THE PERCEPTIONS OF PHYSICAL SCIENCE TEACHERS TRAINED THROUGH TWO DIFFERENT MODES OF TRAINING- (CONVENTIONAL AND OPEN AND DISTANCE LEARNING) AT DOMASI COLLEGE OF EDUCATION.

CHRISTOPHER SALAGI

Dissertation submitted to the Faculty of Education in partial fulfilment of the requirement for the award of the Degree of Master of Education in Teacher Education.

MZUZU UNIVERSITY

MAY, 2016

Dedication

I dedicate this piece of work to my mother Mrs Anne Salagi, my wife and my child Hastings. I know how much you expected from me. However, you understood what I was going through and you never complained when I was not available at the times when you needed me most. I still remember the special love and care that you showed to me during the time I was doing my school.

Declaration (Statement of Originality)

I, Christopher Salagi, declare that the organisation and writing of this dissertation is entirely my own and has been carried out at Mzuzu University under the supervision of Dr Sam Safuli. It has not been concurrently submitted for any other degree than the degree of Master of Education (Teacher Education)

All reference material contained in here has duly acknowledged.

Signed_____

(Student)

Date_____

Signed_____

(Supervisor)

Signed_____

(Coordinator)

Signed_____

(Head f Department)

Abstract

This study explored the perceptions of Physical Science teachers trained through two different modes of training- (conventional and open and distance learning) at Domasi College of Education. Challenges Physical Science teachers face in teaching Physical Science was considered. Twenty teachers from various schools in Central West Education Division were selected. Out of twenty teachers selected ten were those who were trained through conventional teacher training mode and the other ten were teachers who were trained through open and distance mode of teacher training. Head teachers and heads of science department where these teachers were teaching were also involved in this study. A questionnaire was administered to collect data. A statistical package for social science (SPSS) was used to analyse data. Examining the teachers' perceptions, their responses on the nature of science and roles of practical work in science learning, the study shows that 86% of the respondents were of the opinion that it was more challenging to teach Physical Science without any practical work.

Acknowledgements

I thank God for guiding me throughout this journey. I know that it is because of the grace of God for me to reach this final stage. I met many setbacks in my first year, but God has always on my side. My research Supervisor, Dr Sam Safuli, you really encouraged me throughout the research, you did not get tired when I was seeking your guidance.

To all participants, thank you very much for your contributions, I would not talk about dissertation without your contributions. God bless you abundantly.

Mr Banda, Office Assistant for Education Teaching Studies Department, you contributed to my Master's Degree by providing printing assistance from your office. I know I bothered you so much to print out my documents, yet you did not complain. From you I have learnt that everything comes for a specific purpose.

My mother and my late father, how could I forget you yet I saw this world because of you. Keep blessed. My brother Elvis, I know I am where I am today because of your love.

TABLE OF CONTENTS

List of Abbreviations

DCE- Domasi College of Education

CWED-Central West Education Division

ODL- Open Distance Learning

SPSS- Statistical Package for Social Sciences

SSTEP-Secondary School Teacher Education Project

CDSS-Community Day Secondary School

MOE- Ministry of Education

DTED-Department of Teacher Education and Development

CDE-Centre of Distance Education

MSCE-Malawi School Certificate of Examinations

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND OF THE STUDY

1.1.1 BRIEF HISTORY OF DOMASI COLLEGE OF EDUCATION

Domasi College of Education is a government institution that was established by the Ministry of Education in 1993 to train secondary school teachers in order to address the shortage of teachers in secondary schools in Malawi. According to Chakwera and Saiti, (2002) Domasi College became operational in 1994 with thirty-two professional staff members and seventy-two administrative and support staff members. In 1999, the College had thirty-six professional staff members. The College has the capacity to accommodate 540 students, with 180 places reserved for new intakes each year. The College comprises of three faculties namely: Faculty of Science, Faculty of Humanities and Faculty of Education. Faculty of Science has the following Departments: The Department of Biological Science, The Department of Mathematics and Computer Studies and The Department of Physical Science. Faculty of Education has Department of Teaching Studies and Department of Education foundation. Faculty of Humanities has the following Departments: The Department of Geography and Developmental Studies, Language Department, Department of History & Theology and Religious Studies and The Department of Physical Education

In addition to the training of secondary school teachers up to diploma level and degree level, Chakwera and Saiti, (2002) further state that the College offers a consultancy service and undertakes a range of research and evaluation projects. In its mission statement, the Domasi College of Education commits itself to:

- Training secondary school teachers who can make a positive contribution to national development;
- Instilling in its students attributes which are necessary for social and economic growth;
- Making education a lifelong activity.

The College was established with three broad objectives in mind and these are:

- To make a contribution towards alleviating the shortage of secondary school teachers in Malawi;
- To undertake training of secondary school teachers;
- To upgrade T2 Primary school teachers to diploma levels to teach in secondary schools.

1.1.2 DISTANCE EDUCATION AT DOMASI COLLEGE OF EDUCATION

In light of expansions in the primary education in 1994, when the government proclaimed free primary education, Domasi College of Education realized that there was a need to open up more places for training of secondary school teachers (Chimwenje, 1998). Recognizing the serious shortage of qualified teachers in the Community Day Secondary Schools (CDSSs), which have only 7% of qualified teachers, Domasi College of Education introduced an upgrading course through Open and Distance Learning for Primary school teachers deployed in the CDSSs to diploma in education. This was an innovation that was initially supported by the Commonwealth of Learning (COL), which provided technical advice and funded the training of writers for the development of the first modules. The Canadian International Agency (CIDA) then funded the implementation of Open and Distance Education program through the Secondary School Teacher Education Project (SSTEP) under the management of the Hickling Corporation.

The introduction of Open and Distance Education program paralleling the conventional diploma in education program was a bold step. Until this attempt in 1999, the training of secondary school teachers in Malawi had been done through the conventional face- to-face mode in the university colleges. Chakwera and Saiti, (2002) observe that there were fears that such a move would affect teacher quality. The fears were founded on experiences with the open and distance education program at the secondary school level which were characterized by high failure rates at national examinations.

