achievement than other kinds of educational investments such as reduced class size and overall spending on education.

There are two broad elements that most observers agree characterise teacher quality, namely, teacher preparation and qualification, and

teaching practices (<http://necs.ed.gov/surveys/frss/publications/199908012.asp>). These elements of teacher quality are not independent, excellent teacher preparation and qualifications should lead to exemplary teaching behaviours and practices.

Grambs and McClure (1964) observed that a good teacher requires formal preparation. Darling-Hammond (2002) acknowledged that lack of proper training contributes to lower levels of learning, especially for those students who need skilful teaching in order to succeed. Darling-Hammond and Sykes (2003) indicated that those providing little training fail to prepare teachers to succeed, thus adding to the revolving door of ill-prepared individuals who cycle through the classrooms of disadvantaged schools, wasting resources and valuable learning time for their students.

It is generally agreed that training improves performance (Niemi, 1989). Training is absolutely necessary to develop personnel quality (Basu, 1994). The national educational policy document (MOE, 1996) equally acknowledges the link between training and improved performance. MOE (1996:108), indicates that, *“training and professional development underpin what a teacher can accomplish in a school.”* The existence of in-service training for serving teachers is also an indication that policy makers see the need for training to improve performance. MOE (1977:70) also adds, *“... a teacher is not a product of chance, he is the product of*

good education both academically and professionally.” Fuller (1985) observes that, so far as qualifications are concerned, the evidence shows that teacher training contributes to an improvement in pupil performance.

1.1 Background to the Study

In Zambia currently, basic and high school education system has a 9-3 structure, comprising nine years of basic education and three years of high school education (MOE, 1996). Basic education is divided into three levels, namely the lower basic (Grades 1 to 4), the middle basic (Grades 5 to 7), and the upper basic (Grades 8 to 9). The high school education comprises Grades 10 to 12. In regard to the structure of basic and high school education, the system of teacher preparation comprises three levels: certificate level teachers who are trained to teach in lower and middle basic education classes (Grades 1 to 7); diploma level teachers who are trained to teach in upper basic education classes (Grades 8 to 9); and degree level teachers who are trained at the University of Zambia to teach in high schools (Manchishi, 2004; MOE, 1996).

However, there has been a continuing shortage of university graduate teachers in most high schools in Zambia. According to the data reported in the Educational Statistical Bulletin (2004), only 12% of the teachers at high school are appropriately qualified. Some high schools have even been reported to have no single university graduate teacher (Saturday Post, June 3, 2006).

MOE (1996) indicates that, the shortage of university graduate teachers is experienced most acutely in the three crucial areas of Mathematics, Science and English. Kelly, M.J. (1991:137), adds,

A serious difficulty for the secondary school system is the production and retention of the required number of staff qualified in the disciplines required at the senior level, especially mathematics, science and English. Not only do graduate mathematics and science teachers leave the system, but the university does not produce the total number of graduate teachers these subjects require.

In the study conducted by Subulwa (1993) entitled, 'some factors contributing to the attrition of secondary school teachers in Zambia,' the findings, inter alia, revealed that Zambia loses more university trained teachers than those trained from colleges, both at the entry point and from among those already in service. The explanations for this loss of graduate teachers are the general conditions of services and large salary differentials between university trained teachers in teaching and that of a university trained teacher employed outside the teaching fraternity (Sanyal et al 1979; MOE, 1992).

MOE (1992) observed that, university training of graduate teachers does not have the desired effects of increasing the supply of graduate teachers in the schools. MOE (1996) reports that the annual output of university graduate teachers ranges from 150 to 180 and the annual output of diploma holders ranges from 500 to 550. The annual output of the

university graduate teachers is insufficient to meet the required number of graduate teachers in high schools (MOE, 1992).

The possible measures regarding shortage of university graduate teachers according to MOE (1996), are the upgrading of existing diploma holding teachers for teaching in Grades 10 to 12, or adaptation of pre-service training to prepare teachers for work at the higher level. However, the situation is likely to remain critical for a considerable period of time.

The concern still remains that high schools do not have adequate numbers of university graduate teachers. In the absence of sufficient graduate teachers to teach in high schools, non university graduate teachers who are trained to teach Grades 8 to 9 are teaching in high schools. For instance, teachers of mathematics are trained at the University of Zambia, Nkrumah and Copperbelt Teachers' Colleges. In theory, teachers from Nkrumah and Copperbelt Teachers' Colleges teach from Grades 8 to 9, and University of Zambia graduates teach from Grades 10 to 12, in practice, non university graduate teachers from Nkrumah and Copperbelt Teachers' Colleges are teaching Grades 10 to 12 (MOE, 1996).

The deployment of teachers with diplomas in high schools has raised some concerns. For instance, Kelly (1991) argues that, necessary improvements are unlikely to materialise when so many of those teaching at the senior secondary level are not appropriately qualified for the task.

Kelly observed that, the deployment of two-year diploma teachers to teach at the senior secondary level does not contribute to high-quality teaching. Kelly's sentiments are shared by Cockcroft (1982), who wrote that no efforts to improve the quality of teaching are likely to succeed unless there is an adequate supply of suitably qualified teachers.

The then Minister of Education, at the time of the survey, Dr. Brian Chituwo, equally showed concern about the calibre of teachers in high schools. The previous Minister of Education attributed the decline in 2005 Grade 12 pass rate, inter alia, to lack of appropriately qualified teachers at high school level, where senior classes were being taught by under-qualified basic school teachers holding diplomas in education instead of university graduate teachers (Sunday Post, March 19, 2006).

1.2 Statement of the Problem

Concern has been expressed about the calibre of teachers found in high schools. The deployment of teachers with diplomas in high schools has raised some concerns in that, teachers with diplomas are inadequately prepared to teach the classes they are assigned to. Despite the concern, there have been no studies undertaken to critically evaluate the classroom practice of these teachers. Such a situation warranted an investigation. This study, therefore, was set out to make a comparison of the classroom practice of graduate (degree holder) and non graduate (diploma holder) teachers of mathematics in selected high schools.

1.3 Purpose of the Study

The purpose of the study was to determine the differences, if any, in the classroom practice of graduate and non graduate teachers in high schools.

1.4 Research Objectives

The main objectives of the study included the following:-

- To find out whether teachers with degrees outperformed teachers with diplomas in terms of classroom practice.
- To find out whether there was any significant difference in the teachers' classroom performance of graduate and non graduate teachers.
- To find out whether teachers with degrees outperformed teachers with diplomas as regards knowledge of the subject matter and pedagogical aspects
- To determine whether there was a connection between teachers' qualifications and the way they performed in the classrooms.

1.5 Research Questions

Because of the nature of the study, the research was not based on the testing of a single hypothesis. Rather the research was guided by a series of research questions. The research focused on finding out the

differences, if any, in the classroom practice of graduate and non graduate teachers. The study addressed the following questions:-

- Do teachers with degrees outperform teachers with diplomas in terms of classroom practice?
- Is there any significant difference in the teachers' classroom performance of graduate and non graduate teachers?
- Who performs better between the graduate and the non graduate teachers as regards knowledge of the subject matter and pedagogical aspects?
- Is there a connection between teachers' qualifications and the way they perform in the classrooms.

1.6 Significance of the Study

The Ministry of Education recognises that teacher education is central to the effectiveness and efficiency of the total education system (MOE, 1992). The issues to do with teachers' qualifications have not yet been closely studied in Zambia. Hence, the findings of this study might be of great significance to policy makers, teacher training institutions and researchers in education.

The findings and recommendations arising from this study might be of significance to the teacher training institutions. Since the quality of a teacher education programme is to a great extent reflected in the classroom performance of the teachers, the improvement of teacher

education might start with an assessment of the teachers' classroom performance. This study hopes to make known the classroom practice of graduate and non graduate teachers in high schools. The teacher training institutions might use this information to identify areas in their training programmes that may need some improvements. Improved teacher education could result in improved teaching practices and consequently possible increase in pupil achievement.

The findings and recommendations arising from the study might also attract the attention and possible action of policy makers in education in their quest to improve the quality of education in high schools. Additionally, the educational researchers might find this study useful.

1.7 Delimitations

The study was limited to some selected high schools in Ndola and Kitwe districts of the Copperbelt province. The focus was on the classroom practice of graduate (degree holder) and non graduate (diploma holder) teachers of mathematics, and while there were Grades from 10 to 12 at high school level, only the pupils in the eleventh grade were involved in evaluating the teachers.

The reason for focusing on the graduate (degree holder) and non graduate (diploma holder) teachers of mathematics was because of the researcher's experience and interest as a high school teacher of

mathematics who has gone through the two levels of teacher training (that is, diploma level and degree level). The pupils in the eleventh grade were selected to be involved in evaluating the teachers because some of the pupils in the tenth grade were new in the schools, and the pupils in the twelfth grade were in examination classes. The researcher thought that the pupils in the twelfth grade might be disturbed as the study involved changing teachers for a certain period of time.

1.8 Limitations

The following were the limitations in the study: firstly, the researcher was not able to come up with a larger sample and this was due to the fact that there were very few university graduate teachers in most of the high schools and, additionally, financial resources and time were also limiting factors. With adequate financial resources and time, the study would have been extended to other provinces and would have looked at the classroom practice of teachers in other subjects as well. Secondly, it would perhaps have been better to do the study over the time periods of two terms (or more) of the school year so as to allow for more observations. But the research constituted the researcher's masters dissertation which made it imperative that the plan used be adopted and the research be completed within the timeframe of a masters programme.

1.9 Chapter Layout

This chapter has presented the background to the study, statement of the problem, purpose of the study, research objectives, research questions, significance of the study, delimitations and the limitations of the study. The next chapter, chapter 2, focuses on literature review. This chapter provides a review of the relevant literature to the problem under discussion.

Chapter 3 provides an in-depth look into the research methodology used in the dissertation. Included under this chapter are: research design, target population, sample size, sampling procedure, research instruments, data collection, and data analysis. Chapter 4 provides the research findings. Tabulations of tables, where appropriate are done.

Chapter 5 covers the discussion of the findings. In this chapter the findings are discussed under the headings drawn from the objectives of the research. All the research questions have been addressed in this chapter. Chapter 6 concludes the study and also makes recommendations based on the major findings of the study.

CHAPTER TWO

LITERATURE REVIEW

Teacher performance in schools is an area which has been investigated by many researchers. The subject has been tackled from different perspectives and people have come up with different findings depending on the areas they have studied. In this study, the researcher was interested in investigating the teachers' classroom practice with regard to their qualifications.

For many years, educators and researchers have debated which school variables influence student achievement. Some early studies in developed countries like in the United States of America indicated that socioeconomic status and home background factors rather than teachers and schools, were the most important determinants of student achievement. For instance, Coleman et al (1966), suggested that differences in teachers did not matter much. Coleman's study was a huge study employing 60,000 teachers in Grade 6 and beyond, in over 3,000 schools. The principal finding was that nearly all of the variability in how students achieved was attributed to their socioeconomic background rather than to the schools they attended. However, more recent studies have suggested otherwise. A growing body of research suggests that schools can make a difference, and a substantial portion of that difference is attributed to teachers (<http://epaa.asu.edu/epaa/v8n1>).

Studies have indicated that the teacher's knowledge and classroom expertise are the most important influences on how well pupils learn. For instance, in Texas, Ferguson (1991) investigated pupils' performance against teachers' expertise (measured by scores on licensing examination, masters' degree and experience) in 900 Texas school districts controlled for student background and district characteristics. The analysis of the results showed that combined measures of teachers' expertise accounted for more of the inter-district variation in students' reading and mathematics achievement in Grades 1 through 11 than the students' socioeconomic status.

Darling-Hammond and Sykes (2003), report the study done by Wenglinsky in 2002. Wenglinsky's study looked at how mathematics and science achievement levels of more than 7,000 eighth graders on the 1996 National Assessment Educational Progress (NAEP) were related to measures of teaching quality, teacher characteristics and student social class background. He found that student achievement was influenced by both teacher content background and teacher education or professional development coursework, particularly in how to work with diverse student population. Measures of teaching practices which had the strongest effects on achievement were related to teachers' training. The cumulative effect of the combined teacher quality measures outweighed the effect of socioeconomic background on student achievement.

The study done by Heyneman and Loxley (1983) showed that teachers impact may be greater in developing countries than in developed countries. The explanation being that children's home background in developing countries is poor educationally as compared to that of in developed countries. As a result, children in developing countries depend mostly on teachers for their success in school than in developed countries where children are exposed to many learning facilities in their homes. However, Burke (1996) argues that teachers play an important role in pupils' education and school improvement whether in developing or developed countries. Burke's study confirmed the critical role that teachers play in the teaching and learning process.

Some studies have further shown a positive connection between teachers' preparation and their performance and impact in the classrooms (<http://www.ctp.org>). Other studies have even shown that, teacher qualifications and preparation are important elements of teacher effectiveness and important factors in determining student achievement (<http://necs.ed.gov/surveys/frss/publications/199908012.asp>).

Rivkin, et al (1998) identified teacher quality as the most important school-related factor influencing student achievement. They concluded from their analysis of 400,000 students in 3,000 schools that, while school quality is an important determinant of student achievement, the most

important predictor is teacher quality (<http://www.epinet.org/content.cfm/books-teacher-quality-execsum-intro>).

A study conducted by Darling-Hammond (2000) examined the ways in which teacher qualifications and other school inputs are related to student achievement. In Darling-Hammond's study, quantitative analyses indicated that measures of teacher preparation and certification were by far the strongest correlates of student achievement in reading and mathematics, both before and after controlling for student poverty and language status (<http://epaa.asu.edu/epaa/v8n1>).

Hanushek (1992) estimated that the difference between having a good teacher and having a bad teacher can exceed one grade-level equivalent in annual achievement growth. Likewise, Sanders and Rivers (1996) argue that the single most important factor affecting student achievement is teachers, and the effects of teachers on student achievement are both additive and cumulative. These studies though different in nature all conclude that quality teachers are a critical determinant of student achievement.

Sanders and Rivers (1996) used value-added methods to examine the cumulative effects of teacher quality on academic achievement. (Value-added methods are a new and more powerful way of addressing the question of whether teachers matter. Value-added methods examine

students' gains from year to year rather than their scores at a single point in time. Teachers who are adding value to student achievement will be those whose students gain most over the school year). The effectiveness of all teachers of mathematics in Grades 3, 4 and 5 in two large metropolitan school districts in Tennessee was estimated by determining the average amount of annual growth of the students in their classrooms. The data was used to identify the most effective (top 20%) and the least effective (bottom 20%) teachers. The progress of children assigned to low and high performing teachers was tracked over a three-year period. The results were that children assigned to three effective teachers in a row scored at the 83rd percentile in mathematics at the end of the 5th grade, while children assigned to three ineffective teachers in a row scored at the 29th percentile. Hence, the study demonstrated persuasively that the potential effect of teacher quality on academic achievement is quite high.

However, teachers' performance in schools is a source of concern. In Zambia for instance, the Ministry of Education (2003) carried out a study in Choma to determine the factors contributing to poor school performance. Teachers' classroom performance was among the factors identified. There were complaints in some schools that teachers were not executing their teaching functions effectively.

In the study conducted by Mwanza (2004), entitled, 'Teacher Perception of School Management Practices and their Influence on Teacher

Performance in Selected High Schools of Lusaka,' it was found that, in non-effective schools the performance of teachers was generally poor while in the effective schools the performance of teachers was good. It was evident from the results that school management practices did influence teacher performance. The majority of the teachers in effective schools attributed their good performance to their headteachers' management practices. The teachers were motivated to be committed and dedicated to their work. As observed by Basu (1994:146),

Motivation can do miracles as a motivated worker can achieve more than an expert with no motivation. Managers must, therefore, devote considerable time and effort to planning for and achieving a high level of motivation and morale.

Mwanza's study further showed that, non-effective headteachers did not encourage teachers to undertake in-service educational training. In Mwanza's study, teachers in non-effective schools attributed their poor performance to lack of staff development programmes in schools. Hence, professional development programmes are vital to the teaching fraternity. Increased time spent in professional development and collaborative activities is associated with the perception of significant improvement in teaching.

In order to meet the changing demands of their jobs, high-quality teachers must be capable and willing to continuously learn and relearn their trade. Professional development and collaboration with other teachers are strategies for building educators' capacity for effective teaching (<http://nces.ed.gov/surveys/frss/publications/1999080>).

In a comprehensive review of the teaching process and pupil achievement in the United States of America (National Convention, 1996), Darling Hammond (1998) noted that teachers who spend more time in professional development activities were better teachers especially when it came to fostering higher order thinking skills and catering for individual needs.

Every professional needs time to think, learn and strengthen skills and teachers are no exception. Good staff development programmes can reinvigorate teachers (<http://www.nea.org/teacherquality/index.html>). The level of teachers' performance declines if not exposed to regular in-service educational training programmes (Burke, 2000).

Trevaskis (1969) carried out a study to establish the importance of in-service training among those involved with the education of pupils. He found that the rationale for in-service training was derived from the fact that teacher education comprised pre-service and in-service training. He also pointed out that without in-service training in Africa, undoubtedly teachers and school standards would deteriorate.

However, traditional approaches to professional development (such as, workshops, conferences) have been criticised for being relatively ineffective because they typically lack connection to the challenges

teachers face in their classrooms, and they are usually short term. Research suggests that unless professional development programmes are carefully designed and implemented to provide continuity between what teachers learn and what goes on in their classrooms and schools, these activities are not likely to produce any long-lasting effects on either teacher competence or development (<http://nces.ed.gov/surveys/frss/publications/1999080/>).

Some studies (Wiley and Yoon, 1995; Brown et al, 1996; and Kennedy, 1998) have suggested that when professional development is focused on academic content and curriculum that is aligned with standards-based reform, teaching practice and student achievement are likely to improve.

In the study by Lungwangwa and Mwikisa (1998) entitled, 'Educational Indicators, Costs and Determinants of Primary School Effectiveness in Zambia,' it was found that, teachers in effective schools have stronger academic backgrounds as they tended to have acquired more years of pre-service and in-service training than teachers in non-effective schools. In Lungwangwa and Mwikisa's study, the results, inter alia, showed that teachers with more training tended to be more effective than those with less.

The Ministry of Education recognises the need to provide the best possible training programmes in general as well as professional

education to those in teacher training institutions, (MOE, 1977). The quality of education offered in schools will depend on the competences and the skills of the teachers graduating from the teacher training institutions. MOE (1992:97), acknowledges that,

The quality of Zambia's schools reflects the quality of the teachers manning these schools, while the quality of the teachers reflects the effectiveness of the institutions that trained them.

Druva and Anderson (1983) equally acknowledged that, there is a relationship between teacher preparation programmes and what their graduates do as teachers.

There is, however, a significant controversy regarding the characteristics of an effective teacher preparation programme. For instance, Begle (1979) found that the measure of teacher subject matter knowledge did not exert strong influences on student achievement. Begle (1979:29), observed that, *"it seems to be taken for granted that it is important for a teacher to have thorough understanding of the subject matter being taught."*

Begle (1979) adds, the belief that the more a teacher knows about the subject matter, the more effective the teacher will be, needs drastic modification and in fact suggests that once a teacher reaches a certain level of understanding of the subject matter, then further understanding contributes nothing to student achievement.

However, there is wide agreement on some teacher attributes that appear to be related to teacher effectiveness and student learning. For instance, virtually everyone acknowledges the importance of teachers' knowledge in the subject taught. There is a strong consensus that good subject-matter knowledge is critical in effective teaching, (<http://www.ecs.org/clearinghouse/22/3812238.doc>). Monk (1994:142) observed that, "*a good grasp of one's subject area is a necessary but not a sufficient condition for effective teaching.*" The Ministry of Education equally acknowledges that the teacher should have good command of the subject one teaches and be resourceful in translating the knowledge into effective learning experiences for the pupils, (MOE, 1977; MOE, 1992). Shipley, et al (1972), observed that, every teacher needs to prepare oneself in the subject matter and in method. The essential competences required in every teacher are mastery of the material that is to be taught, and skills in communicating that material to pupils (MOE, 1996).

Research has shown many other characteristics that also matter for good teaching. Though there seems to be a prevailing assumption that effective teaching cannot be defined, the research literature indicates otherwise. The studies have identified some of the characteristics of teachers who are defined as 'effective' by pupils, peers and administrators. Some of these characteristics are, clear explanations;

interesting style of presentation; confidence; and many others, (<http://www.utexas.edu/academic/cte/sourcebook/teacher.pdf>).

Kyrianton (1997), also mentions some characteristics of effective teaching which among them include: clarity of the teacher's explanations and directions; encouraging pupils participation and getting all pupils involved; monitoring pupils' progress and attending to pupils' needs. There is evidence to show that the strongest guarantee of teacher effectiveness is a combination of various elements (Darling-Hammond, 2000a; Wilson, et al 2001).

Some studies have also shown a positive effect of teacher experience on student achievement. For instance, Rowan (2002) found a significant effect of teaching experience on reading and mathematics outcomes in elementary school, with larger effects for later school than early elementary school. Likewise, Greenwald, et al (1996), in their analysis of the literature on school resources and student achievement, found significant effects of teacher experience.

Some studies have looked directly at teachers' knowledge of both subject matter and how to teach. Such studies have shown that knowledge of how to teach is as important as knowledge of content (Begle, 1979; Monk, 1994; Wenglinsky, 2000). Hence, teachers need both content knowledge and knowledge of pedagogy.

Summary of the Reviewed Literature

The literature review has shown that teachers play a pivotal role in the teaching and the learning process, and that teacher quality influence pupils' achievement. The literature review has also shown, inter alia, the need for the teachers to have adequate content knowledge as well as adequate knowledge about how to teach the content.