However, with the support of cooperating partners and government, Domasi College of Education went ahead with the introduction of the open and distance education program (Chakwera and Saiti, 2002). This decision was made in the interest of the ever-increasing shortfall of teachers in the secondary education sub- sector, as both Domasi College of Education and the University of Malawi (Chancellor College) had limited capacity to

increase their face-to-face intake. Initially, it was thought that a pilot project should focus on the training of T2 primary school teachers who were teaching in secondary schools. In January 1999, there were a number of T2 teachers who were teaching in secondary schools, and it was estimated that it would take approximately five to seven years to complete training this group of teachers. To start the programme of Open and Distance Teacher training the Commonwealth of Learning (COL) funded the training of professional staff in materials production for Open and Distance Education. Materials for the first year of the program were completed by December 1999. The first cohort of 400 students was enrolled in March 2000.

The Open and Distance Education programme at Domasi College of Education, has a residential component of three to six weeks per year. This take place during school holidays between October and December, when the College is normally on recess. Then students do self-study using instructional print-based materials for forty weeks. It is envisaged that students undergoing open and distance learning complete the program over a minimum of three years and a maximum of five years (Brookhart, 2002). The open and distance teacher education programme offered by Domasi College of Education is the first of its kind at a secondary teacher education level in Malawi. It is argued that improvement of teacher quality can enhance the quality of education offered in the less privileged Community Day Secondary Schools.

Based on the findings of a comparative study of the conventional and open and distance education programs operating within the College, it has been argued that open and distance teacher education would adversely affect teacher quality. However, in spite of its potential to increase access, retain quality and reduce gender disparity. The distance education program continues to be marginalized within the dual mode operation (Woodley, 2004). It is also believed that the success of open and distance education program depends on improved perception, more commitment from all stakeholders as well as appropriate training.

TEACHING AND LEARNING OF SCIENCE

Teaching and learning should be inseparable, in that efficient learning is a criterion and product of effective teaching. In essence, learning is the goal of teaching. Someone has not taught unless someone else has learned (Bezuk et al. 2001). After a few years of teaching, many faculties realize that students learn too little of what they teach. Science teaching requires attention to both the content of the course and the process of moving students from their initial state of knowledge and understanding to the desired level. In fact, teaching is part

of a whole that comprises the teacher, the learner, the disciplinary content, the teaching/learning process, and the evaluation of both the teacher and the learner.

Shulman, (1990) observed that Science is more than a body of knowledge and a way of accumulating and validating that knowledge. It is also a social activity that incorporates certain human values. Holding curiosity, creativity, imagination, and beauty in high esteem is certainly not confined to Science—any more than skepticism and a distaste for dogmatism are. However, they are all highly characteristic of the scientific endeavor. In learning Science, students should encounter such values as part of their experience, not as empty claims. This suggests that teachers should strive to do the following:

1. Welcome Curiosity

Science, Mathematics, and Technology do not create curiosity. They accept it, foster it, incorporate it, reward it, and discipline it—and so does good science teaching (Shulman, 1990; Tobin et al., 1994). Thus, Science teachers should encourage students to raise questions about the material being studied, help them learn to frame their questions clearly enough to begin to search for answers, suggest to them productive ways for finding answers, and reward those who raise and then pursue unusual but relevant questions. In the Science classroom, wondering should be as highly valued as knowing.

2. Reward Creativity

Scientists, Mathematicians, and Engineers prize the creative use of imagination. The science classroom ought to be a place where creativity and invention—as qualities distinct from academic excellence—are recognized and encouraged (Woods, 1995). Indeed, teachers can express their own creativity by inventing activities in which students' creativity and imagination will pay off.

3. Avoid Dogmatism

Woods, (1995) argued that students should experience science as a process for extending understanding, not as unalterable truth. This means that teachers must take care not to convey the impression that they themselves or the textbooks are absolute authorities whose conclusions are always correct. By dealing with the credibility of scientific claims, the overturn of accepted scientific beliefs, and what to make out of disagreements among

scientists, science teachers can help students to balance the necessity for accepting a great deal of science on faith against the importance of keeping an open mind.

4. Promote Aesthetic Responses

Many people regard science as cold and uninteresting (Shulman, 1990). However, a scientific understanding of, say, the formation of stars, the blue of the sky, or the construction of the human heart need not displace the romantic and spiritual meanings of such phenomena. Moreover, scientific knowledge makes additional aesthetic responses possible—such as to the diffracted pattern of street lights seen through a curtain, the pulse of life in a microscopic organism, the cantilevered sweep of a bridge, the efficiency of combustion in living cells, the history in a rock or a tree, an elegant mathematical proof. Teachers of science, mathematics, and technology should establish a learning environment in which students are able to broaden and deepen their response to the beauty of ideas, methods, tools, structures, objects, and living organisms (Shulman, 1990).

Teachers should recognize that for many students, the learning of science involves feelings of severe anxiety and fear of failure (McKeachie, 1994). No doubt this results partly from what is taught and the way it is taught, and partly from attitudes picked up incidentally very early in schooling from parents and teachers who are themselves ill at ease with science and mathematics. Far from dismissing Mathematics and science anxiety as groundless, though, teachers should assure students that they understand the problem and will work with them to overcome it.

5. Build on Success

McKeachie, (1994) observed that teachers should make sure that students have some sense of success in learning Science and Mathematics, and they should deemphasize getting all the right answers as being the main criterion of success. After all, science itself, as Alfred North Whitehead said, is never quite right. Understanding anything is never absolute, and it takes many forms. Accordingly, teachers should strive to make all students—particularly the less-confident ones—aware of their progress and should encourage them to continue studying.

6. Provide Abundant Experience in Using Tools

Many students are fearful of using laboratory instruments and other tools. This fear may result primarily from the lack of opportunity many of them have to become familiar with tools in safe circumstances (McKeachie, 1994). Girls in particular suffer from the mistaken

notion that boys are naturally more adept at using tools. Starting in the earliest grades, all students should gradually gain familiarity with tools and the proper use of tools. By the time they finish school, all students should have had supervised experience with common hand tools, soldering irons, electrical meters, drafting tools, optical and sound equipment, calculators, and computers.

7. Emphasize Group Learning

A group approach has motivational value apart from the need to use team learning (as noted earlier) to promote an understanding of how science and engineering work (Lee, 2004). Overemphasis on competition among students for high grades distorts what ought to be the prime motive for studying science: to find things out. Competition among students in the science classroom may also result in many of them developing a dislike of science and losing their confidence in their ability to learn science. Group approaches, the norm in science, have many advantages in education; for instance, they help youngsters see that everyone can contribute to the attainment of common goals and that progress does not depend on everyone's having the same abilities.

Lee, (2004) also observed that children learn from their parents, siblings, other relatives, peers, and adult authority figures, as well as from teachers. They learn from movies, television, radio, records, trade books and magazines, and home computers, and from going to museums and zoos, parties, club meetings, rock concerts, and sports events, as well as from schoolbooks and the school environment in general. Science teachers should exploit the rich resources of the larger community and involve parents and other concerned adults in useful ways. It is also important for teachers to recognize that some of what their students learn informally is wrong, incomplete, poorly understood, or misunderstood, but that formal education can help students to restructure that knowledge and acquire new knowledge.

Magagula, (1998) noted that learning science, students need time for exploring, for making observations, for taking wrong turns, for testing ideas, for doing things over again; time for building things, calibrating instruments, collecting things, constructing physical and mathematical models for testing ideas; time for learning whatever mathematics, technology, and science they may need to deal with the questions at hand; time for asking around, reading, and arguing; time for wrestling with unfamiliar and counterintuitive ideas and for coming to see the advantage in thinking in a different way. Moreover, any topic in science, mathematics, or technology that is taught only in a single lesson or unit is unlikely to leave a

trace by the end of schooling (Magagula, 1998). To take hold and mature, concepts must not just be presented to students from time to time but must be offered to them periodically in different contexts and at increasing levels of sophistication.

1.2 STATEMENT OF THE PROBLEM

Although Malawi, like most developing countries, strives to improve the quality of education, the performance of learners in Physical Science at secondary school remains poor (MOE, 1999). Currently, there are two groups of teachers who graduated from Domasi College of Education. Those who were trained through Conventional teacher training mode and the other group is that under Open and Distance Education teacher training mode. There is no empirical evidence to show which of the teacher training modes programs prepares teachers better than the other. Thus, no comprehensive research has been done to find out how the perceptions of Physical Science teachers trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education.

The teaching of Physical Science continue to pose challenges (National Science Foundation, 2002). Studies done in different countries have shown that students' performance in Physical Science is generally poor, (National Science Foundation, 2002). A major factor in poor learner performance in Physical Science in Malawi was identified as lack or shortage of qualified Physical Science teachers. Ministry of Education produced figures that showed a serious shortage of qualified teachers in secondary schools, for instance in some Community Day Secondary Schools there is usually one Physical Science teaching one hundred students. It is against this background that Domasi College of Education undertook an intervention to improve the performance of such teachers by introducing Open and Distance Learning. It has been revealed by a survey which was done by (MOE, 2009) on the performance of students in Physical Science basing on the Malawi National Examination Board statistics from 2001 to 2008, the survey found that the performance of students in Physical Science at Malawi School Certificate of Education (MSCE) in Community Day Secondary Schools remains very poor as compared to Conventional Secondary Schools where the majority of teachers are qualified. It has also been argued by Chakwera and Saiti (2002) that the performance of learners in Community Day Secondary Schools has lots of factors. For instance, quality of students themselves. This study therefore seeks to find out the perceptions of Physical Science teachers trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education.

1.3 PURPOSE OF THE STUDY

This study intended to find out the perceptions of Physical Science teachers trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education.

1.4 RSEARCH OBJECTIVES

The research based on the following research objectives:

- To find out the perceptions of Physical Science teachers who were trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education.
- To find out challenges Physical Science teachers face during their training through Conventional or Open and Distance training modes at Domasi College of Education.
- To establish teacher performance in teaching Physical Science in schools from both groups of teachers who were trained through conventional and open and distance learning modes.

1.5 RESEARCH QUESTIONS

The following questions guided the study:

- What were the perceptions of Physical Science teachers trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education?
- What challenges teachers who underwent training using the two different modes of teachers training experience?

- How were Physical Science teachers trained under Conventional and Open and Distance Learning teacher training mode perform in schools?

1.6 SIGNIFICANCE OF THE STUDY

The results of this research study can be used by Administrators and Educators of Domasi College of Education who are currently offering Conventional and Open and Distance learning modes in training their teachers. Administrators and Educators will be required to evaluate and report their programs' outcomes to their respective accrediting bodies. Academic success is one outcome that Domasi College of Education Administrators are

required to report to their respective accrediting body. Therefore, it is imperative that Administrators and Educators consider student academic success when determining the efficacy of offering or continuing to offer an open and distance learning program.

The data from this research provide insight into the academic success of the two groups of students, open and distance learning and conventional or traditional on-campus learning. Domasi College of Education Administrators and Educators will also use this research in their evaluation process.

This research has a significant contribution to the open and distance learning literature. Very little research has been published that find out the perceptions of Physical Science teachers who were trained through Conventional and Open and Distance Education teacher training modes at Domasi College of Education.

The findings of this research project is important for the college Principal who is the overseer of Conventional and Open and Distance Learning modes. As a Principal must ensure that the graduating students, who have obtain their Diploma through Conventional or Open and Distance learning, are academically successful and one measure of academic success is to determine students' certification pass rates. In addition, if there are student characteristics that influence academic success, the Principal or programme Directors will consider using these potential predictors of academic success in the admission process. The College Principal, is responsible for ensuring student academic success in the Conventional and Distance learning modes.

The results of this study can also be used by the Ministry of Education Science and Technology in finding ways on how these two modes of learning can be supported in order to improve academic excellence in the Malawian Secondary Schools.

1.7 THEORETICAL FRAMEWORK

A theory is a "systematically organized body of knowledge applicable in a relatively wide variety of circumstances, especially a system of assumptions, accepted principles, and rules of procedure devised to analyse, predict, or otherwise explain the nature or behaviour of a specified set of phenomena (Brooks, & Brooks, 1999). The study will be guided by three theories namely: constructivism theory, Wedemeyer's Theory of Independent Study and Theory of Performance by Don Elger.

Constructivist learning theory holds that learning always builds upon knowledge that a student already knows; this prior knowledge is called a schema. Because all learning is filtered through pre-existing schemata, constructivists suggest that learning is more effective when a student is actively engaged in the learning process rather than attempting to receive knowledge passively (Brooks, & Brooks, 1999). A wide variety of methods claim to be based on constructivist learning theory. Most of these methods rely on some form of guided discovery where the teacher avoids most direct instruction and attempts to lead the student through questions and activities to discover, discuss, appreciate and verbalize the new knowledge. Constructivist teaching methods are based on constructivist learning theory. Constructivist learning theory says that all knowledge is constructed from a base of prior knowledge. Children are not a blank slate and knowledge cannot be imparted without the child making sense of it according to his or her current conceptions. Brooks, & Brooks, (1999) therefore resolved that children learn best when they are allowed to construct a personal understanding based on experiencing things and reflecting on those experiences.