Regarding the knowledge of the subject matter and knowledge of how to teach among the teachers in high schools in Zambia, one study revealed that University of Zambia trainees were strong in content (subject knowledge) but were weak in the delivery of the lessons (methodology) while their counterpart from teachers' colleges were strong in the delivery of lessons and weak in content, (Manchishi, 2002). Manchishi (2002) carried out a study in Lusaka, entitled, 'the cooperating schools' rating of University of Zambia trainee teachers.' The study sought to find out the cooperating school's rating of the University of Zambia trainee teachers. The data for the study was collected using the semi-structured interviews and the key informants were the heads of department.

Though Manchishi's study was a good attempt to unearth strengths and weaknesses amongst University of Zambia trainee teachers, the data for study was collected only through interviews with the heads of department, yet evaluations by school-based supervisors have been found to lack

strong reliability. Walsh (2001) observed that supervisory rating can be too subjective to measure teacher quality accurately. The researcher would have used other data collection techniques as well so as to offer more solid evidence.

With regard to the teachers trained at the University of Zambia and those trained in colleges, Chiyeke (1987) carried out a study entitled, 'An investigation into the factors affecting geography teachers' classroom performance at junior and senior secondary school levels in Zambia.' Chiyeke identified professional education of the teachers as one of the factors among many others. The study investigated the classroom performance of geography teachers trained at the University of Zambia in relation to those trained at Nkrumah Teachers' College. The data on the teachers' classroom performance was obtained by administering a teacher rating questionnaire to the pupils. A sample of 17 graduate and 20 non graduate teachers of geography were involved in the study. The comparison of these teachers was done at both the upper basic school level and the high school level. Chiyeke concluded that classroom performance of graduate teachers was not significantly different from that of the teachers with diplomas.

Although Chiyeke's study appeared reasonably well-conducted, the study had methodological problems. For instance, the comparison was made between 17 graduate and 20 non graduate geography teachers teaching

at both the upper basic school level and the high school level. It would have been better if the comparison was made using the same number of graduate and non graduate teachers, and it would have been better to evaluate these teachers teaching at the same level.

Although some amount of research related to teachers' performance has been conducted even in Zambia, more research of this nature would validate the previous findings. Different methodologies would give different views to the problem, hence giving more room for suggestions on how to improve the situation.

The present study tried to reduce some of the flaws in some of the researches conducted in Zambia so far as regards the classroom practice of graduate and non graduate teachers, by employing the following techniques.

Firstly, the study used both qualitative and quantitative approaches in the collection and analysing of data. The intent for using both approaches was to allow for an in-depth understanding of the problem which could not be provided by one approach, and also to reduce the limitations and biases that could come in if one approach was used. Secondly, the researcher involved pupils in the evaluation of the teachers. The pupils in each of the classes involved in the study were given a chance to experience the graduate and non graduate teacher's teaching, and this

enabled the two groups of teachers to be evaluated by the same pupils. Pupils were involved in evaluating the teachers because research findings have indicated advantages in pupils' evaluation of teachers (Kowalski, 1978; Gage, 1963). Lastly, the researcher collected data using multiple sources with the intention of offering more solid evidence and hence contribute to a larger body of work from which a preponderance of evidence could be examined.

The next chapter looks at the methodology used in investigating the classroom practice of graduate and non graduate teachers in the selected schools of the Copperbelt province.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

This chapter covers the research methods used in the study. Included under this chapter are: research design, target population, sample size, sampling procedure, research instruments, data collection, and data analysis.

3.1 Research design

A survey approach was used in this study. Survey research involves gathering evidence relating to current conditions, (Ghosh, 1992; Leedy & Ormrod, 2001). The term 'survey' represents a broad category of techniques that use questioning as a strategy to elicit information (Merriam and Simpson, 1995). The survey design was chosen because the study involved asking people, the respondents, for information using questionnaires and interviews. Zikmund (2000), defines survey as a research technique in which information is gathered from a sample of people by use of a data collection technique based on communication with a representative sample of individuals.

The study employed both qualitative and quantitative methods to collect and analyse data. The concept of mixing methods is based on the recognition that any method used on its own has limitations and biases

which could be reduced by employing multiple approaches (Creswell, 2003).

3.2 Target Population

The target population consisted of the teachers of mathematics and pupils in the eleventh grade in the 12 high schools in Ndola and Kitwe districts of the Copperbelt Province. The 12 high schools included: Kansenshi High School, Chifubu High School, Lubuto High School, Masala High School, Saint Andrews High School, Dominican Convent High School, Mukuba High School, Chamboli High School, Mindolo High School, Hellen Kaunda High School, Ndeke High School and Kitwe Boys High School.

Of these 12 high schools, only 5 schools had at least one graduate teacher of mathematics. Zikmund (2000), defines target population as a specific, complete group relevant to the research project. Hence, the target population for this study was arrived at by getting the total number of pupils in the eleventh grade, and the teachers of mathematics from the 5 high schools which had at least a graduate teacher of mathematics. The target population consisted of 1,122 pupils and 35 teachers of mathematics. These were broken down as follows:

Table1. Target Population for Teachers of Mathematics and pupils in the Eleventh grade

Schools	District	Number of teachers of mathematics		Number of Pupils in the eleventh grade
		Graduate	Non graduate	
School A	Kitwe	1	8	358
School B	Kitwe	2	5	293
School C	Ndola	2	1	76
School D	Ndola	1	4	117
School E	Ndola	2	9	278
Total		8	27	1,122

The target population also comprised heads of mathematics department, headteachers and the officials from the Ministry of Education. This represents the sources from which the data was collected.

3.3 Sample Size and Sampling Procedure

The sample included 120 pupils, 12 teachers, 5 heads of department, 12 headteachers, and 6 officials from the Ministry of Education. The sampling techniques used were: convenience sampling, purposive sampling, and systematic sampling.

Convenience sampling was used to select the 12 high schools in Ndola and Kitwe. The 2 districts and the schools were selected because of their proximity to the researcher. Ghosh (1992), defines convenience sampling as a sampling technique where the investigator selects certain items according to his/her convenience.

Within the 12 high schools selected in Ndola and Kitwe, 12 headteachers were purposively chosen. Purposive sampling was also used to select the heads of mathematics department, and the officials from the Ministry of Education. Zikmund (2000) defined purposive sampling as a non-probability sampling technique in which the researcher selects the sample based upon the researcher's judgement about some appropriate characteristics required of the sample members. Purposive sampling enables the researcher to use his/her judgement to select cases that will best enable the researcher to answer the research questions and to meet the objectives (Saunders 2003).

The other stage in the sampling exercise was to select the teachers of mathematics teaching the eleventh grade. The teachers were selected from the 5 high schools within the 12 high schools selected in Ndola and Kitwe as some high schools had no university graduate teachers of mathematics as earlier noted. The 12 teachers sampled (6 graduate teachers and 6 non graduate teachers) were selected on the basis of their availability and willingness to participate in the study.

Within the 5 high schools where 12 teachers were chosen, 6 classes for pupils in the eleventh grade were identified in which 20 pupils per class were chosen using systematic sampling. Systematic sampling involves selecting individuals according to a predetermined sequence, (Leedy and Ormrod, 2001). Systematic sampling involves the selection of the

members from a population list in a systematic fashion (Nkpa, 1997). This form of sampling was preferred because it is convenient whenever a population consists of lists. The lists of pupils from each class sampled, was collected from the class teachers and these were used as sampling frames.

3.4 Research Instruments

Data for this study was gathered through questionnaires and interviews (see Appendix A, B and C). In addition to the questionnaires and interviews, observations were also conducted using the observation checklists (refer to Appendix D), to verify the information given by the respondents.

The questionnaires were tested for error, ambiguity and omissions using a group of pupils in the researcher's residential neighbourhood in Ndola district.

3.4.1. Validity and Reliability of Instruments

To ensure internal validity, the researcher collected data using multiple sources, that is, through questionnaires, interviews and observations. Using multiple sources of data to confirm the emerging findings is one strategy to ensure internal validity, (Mathison, 1988). The internal validity of a research study is the extent to which its design and the data it yields allow the researcher to draw accurate conclusions (Leedy and Ormrod,

2001). To ensure external validity, literature review was used in shaping the questions to the respondents. Leedy and Ormrod (2001), defines external validity of a research study as the extent to which its results apply to a situation beyond the study itself.

The reliability of the pupils' evaluation of the teachers was ensured by averaging the responses of the different pupils within each class. According to Remmers (1960), averaging class responses of 20 or more students is an appropriate method of ensuring reliability. The issue of reliability was also tackled by ensuring that most of the questions to the respondents stressed the respondents' observations rather than their opinions. The reliability of a measurement instrument is the extent to which it yields consistent results (Leedy and Ormrod, 2001). It was also ensured that the same pupils in a particular class evaluated a graduate and a non graduate teacher. This was done by allowing a particular class to be taught by both the graduate teacher and the non graduate teacher.

3.5 Data Collection

Data was gathered during the first term of the 2006 school year (that is from January 9 to April 7, 2006). Before the data collection exercise began, the researcher sought written permission from the Provincial Education Officer for the Copperbelt Province, to visit the schools (refer to Appendix G). The researcher visited the schools to make arrangements.

The research participants were given a general idea of what the study was about. The study employed the following data collection techniques:-

At the beginning of the school term, arrangements were made in the selected high schools where 2 teachers of mathematics (a graduate teacher and a non graduate teacher) were asked to teach a Grade 11 class. One teacher taught for half a term and the other teacher taught for the other half of the term.

3.5.1 **Administration of questionnaires to the pupils**

Structured questionnaires (refer to Appendix A) were administered to the pupils to obtain information on the teachers' classroom practice. The questionnaires were administered in two phases. In the middle of the term, questionnaires were administered to the selected pupils before the other teacher took over. Then at the end of the term, questionnaires were administered again to the same pupils. The pupils responded to the items in the presence of the researcher so that any problem could be attended to on the spot and in order to standardise questionnaire administration. Pupils were assured of the confidentiality of their responses. Pupils were not required to write their names to allay fears of victimisation.

3.5.2 **Observations**

Within the course of the term, the researcher observed some lessons of all the teachers that took part in the study. The observation checklist was used (refer to Appendix D).

3.5.3 Interviews

Face to face interviews were carried out using the interview guides (see Appendix B and C). The key informants were: Mathematics Heads of Department, Headteachers, District Education Standards Officers, Senior Education Standards Officers, and Directors (Director for Standards and Evaluation, and Director for Teacher Education) at the Ministry of Education Headquarters. The information solicited included, inter alia, the strengths/weaknesses of graduate and non graduate teachers with regard to classroom teaching.

In this study, the main methods of gathering data were through questionnaires and interviews, although observations were also done. The observations were conducted simply to verify the information given by the respondents. Only the data obtained through questionnaires and interviews were considered for the final analysis, considering that the pupils and those interviewed had observed the teacher for a longer period of time, and could therefore reliably rate the teachers.