Wedemeyer's Theory of Independent Study provides for a system of features to be provided in Open and Distance Learning related to media, accessibility, content and pace (Simonson, 2009). Further he provides six characteristics of independent study systems:

- The student and teacher are separated
- The normal processes of teaching and learning are carried out in writing or through some other medium
- Teaching is individualized
- Learning takes place through student's activity
- Learning is made convenient for the student in his or her own environment; and
- The learner takes responsibility for the pace of his or her own progress, with freedom to start and stop at any time

This clearly makes sense as Simonson points out that learners are from different backgrounds, located in different areas (possibly cultures) and learning at different time. Hence, this theory will guide the study as far as Distance learning mode is conducted to yield good results.

The study will also be guided by the Theory of Performance which develops and relates six foundational concepts to form a framework that can be used to explain performance as well

as performance improvements (Bezuk et al. 2001). To perform is to produce valued results. A performer can be an individual or a group of people engaging in a collaborative effort. Developing performance is a journey, and level of performance describes location in the journey. Current level of performance depends holistically on six components: context, level of knowledge, levels of skills, level of identity, personal factors, and fixed factors. Three axioms are proposed for effective performance improvements. These involve a performer's mindset, immersion in an enriching environment, and engagement in reflective practice. Bezuk et al. (2001) observed that wonderful accomplishments occur in day-to-day practice in higher education. A teacher magically connects with students. A researcher continually asks the quintessential questions that lead to revolutions in thinking. A dean inspires an entire college to collaborate and attain wonderful outcomes. Since worthy accomplishments are produced from high-level performances, a theory of performance is therefore, useful in many learning contexts.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

The literature is reviewed according to study objectives that included finding out the perceptions of Physical Science teachers who were trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education. Finding out challenges Physical Science teachers face during their training through Conventional or Open and Distance training modes at Domasi College of Education and also to establish teacher performance in teaching Physical Science in schools from both groups of teachers who were trained through conventional and open and distance learning modes

2.1 SIMILARITIES AND DIFFERENCES BETWEEN CONVENTION AND OPEN AND DISTANCE LEARNING

Woodley (2004) gives a very simple and clear description of Distance Learning. Woodley (2004) describes Distance Learning as the intended outcome of a Distance Education instructional process. Keegan (1990) gives an explanation of Distance Learning that helps to differentiate it from open learning. Keegan says Distance Learning is not necessarily open. However, the policy to open access to learning succeeds with an educational method that involves some element of Distance Learning. This, to some extent, provides differences between Distance Learning and open learning, expressions which are at times wrongly used in a synonymous way. Brooks & Brooks, (1999) synthesize recent definitions and define Distance Education as semi-permanent separation (place and/ or time) of learner and instructor during planned learning events. On the other hand Convention learning is defined as face to face mode of learning whereby the teacher is always at the front of learner in a classroom giving learning instruction.

Distance Education's origins may be traced to nineteenth century in England and continental Europe when colleges used postal services for providing education by means of correspondence (Cosnick, 2000). The term "distance education" has been used to describe the process of providing education where the instructor is at a distant (geographically separated) from the student (Brooks & Brooks, 1999), or any instructional arrangement in which the teacher and learner are geographically separated to an extent that requires

communication through media such as print or some other form of technology (Woodley,2004). A major concern about Distance Education continues to be its quality compared to traditional classroom education. This concern has spurred extensive research into the factors that affect the quality of these programs. In many cases, "broad" measures of the effectiveness of Distance Education have been examined. Although student achievement is one common measure of a Distance Education program's success, it is recommended that program evaluators collect and report additional data to give the most exhaustive description possible. According to Woodley (2004) much of the former research on Distance Education has focused on students' characteristics (Woodley, 2004). In Iceland, for instance, Distance Learners tend to be older than Conventional students, they are likely to be working as part-time or full time, have taken some years off from study, and live at some distance from Universities (Forzar & Kumar, 2007). Institutional research, however, is less common according to Woodley, but many issues related to institutional factors are relevant to explain student dropout or success. Among these are selective or open entry, qualifications of teaching staff, library facilities, and teaching methods and assessment.

Until recently, Dlamini, (1998) found out that African Universities have been providing University education through conventional methods such as residential or on-campus teaching. Unfortunately, due to limited financial and human resources, and physical facilities on campus, conventional methods of providing higher education have not been able to admit the large number of people seeking university education. Some of these people are adults who cannot afford to enrol on a full-time basis because of work, family responsibilities, and business commitment. They have children to feed, clothe and send to school, mortgages and insurance premiums to pay, and businesses to run (Dlamini, 1998). Despite the critical role of knowledge in economic development and growth in the global village, African Universities, like the University of Swaziland, continue to face unprecedented challenges such as high demand for university education; dwindling financial resources to maintain and expand physical infrastructure such as lecture rooms and theatres, offices, auditorium, laboratories, libraries, lecturers' house, and hostels; recruit and maintain quality personnel; and invest in new information and communication technologies (Makhubu, 1998). Yet, developing countries, like Swaziland, need highly skilled people with tertiary educational background. In Swaziland, for example, the last national survey on human resource needs indicated that 10% of the labour force fitted the

definition of educated and trained human resource and the majority of technical professionals (70%) were expatriates (University of Swaziland, 2001).

Magagula, (1998) argued that the entrance requirements and the content of both Conventional and Distance Learnings programmes in Zimbabwe were the same. The Conventional and Distance Learners were taught by the same lecturers. They wrote similar tests, assignments, and final examinations. On completion of the programmes, both Conventional and Distance Learners were awarded the same certificates, diplomas and degrees. Distance Learners who wish to transfer to Conventional were accepted and Distance Learners who wish to transfer to Convention programme were permitted as well. The research revealed that Conventional and Distance Learning programmes were the same and comparable. The only difference was the mode of delivery, and perhaps to a certain extent, the background characteristics of the Conventional and Distance Learners.

One of the interesting findings of the study done in Swaziland is that, the majority of Distance and Convention learners were females. This was not surprising considering that Conventional students' enrolment records in the Faculty of Humanities at the University of Swaziland over the years reflect female predominance. For example, during the 2000 academic year, of the 563 students who had enrolled in the Faculty of Humanities, 329 (58%) were female students (University of Swaziland, 2001). However, the picture of Conventional students' enrolment in the Faculty of Science was the opposite of that in the Faculty of Humanities. For example, in the same year, of the 294 Conventional students who had enrolled in the Bachelor of Science degree, only 109 (37%) were female. The question that arises is why? Could it be that female students shy away from Science-related programmes in high schools? Why this was the case requires further research.