3.6 Data Analysis

Data collected by questionnaires were analysed by use of the Statistical Package for the Social Sciences (SPSS) software. Processing of the data included descriptive analysis involving running of frequencies to show how some variables were distributed in percentages. Statistical analyses were also done. In order to carry out the statistical analyses, numerical

values were assigned to the pupils' responses to the questions in the questionnaire (Yes/very much = 2; to some extent = 1; and No/not at all = 0) and through that, each teacher was awarded some scores (see Appendix E and F). The teacher's score per item was determined by finding the average score given by the whole class. The teacher could therefore obtain a maximum average score of 2 or a minimum average score of 0 per item. Hence, out of the 28 items in Appendix A, the most outstanding teacher could obtain the highest total average score of 56 (that is, 28×2), and the poorest teacher could obtain the lowest average score of zero (that is, 28×0).

The scores obtained by each teacher are presented in table 8 and 9. Using the teachers' scores, a statistical test was done using the Analysis of Variance (ANOVA) to determine if the mean scores differed significantly across the graduate and the non graduate teachers. Analysis of Variance (ANOVA) is a technique used to determine if statistically significant differences of means occur between two or more groups (Zikmund, 2000). To determine whether there was any significant difference in the teachers' classroom performance of graduate and non graduate teachers, a computer generated ANOVA table was obtained (refer to table 12). In the ANOVA table, the computer program gives the value for the calculated F ratio at a certain significance level (α). If α is greater than the value for the calculated F, then the difference is significant, and if α is less than the value for the calculated F, then the

difference is not significant (Becker and Harnett, 1987). In this study, the significant level was set at 0.05. The level of significance determines the probability level, say 0.05 or 0.01, that is to be considered too low to warrant support of the assumption that there is no significant difference in the means of the sample groups (Zikmund, 2000). Correlation analysis between the teachers' qualifications and their performance was also done using the teachers' scores. Correlation analysis is used to examine the strength of the relationship, (Becker and Harnett, 1987).

Analysis of interview responses involved the process of structuring of data into a form that allowed patterns to be identified and hypothesis to be generated. This was done using the constant comparative analysis technique. This strategy involved grouping the respondents' answers and analysing different perspectives on central issues.

The next chapter presents the research findings.

CHAPTER FOUR

PRESENTATION OF THE RESEARCH FINDINGS

4.0 Overview

Chapter 3 has outlined the methodology used in the collection of data that constitutes this chapter. Data was obtained from pupils, mathematics heads of department, headteachers as well as officials from the Ministry of Education. This chapter presents the research findings on the classroom practice of graduate and non graduate teachers. The chapter is ordered as follows: The first part is the presentation of the data obtained from pupils through questionnaires. This is followed by the presentation of the data obtained from heads of departments, headteachers and Ministry of Education officials, obtained through interviews. The findings are based on the objectives of the study.

4.1 Findings from Pupils

Questionnaires completed by 120 pupils were processed. Of these 50 or 41.7% were female and 70 or 58.3% were male. The respondents ranged in age from 14 to 23 years.

The findings from the pupils on the classroom practice of graduate and non graduate teachers were based on some of the variables that are considered important for effective teaching, namely, planning, communication, teaching techniques, knowledge of subject matter, lesson

organisation and presentation, class control, motivation and encouragement, and feedback to the pupils.

4.1.1 Planning

Pupils were asked to indicate whether the teachers began and ended the lessons at the right time. In the category of graduate teachers, 81.7% of the pupils indicated that the teachers began and ended the lessons at the right time, whereas 18.3% indicated that the teachers did not begin and end the lessons at the right time. While in the category of non graduate teachers, 71.7% of the pupils indicated that the teachers began and ended the lessons at the right time, whereas 28.3% indicated that the teachers did not begin and end the lessons at the right time.

4.1.2 Communication

Table 2: Pupils' evaluation of the teachers with regard to Communication

	Percentage of pupils who responded to the items as indicated					
	Very much		To some extent		Not at all	
	Graduate teachers	Non graduate teachers	Graduate teachers	Non graduate teachers	Graduate teachers	Non graduate teachers
Teacher encouraged questions from the pupils	73.3	55.8	21.7	31.7	5.0	12.5
The teacher had a good relationship with the class	75.8	50.8	21.7	35.0	2.5	14.2
Teacher's explanations were easy to follow	55.8	44.2	38.3	39.2	5.8	16.7

The data in table 2 shows the pupils' evaluation of the teachers with regard to communication. On whether the teachers encouraged questions from pupils, in the category of graduate teachers, 73.3% of the pupils indicated that the teachers encouraged questions from the pupils very much, whereas 5% indicated that the teachers did not encourage questions and 21.7% indicated that the teachers encouraged questions from the pupils to some extent. While in the category of non graduate teachers, 55.8% of the pupils indicated that the teachers encouraged questions from the pupils very much, whereas 12.5% indicated that the teachers did not encourage questions and 31.7% indicated that the teachers encouraged questions from the pupils to some extent.

Regarding the teachers' relationship with the class, in the category of graduate teachers, 75.8% of the pupils indicated that the teachers had a good relationship with the class very much, whereas 2.5% indicated that the teachers did not have a good relationship with the class and 21.7% indicated that the teachers had a good relationship with the class to some extent. While in the category of non graduate teachers, 50.8% of the pupils indicated that the teachers had a good relationship with the class very much, whereas 14.2% indicated that the teachers did not have a good relationship with the class and 35% indicated that the teachers had a good relationship with the class to some extent.

On whether the teachers' explanations were easy to follow, in the category of graduate teachers, 55.8% of the pupils agreed strongly that the teachers' explanations were easy to follow, whereas 5.8% indicated that the teachers' explanations were not easy to follow and 38.3% indicated that teachers' explanations were easy to follow to some extent. While in the category of non graduate teachers, 44.2% of the pupils agreed strongly that the teachers' explanations were easy to follow, whereas 16.7% indicated that the teachers' explanations were not easy to follow and 39.2% indicated that teachers' explanations were easy to follow to some extent.

4.1.3 Teaching Techniques

Table 3: pupils' evaluation of the teachers with regard to the teaching techniques

	Percentage of pupils who responded to the items as indicated			
	Yes		No	
	Graduate teachers	Non graduate teachers	Graduate teachers	Non graduate teachers
The teacher put across his/her material in an interesting way	80.8	69.2	19.2	30.8
The teacher asked the pupils to find out whether they had understood the lesson	92.5	90.0	7.5	10.0
The teacher used teaching/learning aids during lessons	64.2	41.7	35.8	58.3
The teacher used a variety of teaching methods	48.3	46.7	51.7	53.3

The data in table 3 shows the pupils' evaluation of the teachers with regard to the teaching techniques. On whether the teachers put across the material in an interesting way, in the category of graduate teacher, 80.8% of the pupils indicated that the teachers put across the material in an interesting way, whereas 19.2% indicated that the teachers did not put the material in an interesting way. While in the category of non graduate teachers, 69.2% of the pupils indicated that the teachers put across the material in an interesting way, whereas 30.2% indicated that the teachers did not put the material in an interesting way.

On whether the teachers asked the pupils to find out whether they had understood the lessons, in the category of graduate teachers, 92.5% of the pupils indicated that the teachers asked the pupils to find out whether they had understood the lessons, whereas 7.5% indicated that the teachers did not ask the pupils to find out whether they had understood the lessons. While in the category of non graduate teachers, 90% of the pupils indicated that the teachers asked the pupils to find out whether they had understood the lessons, whereas 10% indicated that the teachers did not ask pupils to find out whether they had understood the lessons.

Regarding the use of teaching/learning aids, in the category of graduate teachers, 64.2% of the pupils indicated that the teachers used the

teaching/learning aids during lessons, whereas 35.8% indicated that the teachers did not use the teaching/learning aids during lessons. While in the category of non graduate teachers, 41.7% of the pupils indicated that the teachers used the teaching/learning aids during lessons, whereas 58.3% indicated that the teachers did not use the teaching/learning aids during lessons. The pupils were also asked to indicate whether the teachers used a variety of teaching methods. In the category of graduate teachers, 48.3% of the pupils indicate that the teachers used a variety of teaching methods, whereas 51.7% indicated that the teachers did not use a variety of teaching methods. While in the category of non graduate teachers, 46.7% of the pupils indicated that the teachers used a variety of teaching methods, whereas 53.3% indicated that the teachers did not use a variety of teaching methods.

Additionally, on the teachers' teaching techniques, pupils were asked to indicate whether the teachers gave chance to all the pupils in class to answer or ask questions. In the category of graduate teachers, 56.7% of the pupils agreed strongly that the teachers gave chance to all the pupils in class to answer or ask questions, whereas 8.3% indicated that the teachers did not give chance to the pupils and 35% indicated that teachers gave chance to the pupils to answer or ask questions to some extent. While in the category of non graduate teachers, 50.8% of the pupils agreed strongly that the teachers gave chance to all the pupils in class to answer or ask questions, whereas 13.3% indicated that the

teachers did not give chance to the pupils and 35% indicated that the teachers gave chance to the pupils to answer or ask questions to some extent.

Pupils were also asked to indicate whether the teachers permitted class discussions. In the category of graduate teachers, 21.7% of the pupils agreed strongly that the teachers permitted class discussions, whereas 34.2% indicated that the teachers did not permit class discussions and 44.2% indicated that the teachers permitted class discussions to some extent. While in the category of non graduate teachers, 19.2% of the pupils agreed strongly that the teachers permitted class discussions, whereas 41.7% indicated that the teachers did not permit class discussions and 39.2% indicated that teachers permitted class discussions to some extent.

4.1.4 Knowledge of Subject Matter

Pupils were asked to indicate whether the teachers seemed to know the subject matter. In the category of graduate teachers, 83.3% of the pupils agreed strongly that the teachers seemed to know the subject matter, whereas 1.7% indicated that the teachers did not seem to know the subject matter and 15% indicated that the teachers seemed to know the subject matter to some extent. While in the category of non graduate teachers, 66.7% of the pupils agreed strongly that the teachers seemed to know the subject matter, whereas 13.3% indicated that the teachers

did not seem to know the subject matter and 20% indicated that the teachers seemed to know the subject matter to some extent.

Regarding the teachers' confidence when teaching, in the category of graduate teachers, 94.2% of the pupils indicated that the teachers were confident when teaching, whereas 5.8% indicated that the teachers were not confident when teaching. While in the category of non graduate teachers, 88.3% of the pupils indicated that the teachers were confident when teaching, whereas 11.7% indicated that the teachers were not confident when teaching.

Pupils were also asked to indicate whether the teachers answered the pupils' questions satisfactorily. In the category of graduate teachers, 62.5% of the pupils agreed strongly that the teachers answered the pupils' questions satisfactorily, whereas 8.3% indicated that the teachers did not answer the pupils' questions satisfactorily and 29.2% indicated that the teachers answered the pupils' questions satisfactorily to some extent. While in the category of non graduate teachers, 41.7% of the pupils agreed strongly that the teachers answered the pupils' questions satisfactorily, whereas 25.8% indicated that the teachers did not answer the pupils' questions satisfactorily and 32.5% indicated that the teachers answered the pupils' questions satisfactorily to some extent.

4.1.5 Lesson Organisation

Table 4: Pupils' evaluation of the teachers with regard to lesson organisation and presentation

	Percentage of pupils who responded to the items as indicated					
	Very much		To some extent		Not at all	
	Graduate teachers	Non graduate teachers	Graduate teachers	Non graduate teachers	Graduate teachers	Non graduate teachers
The teacher showed interest in what he/she was teaching	86.7	65.8	9.2	21.7	4.1	12.5
Teacher presented the lessons in an organised and clear manner	76.7	55.0	17.5	31.7	5.8	13.3

The data in table 4 shows the results of the pupils' evaluation of the teachers with regard to lesson organisation and presentation. Pupils were asked to indicate whether the teachers showed interest in what they were teaching. In the category of graduate teachers, 86.7% of the pupils agreed strongly that the teachers showed interest in what they were teaching, whereas 4.1% indicated that the teachers did not show interest in what they were teaching and 9.2% indicated that the teachers showed interest in what they were teaching to some extent. While in the category of non graduate teachers, 65.8% of the pupils agreed strongly that the teachers showed interest in what they were teaching, whereas 12.5% indicated that the teachers did not show interest in what they were

teaching and 21.7% indicated that the teachers showed interest in what they were teaching to some extent.

Pupils were also requested to indicate whether the teachers presented the lessons in an organised and clear manner. In the category of graduate teachers, 76.7% of the pupils agreed strongly that the teachers presented the lessons in an organised and clear manner, whereas 5.8% indicated that the teachers did not present the lessons in an organised and clear manner and 17.5% indicated that the teachers presented the lessons in an organised and clear manner to some extent. While in the category of non graduate teachers, 55.0% of the pupils agreed strongly that the teachers presented the lessons in an organised and clear manner, whereas 13.3% indicated that the teachers did not present the lessons in an organised and clear manner and 31.7% indicated that the teachers presented the lessons in an organised and clear manner to some extent.

4.1.6 Class Control

The pupils were asked to indicate whether the teachers had good control of the class. In the category of graduate teachers, 73.3% of the pupils agreed strongly that the teachers had good control of the class, whereas 5% indicated that the teachers did not have good control of the class and 21.7% indicated that the teachers had good control of the class to some extent. While in the category of non graduate teachers, 55.8% of the

pupils agreed strongly that the teachers had good control of the class, whereas 23.3% indicated that the teachers did not have good control of the class and 20.8% indicated that the teachers had good control of the class to some extent. Pupils were also requested to indicate whether the teachers were respected by the class. In the category of graduate teachers, 100% of the pupils indicated that the teachers were respected by the class. While in the category of non graduate teachers, 90.8% of the pupils indicated that the teachers were respected by the class, whereas 9.2% indicated that the teachers were not respected by the class.

4.1.7 Motivation and Encouragement

Table 5: Pupils' evaluation of the teachers with regard to motivation and encouragement

	Percentage of pupils who responded to the items as indicated			
	Yes		No	
	Graduate teachers	Non graduate teachers	Graduate teachers	Non graduate teachers
The teacher knew pupils by name	55.8	55.0	44.2	45.0
The teacher showed concern for individual pupils	73.3	53.3	26.7	46.7
The teacher told the pupils about the importance of the subject	81.7	58.3	18.3	41.7
The teacher made the subject interesting	90.0	70.0	10.0	30.0
Pupils' interest in the subject increased because of the teacher	75.0	54.2	25.0	45.8
The teacher was available to give extra help outside the normal classes	59.2	45.0	40.8	55.0

The data in table 5 shows the pupils' evaluation of the teachers with regard to motivation and encouragement. On whether the teachers knew the pupils by name, in the category of graduate teachers, 55.8% of the pupils indicated that the teachers knew the pupils by name, whereas 44.2% indicated that the teachers did not know the pupils by name. While in the category of non graduate teachers, 55% of the pupils indicated that the teachers knew pupils by name, whereas 45% indicated that the teachers did not know the pupils by name. Regarding the teachers' concern for individual pupils, in the category of graduate teachers, 73.3% of the pupils indicated that the teachers showed concern for individual pupils, whereas 26.7% indicated that the teachers did not show concern for individual pupils. While in the category of non graduate teachers, 53.3% of the pupils indicated that the teachers showed concern for individual pupils, whereas 46.7% indicated that the teachers did not show concern for individual pupils.

On whether the teachers told the pupils about the importance of the subject, in the category of graduate teachers, 81.7% of the pupils indicated that the teachers told them about the importance of the subject, whereas 18.3% indicated that the teachers did not tell them about the importance of the subject. While in the category of non graduate teachers, 58.3% of the pupils indicated that the teachers told them about

the importance of the subject, whereas 41.7% indicated that the teachers did not tell them about the importance of the subject.

Pupils were also requested to indicate whether the teachers made the subject interesting. In the category of graduate teachers, 90% of the pupils indicated that the teachers made the subject interesting, whereas 10% indicated that the teachers did not make the subject interesting. While in the category of non graduate teachers, 70% of the pupils indicated that the teachers made the subject interesting, whereas 30% indicated that the teachers did not make the subject interesting. On whether the pupils' interest in the subject had increased because of the teachers, in the category of graduate teachers, 75% of the pupils indicated that their interest in the subject had increased because of the teachers, whereas 25% indicated that their interest in the subject had not increased because of the teachers. While in the category of non graduate teachers, 54.2% of the pupils indicated that their interest in the subject had increased because of the teachers, whereas 45.8% indicated that their interest in the subject had not increased because of the teachers.

Pupils were also asked to indicate whether the teachers were available to give extra help outside the normal classes. In the category of graduate teachers, 59.2% of the pupils indicated that the teachers were available to give extra help outside the normal classes, whereas 40.8% indicated that the teachers were not available to give extra help outside the normal

classes. While in the category of non graduate teachers, 45% of the pupils indicated that the teachers were available to give extra help outside the normal classes, whereas 55% indicated that the teachers were not available to give extra help outside the normal classes.

4.1.8 Feedback to Pupils

Table 6: Pupils' evaluation of the teachers with regard to feedback

	Percentage of pupils who responded to the items as indicated			
	Yes		No	
	Graduate teachers	Non graduate teachers	Graduate teachers	Non graduate teachers
The teacher gave class tests regularly	69.2	74.2	30.8	25.8
The teacher checked the pupils' exercise books	80.8	71.7	19.2	28.3

The data in table 6 shows the pupils' evaluation of the teachers with regard to feedback. Pupils were asked to indicate whether the teachers gave class tests regularly. In the category of graduate teachers, 69.2% of the pupils indicated that the teachers gave class tests regularly, whereas 30.8% indicated that the teachers did not give class tests regularly. While in the category of non graduate teachers, 74.2% of the pupils indicated that the teachers gave class tests regularly, whereas 25.8% indicated that the teachers did not give class tests regularly.

Pupils were also requested to indicate whether the teachers checked the pupils' exercise books. In the category of graduate teachers, 80.8% of the pupils indicated that the teachers checked the exercise books, whereas 19.2% indicated that the teachers did not check the exercise books. While in the category of non graduate teachers, 71.7% of the pupils indicated that the teachers checked the exercise books, whereas 28.3% indicated that the teachers did not check the exercise books.

4.1.9 Homework

Table 7: Pupils' evaluation of the teachers with regard to homework

	Percentage of pupils who responded to the items as indicated			
	Yes		No	
	Graduate teachers	Non graduate teachers	Graduate teachers	Non graduate teachers
The teacher gave homework regularly	80	57.5	20	42.5
The homework given helped pupils to understand the lessons	77.5	63.3	22.5	36.7

The data in table 7 shows the pupils' evaluation of the teachers with regard to homework. Pupils were asked to indicate whether the teachers gave homework regularly. In the category of graduate teachers, 80% of the pupils indicated that the teachers gave homework regularly, whereas 20% indicated that the teachers did not give the homework regularly. While in the category of non graduate teachers, 57.5% of the pupils

indicated that the teachers gave homework regularly, whereas 42.5% indicated that the teachers did not give homework regularly. Pupils were also asked to indicate whether the homework given helped them to understand the lessons. In the category of graduate teachers, 77.5% of the pupils indicated that the homework helped them to understand the lessons, whereas 22.5% indicated that the homework did not help them to understand the lessons. While in the category of non graduate teachers, 63.3% of the pupils indicated that the homework helped them to understand the lessons, whereas 36.7% indicated that the homework did not help them to understand the lessons.

In the additional questions, pupils were asked to indicate whether they wanted their teachers to continue teaching them or not. In the category of graduate teachers, 15.8% of the pupils rejected them, whereas, 84.2% did not. In the category of the non graduate teachers, 36.7% of the pupils rejected them, whereas 63.3% did not.

The pupils were also requested to indicate what they liked about the teachers' teaching. The pupils mentioned what they liked about their teachers' teaching. For instance, in the category of graduate teachers, 25% of the pupils indicated that they liked the teachers' explanations and 10% of the pupils liked the teachers' confidence when teaching. While in the category of non graduate teachers, 18.3% of the pupils indicated that they liked the teachers' explanations and 5% of the pupils indicated that

they liked the teachers' confidence when teaching. All the pupils' responses on what they liked about their teachers' teaching are summarised in table 8.

Table 8: Pupils' responses on what they liked about the teachers' teaching

	Percentage of pupils stating that the indicated, was what they liked about the teachers' teaching	
	Graduate teachers	Non graduate teachers
Clear explanations	25	18.3
Ensured that pupils understood the lessons	15	17.5
Made lessons interesting	8.3	6.7
Encouraged questions	5.8	0
Seemed to know the subject	6.7	0.8
Confidence when teaching	10	5
Total	70.8	48.3

From table 8, the percentage of pupils added up to 70.8% and 48.3% for graduate and non graduate teachers respectively instead of 100% in some extent = 1; and no/not at all = 0), and through that each teacher each category of the teachers, indicating that out of the 120 respondents, was awarded some scores (refer to Appendix E and F). The score per some pupils did not state anything on what they liked about their item for each teacher was found by averaging the scores from the teachers' teaching.

Pupils were also asked to rate their teachers. The results are presented in table 9.



Table 9: Rating of teachers' performance by their pupils

	Percentage of pupils rating the teachers as indicated	
	Graduate teachers	Non graduate teachers
Excellent	49.2	27.5
Good	35.0	36.7
Average	15.8	35.8

The data in table 9 shows the rating of the teachers' performance by the pupils. In the category of the graduate teachers, 49.2% of the pupils rated them as excellent teachers, 35% rated them as good teachers, and 15.8% of the pupils rated them as average. While in the category of non graduate teachers, 27.5% of the pupils rated them as excellent teachers, 36.7% rated them as good teachers, and 35.8% of the pupils rated them as average.