The second interesting finding of the study worth to be highlighted is that Distance Learners tended to perform better in the academic studies than the Conventional learners (University of Swaziland, 2001). One would have thought that since Conventional learners had better O-Level grades, had more access to library facilities and course lecturers, had more quality time to study, and more face-to-face interaction with course lecturers than Distance Learners, they would perform better than Distance Learners, however, this was not the case (University of Swaziland, 2001).

The research which was conducted in Iceland revealed that the supply of Distance Education at Icelandic Universities has grown rapidly, with new courses being added every year. One reason is the rising use of computers and the Internet in Iceland. In 2007, ninety one percent of individuals used computers, and ninety one percent used the Internet (Statistics Iceland, 2008a). At present, seven out of eight Universities offer Distance Education of one type or another. In 2007, 17,570 students were registered at those Universities, of which 2,776 (15.8%) were registered in Distance Education (Bielenberg, 1993). The distance studies are carried out in different ways, either by means of teleconferencing equipment or via the Internet. Each University has its own variation of course organisation and the implementation of the distance programme. The Faculty of Business and Science first offered distance studies in 2000. The program was initially developed as Conventional program, and later adapted to Distance Education. This faculty had the largest number of students within the University, as well as the largest share of Distance Learners. Distance Education in the Business Administration is organised as a group activity thus it is set-up in cooperation with many learning centres throughout Iceland, where the students come to take part in lectures and discussions via interactive teleconference equipment supervised by a Lecturer. In general, Distance Learners have five meeting points, two hours at a time, for each academic course in the study. Bielenberg, (1993) added that new Distance Learners to the faculty attend campus for a few days in the beginning of the first semester. Also, they visit the University every mid-term after that for a few days for lectures, course work, discussion, etc. The teaching model in Business Administration bears significant similarity to the fourth generation of Distance Education.

However, in Malawi there are a number of institutions which are offering Open and Distance Learning one of these institutions is Domasi College of Education. From 2000 the college has been offering Diploma in Education both upgrading and pre-service courses. From 2010 the Department of Teacher Education and Development has been offering Primary School Training Programme. The Distance teacher education program offered by Domasi College of Education is the first of its kind at the secondary teacher education level in Malawi. It is an innovation within the government's broad aim of increasing access and reducing disparity in secondary education. With the introduction of this program, Domasi College has become a dual mode institution because it delivers two programs through different modes. Msiska, (2013) argued that improvement of teacher quality can enhance

the quality of education offered in the less privileged Community Day Secondary Schools. Based on the findings of a comparative study of the Conventional and Distance Education programs operating within the College, there were fears that were expressed earlier that Distance teacher education would adversely affect teacher quality. However, in spite of its potential to increase access, retain quality and reduce gender disparity, the distance education program continues to be marginalized within the dual mode operation. It is finally argued that the success of Distance Education program depends on improved perception, more commitment from all stakeholders as well as appropriate training.

It has been observed that all institutions in Malawi use hybrid of short residential face-to-face tuition followed by independent home-study model. Domasi College of Education and Mzuzu University have eight weeks of face-to-face and forty weeks of independent home-study in academic year. Department of Teacher Education and Development has nine weeks of face-to-face and thirty nine independent home study in academic year. Radio instructions of thirty minutes per week are only used with the Initial Teacher Education Programme of the DTED, (Msiska 2013). Msiska (2013) also observed that face-to-face sessions, learners receive tuition, collect study materials including continuous assessment tasks, use institutional libraries, have individualised discussions, etc. Home-study period, learners are encouraged to form study circles, hold monthly seminars and meetings, and keep a professional portfolios to ensure successful learning. Malawi College of Distance Education broadcasts radio programmes known as Tikwere on local radio station once a week for thirty minutes for Initial Teacher Education Programme only. However, Msiska (2013) added that Open and Distance Learning in Malawi is predominantly driven by basic, rudimentary and obsolete technologies in the name of computers for word processing, printing and ink duplicating machines, CD-ROMs, LCD projectors, audio/video tapes, and mobile phones for sending mass messages to learners. The radio is only used by Malawi College of Distance Education in the Initial Primary Teacher Education Programme of the Department of Teacher Education and Development. Department of Teacher Education and Development Reduced teacher-pupil ration from 1:90 in 2010 to 1:60 in 2012. Target is 1: 40 by 2017. Created 16,000 jobs for school leavers due to Distance Learning mode of primary teachers.

The study conducted by Forzar & Kumar, (2007) revealed that teacher education institutions using Open and Distance Learning delivery mode essentially have employed one model, that of blending face-to-face instructions with independent home-study during the distance learning period. Of course, there are slight modifications to this model as you go from one institution to the other. For example, Domasi College of Education has 8 weeks of residential face-to-face orientation at the College and 40 weeks of independent study at home in each academic year. During the face-to-face sessions, learners are introduced to the instructional materials in all the courses for that whole academic year. Study materials such as instructional modules, textbooks, and pamphlets are given to learners during this period. It is during the same period that lecturers give continuous assessment assignments to learners. On average, a learner collects two continuous assessment tasks for each course to be completed during the 40 weeks of independent home-study.

For Domasi College of Education, during the home-study period, learners are encouraged to form study circles, hold monthly seminars and meetings, and keep a professional portfolios to ensure successful learning (Chakwera & Saiti, 2002). A Study Circle is a small group of learners pursuing similar subjects/courses who work together on a particular learning challenge. Study circles are either informally organized or time tabled to meet on specific days, for example, once a week on every Friday. In principle, study circles are meant to encourage active learning through group problem solving, reading and discussions; give a chance to participate in and contribute to group's learning; ensure variety in the learning styles; offer an opportunity to monitor performance and progress of other participating members. Seminars and professional meetings are held monthly and usually at the Cluster Leading School and are coordinated by Field Supervisors. The purpose of these seminars and professional meetings is to discuss issues pertaining to distance learning support required, clarity of subject content, effectiveness of teaching methods employed, community projects/school-based activities, professional topics as identified by learners, among others (Msiska, 2013). A professional portfolio is a collection of documents, sample performances and any relevant materials which show the range and evolution in a learner's work and gives professional accomplishments in the life of learner (Woodley, 2005). During the home-study period, learners compile a portfolio about their studies based on specific guidelines.

2.2 CHALLENGES THAT EXIST UNDER CONVENTIONAL SYSTEM AND THOSE UNDER DISTANCE LEARNING

Woodley (2004) observed challenges and opportunities of technology based instruction in Open and Distance Learning (ODL) institutions particularly at the Open University of Tanzania (OUT) and Centre for Continuing and Distance Education (CCDE -China).Open and Distance Learning (ODL) is now becoming significant all around the world in contemporary educational systems including Tanzania and China as an alternative way to meet the huge unmet demand for educational at all levels and especially for higher education. The use of educational technologies in Distance Education has the potential in addressing most of the challenges that Distance Learners encounter in their learning which sometimes are so pressing to the extent that some Distance Learners opt to withdraw from studies and others delay to graduate (Woodley (2004). Those challenges include lack of effective communication and interaction between the Lecturers and students and delays in delivery of study materials or assignments.

In this case, technology- based instruction refers to the use of technology to facilitate effective learning. This brings some components necessary to support effective learning which are access to learning materials, development of structures that attract attention and keep the learner on task, structure that assist students in understanding the facets of the learning experience and a level of interaction among learners, and between the learner and the information to ensure a valuable learning experience (Woodley (2004). Despite notable potential of technology in Open and Distance Learning, many challenges loom concerning the use of technology and thus printed materials still dominate the teaching and learning process especially in developing countries. Like other developing countries, China and Tanzania are affected by those challenges to a greater or lesser extent despite their efforts to integrate technology in the delivery of Distance Education that means Distance Learners continue to experience some difficulties in learning.

Both China and Tanzania still make use of printed materials in facilitating Distance Learning, although they can vary in extent to which those printed materials are used within those countries (Dlaminin, 1998). Woodley (2004) reported that students of Open University of Tanzania have been using mobile phones to facilitate communication among them and regional centres staffs and to read online materials despite the hidden cost to students and small capacity of their phones to read some documents like PDF files.

However, Woodley (2004) found that despite that mobile phones are owned by majority of students and instructors, both instructors and students confirmed that those mobile phones are not used for delivery of courses and communication. This gives the impression that mobile phones facilitate communication among students themselves and regional centres, by means of administrative staff and not their instructors. Emails have been used in China to facilitate communication among students themselves and their instructors, to submit assignments to their teachers and to post e-learning materials for students to read (Lee, 2004).

EFFECTS OF FACILITIES AND PRIOR KNOWLEDGE ON OPEN AND DISTANCE LEARNING

Research done by Lincoln & Guba, (1985) has shown that Distance Education is cost-efficient and effective. There is no way Conventional Universities are going to build hostels, classrooms, lecture theatres, auditoriums, hostels, student union buildings, refectories, libraries, offices, etc. as fast as the growing demand and need for university education. However, as Cohen, (2002) assert, limitations of existing research indicate the need for further research on the effectiveness of Distance Education. Other factors found to explain Distance Learning student attrition include general college preparation, lack of guidance and information prior to enrolment, perceived lack of support from faculty, and difficulties in contacting them (Meyer, 2002). Other researchers have found that student characteristics such as computer literacy and confidence, reading ability, and time management skills play a role in successful course completion (Joyce & showers, 1995). Some educators report that students may take Distance Learning courses because they think these courses will be easier (Dlaminin, 1998). This expectation could explain the attrition of first-time Distance Learners when they realize these classes require the same amount of work demanded by Conventional courses. Researchers have also paid a substantial amount of attention to Distance Learner attrition, but less work has been done on specific remedies to improve the persistence of these students. While many possible solutions have been proposed, few have been tested empirically, and the research that does exist is not in complete agreement. Joyce & showers, (1995) make the case that persistence and drop out are influenced by many different variables, many of which affect each other. So, studies that focus on single variables can be misleading or fruitless.

Still, a common criticism of Distance Learning is the lack of personal contact and immediate instructor feedback that some students prefer (Joyce & showers, 1995). One of the most frequently stated reasons for dropout is the sense of isolation experienced by students studying Distance Learning (Woodley, 2004). In a study of a video-based Distance Learning program Joyce & showers, (1995) showed that faculty-initiated contact (via phone calls) improved course completion among freshmen students. Dlamini, (1998) recommended that faculty initiate contact earlier and more frequently with students, perhaps with an electronic bulletin board system (i.e., asynchronous discussion). Joyce & showers, (1995) has argued for more faculty-student contact in Distance Learning environments, and Woodley, (2004) described the benefits of "proactive contact." But these interactions can be time-consuming and difficult for faculty to sustain, especially with larger class sizes.

In addition to supplemental tutoring, some educators have recommended pre-course orientations to help manage students' expectations and generally prepare them for Distance Learning (Barth, 1990). These orientations can describe the specific demands of a particular course. They can also provide instruction on general study approaches and the technical skills necessary for success. For instance, Woodley (2004) showed that computer training is positively related to retention. In another example, an "online boot camp" offered by Boise State University (mandatory for first-year online students) improved completion rates by 20% to 40% per class by running students through drills with the course delivery software and allowing them to chat informally online before their course began (Brookhart, 2002).

A study which was conducted in Zimbabwe on orientations revealed that orientations can be held online or on campus. In the same study, 68% of student respondents said their on-campus orientation was conveniently scheduled, and only 7% said it was not helpful. But, given that these students have chosen Distance Learning to avoid having to come to campus, some institutions are beginning to offer their student services including orientations at a distance via technology (Brookhart, 2002). The then Vice Chancellor of the University of Zimbabwe, was requested by the Government of Zimbabwe to come up with a far reaching solution to the general shortage of places for University education. He set up what Magagula, referred to as the Vice Chancellor's Working Party on University Extension (Magagula, 1998) whose mandate was to recommend an alternative mode of study that would address the problem of shortage of places for those in need of university

education. The Working Party observed that primary and secondary education had experienced astronomical expansion since independence in 1980. This had unfortunately not been complemented by similar expansion at the university level. The Vice Chancellor's desire for a solution to the shortage of places at the University of Zimbabwe was further necessitated by the realisation that of the 7 000 "A" level graduates who had applied to enter the University of Zimbabwe in 1987, only 2 000 had been placed. The figure 7 000 did not include Diploma holders and others who qualified to enrol for university education.

The University of Zimbabwe Vice Chancellor's Working Party, buoyed by the findings of the 1985 Report of the Task Force on External Degree programmes in Kenya (Magagula, 1998), and recommended the introduction of a Distance Learning University to alleviate the problem of place shortages at the university level. The Task Force had realised that Distance Education was a systematically organised and cost-effective educational approach which is utilisable at all levels of education. This appreciation of Distance Education conforms to the description of the same given Keegan (1990) which portrays distance education as having wider access opportunities for all in need while operational and infrastructural costs are very low.