The pupils' responses on the first 28 items in Appendix A were quantified by assigning a numerical value to each response (yes/very much = 2; to some extent = 1; and no/not at all = 0), and through that, each teacher was awarded some scores (refer to Appendix E and F). The score per item for each teacher was found by averaging the scores from the different pupils within each class. This was done to ensure reliability as earlier noted. The scores obtained by each teacher have been presented in table 10 and 11.

Table 10: Scores for Graduate Teachers on the Items in Appendix A

		Scores per Item																					Total									
		Planning			Communication			Teaching techniques						Knowledge of subject matter			Lesson organisation and presentation			Class control				Motivation and encouragement						Feedback to pupils		Homework
Teachers		q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16	q17	q18	q19	q20	q21	q22	q23	q24	q25	q26	q27	q28	47.7		
1A	1.3	1.7	1.8	1.4	2	1.9	1.5	0.9	1.2	0.5	2	2	1.7	2	1.9	1.9	1.9	2	1.5	1.5	1.7	2	1.9	1.7	2	1.9	2	1.9	2	2	47.7	
1B	2	1.6	1.3	1.4	1.8	1.7	0.9	0.9	1.3	0.9	1.6	1.7	1	1.8	1.4	1.4	1.5	2	0.5	1	1.4	1.5	1.1	0.5	1.9	1.3	1.7	1.4	1.2	38.8		
1C	1.7	1.7	1.9	1.2	1.4	1.9	1.5	0.7	1.3	0.8	1.9	2	1.7	1.9	1.7	1.7	1.8	2	1.7	1.7	1.9	1.2	1.3	1.3	0.7	1.6	1.8	1.4	1.5	43.8		
1D	1.3	1.8	1.8	1.9	1.7	1.9	1.7	0.8	1.3	1.3	1.8	2	1.7	1.7	1.6	1.6	2	2	0.7	1.5	1.7	2	2	0.8	0.7	1.5	1.6	1.7	1.9	4		
1E	1.7	1.6	1.8	1.9	1.9	2	1.4	1.2	1.6	1	2	2	1.9	1.9	1.9	2	1.7	2	1.2	1.6	1.7	2	2	1.7	1.8	2	1.9	1.9	2	49.7		
1F	1.7	1.8	1.5	1.5	1.3	1.6	1.2	0.9	1.4	0.9	1.8	1.6	1.4	1.7	1.7	1.8	2	1.1	1.5	1.4	1.4	0.8	1.1	1.2	1.4	0.6	1	1.5	38.8			
		Total																								262.2						

Table 11: Scores for non Graduate Teachers on the Items in Appendix A

		Scores per Item																				Total															
		Planning					Communication					Teaching techniques					Knowledge of subject matter			Lesson organisation and presentation			Class control					Motivation and encouragement					Feedback to pupils			Homework	
Teachers		q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16	q17	q18	q19	q20*	q21	q22	q23	q24	q25	q26	q27	q28								
2A	1.2	1.5	1.7	1.3	1.9	1.9	1.5	1	1.2	0.5	1.8	2	1.1	1.7	1.7	1	1.8	1.4	1	1.9	1.6	1.4	0.8	1.7	1.8	1.7	1.7	1.4	1.6	41.1							
2B	1.8	1	1.1	1.2	1	1.7	1.1	0.6	1.1	0.7	1.1	1.3	0.8	1.5	1.4	1.3	1.6	0.6	0.7	0.8	0.9	0.7	0.6	1.7	1.7	1.7	0.5	0.8	0.6	29.9							
2C	2	1.8	1.6	1.5	2	2	1.7	1.1	0.8	1.5	2	2	1.7	2	1.8	1.5	2	2	1.8	1.4	1.9	1.7	1.8	1.9	1.8	1.3	1.7	2	48.3								
2D	1.8	1.5	1.6	1.6	1.6	1.9	1.5	0.7	0.6	1.3	1.8	1.9	1.6	2	1.9	1.2	2	1.2	1.5	1.5	1.9	1.3	0.8	1.4	0.8	1.2	1.5	1.8	41.4								
2E	1.2	1.5	1.5	1	1.1	1.8	1.5	0.9	0.8	1	1.3	1.7	1	1.4	1.1	1.2	1.8	1.3	1.2	0.6	1.4	0.9	0.8	1.6	2	1.5	1.3	1	35.4								
2F	0.6	1.4	0.9	1.1	0.7	1.5	1.1	0.5	0.5	0.6	1.4	1.7	0.9	0.8	0.8	1.9	1.7	0.1	0.2	0.8	0.7	0.5	0.6	0.6	0.9	1.2	0.9	0.6	25.2								
																Total											221.3										

From table 10, the total score for all the graduate teachers was 262.1 with the highest teacher scoring 49.4 and the lowest teacher scoring 38.3. From table 11, the total score for all the non graduate teachers was 221.3 with the highest teacher scoring 48.3 and the lowest scoring 25.2.

The researcher wanted to know whether there was any significant difference in the teachers' classroom performance of graduate and non graduate teachers. Using the teachers' scores, a statistical test was done using the Analysis of Variance (ANOVA). The results obtained are shown in table 12.

Table 12: Computer generated ANOVA table for the data in table 10 and 11

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	155.520	1	155.520	3.495	.091
Within Groups	444.944	10	44.494		
Total	600.464	11			

Table 12 shows a computer generated ANOVA table. In the table, the calculated F ratio was 3.495 and the significant value for the calculated F was 0.091. The level of significance for the calculated F ratio was greater than the α level of 0.05. Therefore, this suggested that the difference was not significant since the value for the calculated F was greater than the α level of 0.05, as earlier stated.

To determine whether there was a connection between the teachers' qualifications and their classroom performance, another statistical test was done using the teachers' scores. A statistical test was done using correlations and the results are presented in table 13.

Table 13: Correlations

		Total Scores	Teacher Profession
Total Scores	Pearson Correlation	1	-.509
	Sig. (2-tailed)	.	.091
	N	12	12
Teacher profession	Pearson Correlation	-.509	1
	Sig. (2-tailed)	.091	.
	N	12	12

A comparison of the scores obtained by the teachers through the pupils' evaluation showed a negative (-0.509) correlation as shown in table 13. The results suggested, though in a moderate way, that the classroom performance of the teachers was not closely related to their qualifications. Although most of the graduate teachers obtained slightly higher scores than the non graduate teachers, some of the non graduate teachers obtained slightly higher scores than the graduate teachers (See table 10 and 11).

4.2 Findings from Heads of Department, School Managers (Head teachers) and Ministry of Education officials

As stated earlier, in addition to the questionnaires, the other main method of collecting data was through interviews. Face-to-face interviews were conducted with heads of department, headteachers, and Ministry of Education officials using the interview guides in Appendix A and B. The responses to the questions were written down by the researcher as the interviewees spoke.

4.2.1 Findings from the Heads of Department

On the overall classroom practice of graduate and non graduate teachers, all the heads of department acknowledged that some graduate teachers performed better than non graduate teachers and some non graduate teachers performed better than graduate teachers.

Regarding the subject matter knowledge and pedagogical aspects, all the respondents acknowledged that graduate teachers were better in the subject matter knowledge than the non graduate teachers. On the other hand, all the respondents acknowledged that non graduate teachers were better in pedagogical aspects than the graduate teachers.

The respondents attributed the differences between graduate and non graduate teachers' classroom practice to the kind of training that teachers went through. The views for all the respondents were that, at the

University of Zambia, there was more focus on the subject content than the pedagogical aspects, whereas in colleges it was vice versa. Some heads of department indicated that, because of the adequate subject knowledge that graduate teachers had, the teachers taught with confidence and encouraged pupils' questions and opinions. The respondents mentioned that, although non graduate teachers had better teaching methodologies than the graduate teachers, non graduate teachers lacked confidence when teaching certain topics and did not encourage questions from pupils when teaching. One respondent, however, mentioned that non graduate teachers were committed to their work compared to the graduate teachers. The respondent said,

Non graduate teachers are committed to their work and they look settled in their career as they cannot easily be absorbed in other sectors. But the graduate teachers are not committed to their work and do not look settled, they always seem to be looking for other opportunities outside teaching.

Regarding the connection between the teachers' qualifications and the way they performed in the classrooms, most of the respondents acknowledged that there was a link between the teachers' qualifications and their performance in the classrooms. However, one respondent indicated that there was no link between the teachers' qualifications and their performance in the classrooms, and the respondent had this to say, *"Teaching is a talent, some teachers perform better because of their teaching talents and not the qualifications they have."*

4.2.2 Findings from the School Managers (Headteachers)

On the overall classroom practice of graduate and non graduate teachers, all the respondents indicated that some graduate teachers outperformed non graduate teachers, and some non graduate teachers outperformed graduate teachers.

Regarding the subject matter knowledge and pedagogical aspects, all the respondents acknowledged that graduate teachers were better in the knowledge of the subject matter than the non graduate teachers. On the other hand, all the respondents judged that non graduate teachers were better in pedagogical aspects than the graduate teachers. The explanation given for the differences between graduate and non graduate teachers' classroom practice was the kind of training that the teachers went through. The headteachers' views equally were that at the University of Zambia, there was more focus on the subject content than the pedagogical aspects, whereas in colleges it was vice versa. For instance, one respondent had this to say, "*University of Zambia focuses on content and higher aspects that are not even found in schools, while colleges focus much on methodology.*"

On the most preferred teachers in regard to classroom teaching, all the respondents indicated that they would prefer teachers who had both qualifications (a diploma and a degree). The views were that, the teachers who had both qualifications had a combination of adequate

content knowledge and adequate knowledge of how to teach it (methodology).

On the performance of the pupils at Grade 12 level with regard to their teachers' qualifications, most of the respondents indicated that in some cases pupils taught by graduate teachers performed better than those taught by non graduate teachers, and in other cases those taught by non graduate teachers performed better than those taught by graduate teachers. Some respondents, however, mentioned that with less experienced teachers, pupils taught by graduate teachers were likely to perform better than those taught by non graduate teachers. The respondents added that when both categories of teachers gain a lot of experience, the issue of qualifications does not come in when it comes to how pupils performed at Grade 12 level.

Regarding the connection between the teachers' qualifications and the way they performed in the classrooms, most of the respondents acknowledged that there was a link between the teachers' qualifications and their performance in the classrooms. These findings were revealed by responses such as,

There is a link between the teachers' qualifications and their performance in the classrooms, in practical terms degree holders are expected to perform better than the diploma holders, but in reality other issues come in.

Many such statements were made by the respondents. All the respondents, however, indicated that a lot of factors influenced the way teachers performed in the classrooms. School management and administration was one aspect that most of the respondents noted to have an influence on how teachers performed. One headteacher at a mission school indicated that there was need to check up on the teachers' classroom practice.

There was also evidence from the headteachers that teachers needed to learn continuously. Sharing of ideas amongst the teachers was perceived to lead to desirable classroom practice. Some respondents indicated that programmes such as, School Programme of In-service for the Term (SPRINT), helped the teachers to improve their teaching.

4.2.3 Findings from the Ministry of Education Officials

Regarding the subject matter knowledge and pedagogical aspects, all the respondents acknowledged that graduate teachers were better in content knowledge than the non graduate teachers. On the other hand, all the respondents acknowledged that non graduate teachers were better in pedagogical aspects than the graduate teachers.

The Ministry of Education officials equally attributed the differences between the graduate and non graduate teachers' classroom practice to the kind of training that teachers went through. The officials' views equally

were that, at the University of Zambia, there was more focus on the subject content than the pedagogical aspects, whereas in colleges it was vice versa. For instance, one District Education Standards Officer said,

At the university the focus is more on content than methodology, and that is why the students' teaching practice is short. While colleges put more emphasis on methodology, and that is why the students' teaching practice is long.

As noted by some heads of department and also evidenced from the pupils' responses that graduate teachers encouraged questions from the pupils, one Senior Education Standards Officer acknowledged that non graduate teachers did not encourage questions from pupils as much as the graduate teachers did. The Senior Education Standards Officer gave an example of one lesson he observed where a non graduate teacher got annoyed when the pupils asked questions. The respondent mentioned that such instances were common amongst the non graduate teachers in most of the lessons he observed. However, regarding lesson preparation, one respondent said that non graduate teachers were better than graduate teachers. The respondent added that, "*diploma holders feel the inadequacy, hence they research more.*"

All the officials interviewed indicated that teachers who had gone through both college and university tended to be the best teachers as regards the classroom teaching. The officials' views were that these teachers had a

combination of adequate content knowledge and adequate knowledge of how to teach it (methodology).

Regarding the connection between the teachers' qualifications and the way the teachers performed in the classrooms, most of the respondents acknowledged that there was a link between the teachers' qualifications and their performance in the classrooms. Some of the statements expressing such views were:

Those with more content are expected to perform better but due to other factors they don't.

There is a link between the teachers' qualifications and their performance, better qualified teachers can branch out and explain more.

The Ministry of Education officials equally felt that the way teachers performed in the classrooms was to some extent influenced by various factors besides their qualifications. One respondent said,

Teachers tend to perform better when they gain a lot of experience and when they do a lot of reading/research, but they have no time due to other commitments such as private tuitions and Academic Production Unit (APU).

Another respondent said that the many problems that teachers faced, such as, lack of teaching resources, low salaries and poor conditions of service, affected the way teachers performed in the classrooms. As noted by the headteachers that school management and administration was an important factor in the way teachers performed in the classrooms, the Ministry of Education officials equally acknowledged that the culture of

the school had a lot do with how teachers performed in the classrooms. One respondent said, *“the performance of teachers depends largely on the way the school is run.”* Many such statements were made by the respondents. Most of the respondents gave examples of the mission schools where they noted that teachers in the mission schools tended to perform better than those in government schools.

4.3 **Researcher’s Observations**

As noted earlier, the main methods of collecting data was through questionnaires and interviews, although observations were also conducted. The researcher observed all the teachers that took part in the study using the observation checklists (see Appendix D). The purpose for conducting the observations was to verify the information given by the respondents.

The following were the notable observations regarding this study. The researcher observed that graduate teachers looked confident when teaching and their explanations in class were detailed compared to the non graduate teachers. Regarding the overall classroom practice, it was observed that some non graduate teachers performed better than the graduate teachers, and some graduate teachers performed better than the non graduate teachers.

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.0 Introduction

Chapter four has presented the research findings. This chapter discusses the findings of the study. All the research questions have been addressed in this chapter. Although the size of the sample for this study was small, and thus was not a representative sample from which one would draw population inferences, the analysis of this study confirmed several findings reported by various researchers. This chapter discusses the findings under the headings drawn from the objectives of the research.

5.1 **Comparison of Graduate and non Graduate Teachers as regards the Knowledge of the Subject Matter and Pedagogical aspects.**

The study addressed the question as to whether teachers with degrees outperformed teachers with diplomas as regards the knowledge of the subject matter and pedagogical aspects. From the pupils' responses, it was evident that graduate teachers were better in the knowledge of the subject matter than the non graduate teachers. In the questionnaire, pupils were asked to indicate whether their teachers seemed to know the subject matter. In the category of graduate teachers, 83.3% of the pupils agreed strongly that the teachers seemed to know the subject matter. While in the category of non graduate teachers, 66.7% of the pupils agreed strongly that the teachers seemed to know the subject matter. Hence, from the pupils' responses, it was observed that graduate

teachers scored higher than the non graduate teachers on the knowledge of the subject matter.

It was also evident from the respondents interviewed that graduate teachers were better in the knowledge of the subject matter than the non graduate teachers. All the respondents interviewed indicated that graduate teachers were better in the knowledge of the subject matter than the non graduate teachers.

On the other hand, from the pupils' responses, there was no convincing evidence that non graduate teachers were better in pedagogical aspects than the graduate teachers. It was observed that graduate teachers scored slightly higher than the non graduate teachers in most of the items in the questionnaire. It was further noted that almost half of the graduate teachers that took part in the study had both qualifications (a diploma and a degree) and this might explain why most of the graduate teachers obtained slightly higher scores from the pupils' evaluation than the non graduate teachers (refer to tables 10 and 11). Hence from the pupils' responses it was difficult to get evidence that non graduate teachers were better in pedagogical aspects than the graduate teachers.

However, from the survey, the results from the interviews showed that non graduate teachers were better in pedagogical aspects than the graduate teachers. This was indicated by all the respondents interviewed.

Hence, the results from the interviews and questionnaires showed that graduate teachers were better in the knowledge of the subject matter, while non graduate teachers were better in pedagogical aspects as evidenced by the responses of the people interviewed. The findings are consistent with Manchishi (2002) who found out that University of Zambia trainees were strong in content (subject knowledge) but were weak in the delivery of the lessons (methodology) while their counterpart from the teachers' colleges were strong in the delivery of lessons and weak in content.

From the survey, the explanation given for the differences between the graduate and the non graduate teachers' classroom practice was the kind of training that these teachers went through. The respondents interviewed indicated that, university training focuses much on the subject content than the pedagogical aspects while in colleges there was more focus on pedagogical aspects. These findings are in line with what the Ministry of Education (1992) stated, that the quality of the teachers reflects the effectiveness of the institution that trained them. The findings are also in line with Druva and Anderson (1983) who acknowledged that, there is a relationship between teacher preparation programmes and what their graduates do as teachers.

There was also evidence from the results of the respondents interviewed that the teachers who had both qualifications (a diploma and a degree) were better in terms of classroom practice than the teachers who had either a diploma or a degree. The respondents' views were that, the teachers who had both qualifications (a diploma and a degree) had a combination of adequate content knowledge and adequate pedagogical knowledge. These findings confirm what a number of studies (which include: Shipley, et al 1972; Begle, 1979; Monk, 1994; Winglinsky, 2000) have shown that teachers need both content knowledge and knowledge of pedagogy. The Ministry of Education in Zambia equally recognises the need for teachers to have both content knowledge and knowledge of pedagogy (MOE, 1977; MOE, 1992; MOE, 1996). Hence, the fact still remains that training of teachers should not emphasise either content knowledge or pedagogical aspects only but it should be noted that teachers need both. There is need to have teachers who are more knowledgeable in their field and are skilful at teaching it to others.

5.2 Comparison of Graduate and non Graduate Teachers as Regards the Overall Classroom Practice

The study addressed the question as to whether teachers with degrees outperformed teachers with diplomas in terms of classroom practice. From the findings, it was evident that some graduate teachers performed better than non graduate teachers and some non graduate teachers performed better than graduate teachers. From the results of the pupils'

evaluation of their teachers, it was noted that some graduate teachers obtained higher scores than the non graduate teachers and some non graduate teachers obtained higher scores than the graduate teachers (refer to table 10 and 11). All the respondents interviewed observed that some graduate teachers performed better than non graduate teachers and some non graduate teachers performed better than the graduate teachers.

The above findings corresponded with the responses on the performance of pupils under the tutelage of graduate and non graduate teachers. Obanya (1994) observes that, teacher competence should be gauged by discovering how well pupils do under the tutelage of the particular teacher. During the survey, the headteachers were asked to mention how pupils performed at Grade 12 level with regard to their teachers' qualifications. Most of the headteachers interviewed observed that, in some cases pupils taught by non graduate teachers performed better than those taught and graduate teachers, and in other cases those taught by graduate teachers performed better than those taught by non graduate teachers. These findings are consistent with Subulwa (2004), who observed that the responsibility for pupils' poor performance (if at all it is there) is not the fault of the teachers with diplomas. The findings further revealed that teachers' experience had a lot to do with the pupils' performance. These results confirm what a number of studies (which

include: Rowan, 2002; Greenwald, et al, 1996) have shown that there is a positive effect of teacher experience on student achievement.

Further investigation revealed that, there was no significant difference between the classroom performance of graduate and non graduate teachers. From the results of the pupils' evaluation of their teachers, the analysis of the scores obtained by the teachers showed that the classroom performance of graduate and non graduate teachers did not differ significantly (refer to table 12). The non manifestation of a significant difference between the classroom performance of graduate and non graduate teachers is consistent with Chiyeke (1987) who observed that the classroom performance of graduate teachers was not significantly different from the non graduate teachers.

5.3 Correlation between the Teachers' Qualification and their Performance in the Classrooms

From the survey, the researcher wanted to know whether there was a connection between the teachers' qualifications and the way they performed in the classrooms. From the scores obtained by the teachers through pupils' evaluation, a comparison of the scores showed, though in a moderate way, a negative (-0.509) correlation between the teachers' qualifications and their performance (refer to table 13). The results suggested that the performance of the teachers was not closely related to their qualifications. However, Leedy and Ormrod, (2001) cautions that,

correlation does not, in and of itself, indicate causation. The good researcher is never content to stop at the point of finding a correlation. The correlation coefficient is merely a signpost pointing to further discovery (Leedy and Ormrod, 2001). Hence, in this study, further investigations were done through interviews to find out whether there was a connection between the teachers' qualifications and their performance in the classroom.

The results from the interviews showed that there was a connection between teachers' qualifications and their performance in the classroom. Most of the respondents interviewed acknowledged that there was a link between the teachers' qualifications and their performance in the classroom. The findings are in line with other studies that have shown a positive connection between the teachers' qualifications and their performance and impact in the classroom (<http://www.ctp.org>). The respondents, however, explained that the way teachers performed in the classrooms was to a greater extent influenced by various factors. The factors mentioned, inter alia, included the availability of resources, school management, and the culture of the school in general. Some of these findings are consistent with Mwanza (2004) who observed that the way schools are managed do influence the performance of teachers.

Further responses from some headteachers revealed that peer collaboration amongst the teachers and programmes such as the School

Programme of In-service for the Term (SPRINT), helped teachers to improve their teaching. These results are in line with many other researchers (such as Trevaskis, 1969; Wiley and Yoon, 1995; Brown, et al, 1996; Darling-Hammond, 1998; Kennedy, 1998; Burke, 2000) who have showed the importance of professional development activities.