The Working Party's recommendation saw the establishment of the Centre of Distance Education (CDE) under the management of the University of Zimbabwe in 1993. As early as 1995 the Centre for Distance Education, in one of its circulars, revealed that since its inception in 1993, about 90% of its student population was made up of non-degreed primary and secondary school teachers. Of the 90%, more than 80% were non-degreed primary school teachers. In view of the ever growing popularity of the Bachelor of Educational Administration, Planning and Policy Studies degree (BEDEAPPS) degree programme among the Zimbabwean primary school teachers, it was high time that a study was carried out to determine the professional growth realised by the majority of the programme's students who happened to be primary school teachers lest those primary school teachers had already or were going to waste time studying for a professionally non-value adding qualification (Magagula, 1998).

Msiska (2013) observed that Malawi has successfully used Open and Distance Learning since 1965, except that technologies used make the delivery mode cumbersome for both tutors and learners, leading to the inimical prejudice that education and training through Open and Distance Learning is more challenging than through the residential face-to-face

mode of provision. Given that only 0.5% of the eligible schools leavers access higher education and training in Malawi, it is a must that Malawi invests in requisite infrastructure and technologies to enhance efficacy of Open and Distance and Learning as a means of broadening and increasing access to education and training.

According to Msiska (2013) the teacher education programme through Open and Distance Learning at Mzuzu University also uses blended learning. Learners start with a four-week face-to-face orientation in each semester meant to introduce them to Open and Distance Learning techniques, explain to them how to work their way around the instructional modules, including how to tackle continuous assessment assignments, how to handle self-assessment exercises at the end of each unit and the module itself, and how to approach semester-end examination questions. During face-to-face orientation period, learners are given instructional modules and have the opportunity to use the university library. All other complementary instructional materials are given to learners during the face-to face orientation, this is contrary to conventional students who stay at the college for the whole semester of sixteen weeks using the University library and meeting their respective Lecturers. Considering that the instructional module is not exhaustive in Distance Education, learners are given some money though not enough by the University to help photocopy as many reference materials as they will require during the independent home-study period. The orientation is also meant to provide an opportunity for the lecturers and students to go through materials deemed difficult for students to tackle on their own. It has also been noted by Msiska (2013) that for students studying basic sciences, Mzuzu University organises a summer school in the middle of each semester for purposes of conducting laboratory experiments though not common. This is done at the University, because Satellite Learning Centres have not yet been established.

Chakwera and Saiti, (2002) discovered that the implementation of Distance Education program at Domasi College of Education has met several challenges, especially with respect to quality assurance, human resources, and perceptions . The major concern of those who opposed the introduction of Distance Education for teachers was its potential to dilute quality. It was argued that the teachers that would be trained through this method would not match their counterparts in the Conventional program. With the experience of the Malawi College of Distance Education, these concerns were quite pertinent. In addition, the country was experiencing another poorly coordinated Malawi Integrated In-service Teacher program (MIITEP) (MOESC, 2000). In view of this concern, the college

has attempted to match its parallel programs in a number of ways: Selection, whereby the target group for the Distance Education program is Trained Primary School teachers with T2 certificates who are presently teaching in Community Day Secondary Schools. While in principle any member of this group qualifies, it was necessary to select those to be admitted following the criteria approved by the University of Malawi Senate, which is the accrediting institution. As is the case in the regular program, qualifying candidates must have four credit passes including English in their Malawi School Certificate of Examinations (MSCE, O level equivalent). A slight departure from the regular program was that the teacher learners in the Distance Education program do not need an aggregate of ten points for the two teaching subjects they choose to study, as is the case with the Conventional program. This change enables those with aggregates higher than ten points to get access to higher education. At present there are about 60% who would have been denied access to Diploma if the regular program ten-point criterion been used in the distance program.

However, Chakwera and Saiti, (2002) noted that the short-listed candidates for Distance Learning still take aptitude tests in Communication, Numerical Skills, and Reasoning Skills as their Conventional program counterparts, and those who are top- ranked get selected. All this is done to ensure that only the most deserving candidates, in terms of academic qualification, get a chance. Those who have taught in CDSS for a number of years but fail to meet the academic criteria are not considered in this program. In a way, this selection procedure perpetuates the elitist nature of our education system where experience does not really count to enter higher education. However, the selection process ensures credibility of the program as it establishes parallel links with the regular program. As a parallel program, the Distance Education curriculum is not different from the one used for the Conventional program. All course outlines of the subjects offered by the college were modularized to develop the teaching materials for the distance education program. The academic staff members who teach the courses were asked to write the modules after some training in writing for the distance mode. In this way, the Distance program satisfied conditionality for a parallel program of teaching the same curriculum.

Chakwera and Saiti, (2002) also argued that in a six- week session annually, the teacher-learners are brought together in face-to- face contact with the college staff although the period is not enough. During these sessions, lecturers attend to potentially difficult topics to help students with what is expected of them. In sciences, most of the residential time is

devoted to practical work associated with the content of the modules. These sessions help to build confidence in both the learners and the general public about the authenticity of the Diploma program offered through the Distance mode. The face-to-face contact between the Distance Learners and the academic staff members who teach the regular program is going a long way in establishing the equivalence of the two programs offered by the same institution. By the end of these sessions, teacher learners become more determined to manage the rest of the work on their own.

2.3 STUDENT TEACHER PERFORMANCE UNDER CONVENTIONAL SYSTEM AND THOSE UNDER DISTANCE LEARNING

A substantial body of research on Distance Education, conducted between 1952 and 1992, showed that Distance Education outcomes were not that different from those achieved in Conventional classrooms (Lee, 2004). In their review of Distance Education programs, Lee, (2004) reported with few exceptions, the bulk of these writings suggest that the learning outcomes of students using technology at a distance are similar to the learning outcomes of students who participate in Conventional classroom instruction. The attitudes and satisfaction of students using Distance Education also are characterized as generally positive. Most of these studies conclude that, regardless of the technology used, Distance Education courses compare favorably with classroom-based instruction and enjoy high student satisfaction. Russell (2002) also examined numerous studies and similarly reported further support that there is "no significant difference" phenomenon.