The next chapter concludes on the findings of the research and makes recommendations based on the findings.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This research was set out to compare the classroom practice of graduate (degree holder) and non graduate (diploma holder) teachers of mathematics in selected high schools of the Copperbelt Province. This chapter concludes the study and also makes recommendations based on the major findings of the study.

6.1 Conclusion

Through the assessment of the pupils' evaluation of their teachers, and the views from the heads of department, headteachers and Ministry of Education Officials about the teachers' classroom practice, the following were the major findings from the survey conducted.

The study revealed that graduate teachers were better in the subject knowledge than the non graduate teachers, while non graduate teachers were better in pedagogical aspects than the graduate teachers. This is a serious revelation, as this means that there is need to improve teacher preparation.

The results also generally indicated that some graduate teachers outperformed non graduate teachers, and some non graduate teachers outperformed the graduate teachers in terms of classroom practice.

The analysis of the quantitative data revealed that there was no significant difference between the classroom performance of graduate and non graduate teachers.

The study also revealed that various factors influenced the way teachers performed in classrooms. The factors mentioned included, inter alia, availability of resources, the way schools were managed and the culture of the school in general.

6.2 Recommendations

Based on the findings and conclusion discussed above, some recommendations were made:

6.2.1 Recommendations to the Teacher Training Institutions

One of the major findings of the study was that the graduate teachers were better in the subject knowledge than the non graduate teachers, and the non graduate teachers were better in pedagogical aspects than the graduate teachers. In view of these findings, there is need to improve the way teachers are prepared for the classroom.

The recommendation to the institutions that prepare non graduate teachers (diploma holders) who get to work in high schools, is to ensure

that teachers graduate not only with strong knowledge of pedagogy but also with strong content knowledge.

The recommendation to the institution training the graduate teachers, the Education faculty of the University of Zambia in this case, is to see to it that teachers graduate not only with strong content knowledge but also with strong knowledge of pedagogy. The challenge is to develop teachers who not only have a deep understanding of the subject matter, but also have adequate knowledge of how to teach it. This could lead to desirable classroom practices.

Teachers need both content knowledge and knowledge of pedagogy. Hence, the training of teachers should not emphasise either content knowledge or pedagogical aspects only but both.

6.2.2 Recommendations to the School Managers (Headteachers)

From the findings, some respondents revealed that school management and administration, and the culture of the school in general affected the way teachers performed in classrooms. In view of this, the recommendation is that, the school managers should employ management practices that might enhance teachers' classroom performance. School managers should strive to promote the school culture that always point to excellence and effectiveness.

6.2.3 Recommendations to the Ministry of Education

The study revealed that the graduate teachers were better in the subject knowledge than the non graduate teachers, and the non graduate teachers were better in pedagogical aspects than the graduate teachers. In view of these findings, the recommendation is that, the Ministry of Education through the Teacher Education directorate, should ensure that graduate and non graduate teachers in high schools are upgraded in the knowledge of pedagogy and content knowledge respectively. The Ministry of Education should also ensure that all the future teachers deployed in high schools have the desired training.

6.2.4 Recommendations for Further Research

This study was limited to some selected high schools of the Copperbelt Province, and it was further limited to the teachers of mathematics. Hence, there is need to take a study of teachers' classroom practice on a wider scale involving more than one province, and also assess the classroom practice of teachers in other subjects as well.

This study looked at the teachers' classroom practice with regard to the teachers' qualifications. Further studies could focus on the teachers' classroom practice with regard to other factors such as the teachers' experience. Further studies may also focus on the headteachers' management practices with regard to their qualifications.

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APPENDIX A
QUESTIONNAIRE FOR PUPILS
PUPILS' ASSESSMENT OF TEACHER CLASSROOM PRACTICE

Dear Respondent,

You have been selected to respond to a questionnaire on the classroom practice of your teacher of mathematics at your school. Please fill in your responses to the items given below. There are no implied correct or wrong answers to the statements/questions. Please respond to all the items freely and honestly. The information obtained will be treated with strict confidentiality and your cooperation will be highly appreciated.

Instructions

- i) Do not write your name on this questionnaire.
- ii) Please tick in the box for your appropriate responses.
- iii) Where blank spaces are provided, write your own answer.
- iv) Hand back the questionnaire to the Researcher after completion.
- v) Additional space is provided at the end of the questionnaire should you wish to elaborate on any of your answer.

School: _____ Class: _____

Age: _____ Sex: Male Female

Code of the teacher: _____

a) Planning

1) Does the teacher begin and end the lesson at the right time?

Yes No

b) **Communication**

- 2) Does the teacher encourage questions from the pupils? Not at all
To some extent Very much
- 3) Has the teacher got a good relationship with the class? Not at all
To some extent Very much
- 4) Do you follow the teacher's explanations easily? Not at all
To some extent Very much

c) **Teaching Techniques**

- 5) Does the teacher put his/her material across in an interesting way?
Yes No
- 6) Does the teacher ask questions to pupils to find out whether they have understood the lesson? Yes No
- 7) Does the teacher give chance to all the pupils in the class to answer or ask questions? Not at all To some extent Very much
- 8) Does the teacher permit class discussions when and where necessary?
Not at all To some extent Very much
- 9) Does the teacher use teaching/learning aids during lessons?
Yes No
- 10) Does the teacher vary his/her approach in teaching the class?
Yes No

d) **Knowledge of the Subject Matter**

- 11) Does the teacher seem to know the subject matter?
Not at all To some extent Very much

- 12) Is the teacher confident when teaching? Yes No
- 13) Does the teacher answer pupils' questions satisfactorily?
Not at all To some extent Very much

e) **Lesson Organisation and Presentation**

- 14) Does the teacher show an interest in what he/she is teaching?
Not at all To some extent Very much
- 15) Does the teacher present the lessons in an organized and clear manner? Not at all To some extent Very much

f) **Class Control**

- 16) Has the teacher got good control of the class?
Not at all To some extent Very much
- 17) Is the teacher respected by the class? Yes No

g) **Motivation and Encouragement**

- 18) Does the teacher know you by name? Yes No
- 19) Does the teacher show concern about you as an individual?
Yes No
- 20) Does the teacher tell you the importance of mathematics?
Yes No
- 21) Does the teacher make the subject interesting? Yes No
- 22) Has your interest in the subject increased because of the teacher?
Yes No

23) Is the teacher available to give extra help outside the normal classes?

Yes No

h) Feedback to Pupils

24) Does the teacher give class tests regularly? Yes No

25) Does the teacher check pupils' exercise books? Yes No

i) Homework

26) Does the teacher give homework regularly? Yes No

27) Does the homework help you to understand your lessons?

Yes No

Other Questions

28) Would you like the teacher to continue teaching you? Yes No

29) What do you like about the teacher's teaching?

.....
.....

30) How would you rate your teacher's teaching? (Excellent, good, average)

.....

If you would like to elaborate on any of your answers or comment on any aspect that the researcher has overlooked, please make use of the space below.

.....
.....

Thank you very much for your cooperation

APPENDIX B

INTERVIEW GUIDE FOR HEADTEACHERS AND HEADS OF MATHEMATICS DEPARTMENT

1. How many graduate and non graduate teachers of Mathematics do you have?
2. From your observations, who performs better between graduate and non graduate teachers with regard to classroom teaching?
3. There is a strong consensus that adequate subject knowledge is necessary for teachers to be successful. Which group of teachers (graduate or non graduate) do you think have adequate subject knowledge?
4. Teachers need to acquire not only adequate knowledge of the subject, but also knowledge of how to teach it. Which group of teachers (graduate or non graduate) do you think have adequate knowledge of how to teach (methodology)?
5. What are the reasons for the differences, if any, in the classroom practice of graduate and non graduate teachers?
6. What are the strengths/weaknesses of graduate and non graduate teachers with regard to classroom teaching?
7. Which group of teachers would you prefer (graduate or non graduate)?
8. From your observations, is there a connection between the teachers' qualifications and the way they perform in the classrooms.
9. How is the pupils' performance at Grade 12 level as regards the teachers' qualifications?

APPENDIX C

INTERVIEW GUIDE FOR THE OFFICIALS IN THE MINISTRY OF EDUCATION

1. What is the Ministry of Education's policy on qualifications for high school teachers?
2. What are your views on the classroom performance of graduate teachers (degree holders) compared to non graduate teachers (diploma holders) with regard to:
 - knowledge of the subject matter?
 - Knowledge of how to teach (methodology)?
3. What are the reasons for the differences, if any, in the teaching practices of graduate and non graduate teachers?
4. What are the strengths/ weaknesses of graduate and non graduate teachers with regard to classroom teaching?
5. From your observations, is there a connection between the teachers' qualifications and the way they perform in the classrooms?

APPENDIX D

CLASSROOM OBSERVATION SCHEDULE

Scoring/Scaling Instructions

Assessment is based on the 4 point Scoring System as described below:

- 4 Very good
- 3 Good
- 2 Satisfactory
- 1 Poor

All the competence should be assessed and scored

Area of Competence	Competences	Scaling				Comments
		1	2	3	4	
Planning	Schemes/Weekly forecast/Records of work					
	Lesson Plan					
Communication / Presentation	Use of appropriate vocabulary					
	Questioning technique					
	Pupil - pupil interaction					
	Teacher – pupil interaction					
Methods	Learner Centered					
	Activity Based					
	Problem Solving					
Approaches to teaching & learning	Varying teaching method					
	Using teaching/ Learning aids					
Knowledge of Content	Explanation & Application of concepts					
	Correctness in content delivery					
	Confidence in content delivery					
Class Organization and Management	Time management					
	Motivation					
	Class organization					
	Class management					
	Special Education Needs					
Assessment	Evaluation of Teaching/ Learning					
	Generating remedial work					
Sub – Total Score						
Total Score						

Maximum Score = 21 Competences × 4 = 84

Maximum Final Score

84

Assessor's Post Observation Comments

.....

(source: University of Zambia, School of Education)

APPENDIX G

LETTER FROM THE PROVINCIAL EDUCATION OFFICER AS PERMISSION TO THE SCHOOLS VISITED.

All Correspondence should be addressed
To the Provincial Education Officer
Telephone: 610353/9



In reply please quote
No.....

PEOCB/101/1/1

REPUBLIC OF ZAMBIA

MINISTRY OF EDUCATION

OFFICE OF THE P.E.O
P.O. Box 71552
NDOLA - ZAMBIA

30th January 2006

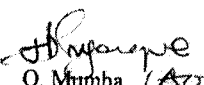
The Headteacher

RE: FIELD WORK FOR MED STUDENTS: J. MALIWATU

The above named is a student at the University of Zambia School of Education. She is taking a Masters Programme in Education which has a field work component of which she has to complete.

Kindly assist her in all possible ways.

Thanking you in advance.


O. Mumba (AOD)
Executive Officer
For/Provincial Education Officer
COPPERBELT PROVINCE