Magagula, (1998) studied the performance of Distance Learning and Convention students and found that Distance Learning students performed at the same level as Convention students and sometimes better. Lincoln and Guba (1985) studied the academic performance scores of primary teachers in Sri Lanka and Indonesia who were studying a language programme through Distance Learning and found that they performed better than their on-campus counterparts. Similarly, Cohen, et al.'s (1998) meta-analysis review of empirical studies looking at academic performance of Convention and Distance learners found that academic performance scores of Distance learners were as good as, if not better than, those achieved in Conventional classrooms.

Much of the research on student retention and attrition references Barth, (1990) argued that the model presents a series of causal factors related in a longitudinal process. Student attributes and family background affect initial levels of commitment to goals and the

institution. These in turn affect academic performance and interaction with peers and faculty, which in turn lead a student to be more or less "integrated" into the academic and social systems of the institution. Barth proposed that a student who is more integrated is more likely to persist. Subsequent research has supported Barth's theory in explaining the behaviour of traditional, classroom-based students at residential colleges, although the importance of individual causal variables has differed between studies. For example, Barth. (1990) found that frequency of contact with faculty made the largest, individual contribution to the model, while Beckmarn, Senk and Thompson (1997) found that student educational goals and those of their parents, part of attributes and background had greater influence than peer or faculty interactions.

Barth's model challenges researchers in Distance Learning to find appropriate measures for interaction. For instance, Fozar and Kumar (2007) adapted Barth's model to study "completing" and "non-completing" students at The Open Learning Institute in British Columbia. Adding ratings of telephone exchanges between students and course tutors, the adapted model explained 32% of the total variance in student drop or withdrawal decisions. Telephone interaction was positively related to persistence, although the correlation was not strong. Distance Learners typically attend college part time, and many never intend to complete an entire program of study (Bielenberg, 1993. For this reason, research on drop out in Distance Education often focuses on individual course completion rates rather than program or institutional attrition (Lincoln and Guba (1985). But, with this focus, individual course characteristics could play a greater role in withdrawal decisions.

Former studies have noted that boredom with courses, as well as dissatisfaction with requirements, could explain poorer performance of distance students as compared to local students (Fozar & Kumar, 2007; Woodley, 2004). In order to analyse students' attitudes towards courses within the faculty, the assessment of courses given by students at the end of each semester was examined. Data for four semesters were retrieved from spring 2006 to autumn 2007. In was possible to compare the overall grade between local and distance students in fifty seven courses. In thirty six instances, conventional students gave the course a higher score, while in twenty one instances Distance Learners gave the course a higher score. The difference was significant in eleven courses. Where the difference was significant, it is interesting to see that in six courses Distance students gave the course a higher score.

In a survey of students who enrolled in correspondence Business courses, Merriam (1998) tested Barth's model with Sweet's adaptation, but added variables regarding individual courses and communication with peers. Their model explained a larger percentage of total variance between completers and non-completers between 40% and 58%, depending on the course. Other significant factors included prior experience with Distance Learning and reasons for taking the course. Nevertheless, others have questioned the validity of Barth's model when applied to Distance Learners and some have offered alternative models (Meyer, 2002). Distance Learning students are typically older, attend school part-time, and often juggle a full-time job along with family responsibilities (Merriam (1998). This can serve to increase the importance of factors external to the academic environment. In fact, Meyer, (2002), found "lack of time" to be the single most commonly cited reason for dropping out offered by Distance Learners. But Cosmic, (2000), using personal interviews, also found "deeper" reasons for withdrawal, such as poor direction and feedback on assignments, problems with time management, and students trying to accomplish too much.

However, Magagula, (1998) reviewed studies that compared Distance Learning technologies with traditional forms of face-to-face learning or contrasted the outputs of one Distance Learning medium over another. They found that students taking courses through instructional television achieved at the same level as students taking courses through conventional modes. Likewise, classroom achievement for students learning through interactive Distance modes was equivalent to achievement of students in conventional classrooms. The question that arose was why? Keegan (1990) speculate that Distance Learners tend to perform better than conventional learners because the printed materials are well written, packaged, and have clear objectives. Second, the content and concepts are properly sequenced in small chunks, starting with simple concepts to more complex concepts. In addition, Distance Learners receive more direct learner support services through face-to-face tutorials than Convention students. One of the key factors for comparative advantage in the globalized economy is investment in human capital and creating the critical mass of highly skilled human resource, (Makhuba, 1998). Africa is lacking in this regard. To begin to address this challenge, institutions of higher learning have no choice but to invest in Distance Learning and embrace information and communication technologies. The study, like others, seems to indicate that Distance

Learners are as good as Conventional Learners, if not better, so long as they are provided with appropriate support services.

Research offers many interrelated factors that influence Distance Learner attrition and persistence Kosnick, (2000). Most of these such as illness, academic background, and job demands are out of the institution's control. With that in mind, there is a need to focus on controllable factors such as student skills and expectations as well as specific responses to those factors such as supplemental tutoring and pre-course orientations. Of course, one cannot presume that students will use these support services if they are offered. For instance, Kosnick, (2000) makes a case for two-way communication as one of the "constituent elements" in an effective Distance Learning program. However, the use of these services has often disappointed educators. "Communication initiated by students and based on questions that they raise and want further comment on along with suggestions for further reading, implementation, and practice, would seem very desirable. However, few Distance Learning institutions have managed to inspire more than a minority of their students to make use of this facility."

Some experts explain this phenomenon by arguing that students who succeed and persist in Distance Learning are by their nature more independent and self-regulating (Bielenberg, 1993). In their quest for education "anytime and anywhere," they may be willing to forgo or even desire less interaction with teachers and fellow students. But, not all students who prefer the convenience of Distance Learning courses are independent learners who work well in isolation. Some may require the assistance provided by the support services. From time immemorial, teacher-lecturing to student-listening was the primary mode of Convention academic education. The delivery system for higher education has been a classroom setting with a Professor giving a lecture and students listening and writing notes. Interaction between the Professor and student has been viewed as an essential learning element within this arrangement (Bielenberg, 1993), often referred to as the "sage on the stage."

Technological improvements such as printing machines, postal services, telephone, radio, television, and more recently the Internet, have been a driving force yielding new delivery methods and platforms. These new learning methods used to deliver Distance Education are proliferating exponentially in various learning programs, and leading some experts to predict that the "residential based model," in the form of students attending classes at

prearranged times and locations, will disappear in the near future (Keegan & MaTaggart, 1990). Although an expensive option today, video conferencing may create a virtual feeling that we are "back in the classroom." Some forms of Distance Learning has progressed in concept and practice from an "anywhere," to an "anytime," to an "any pace" delivery method.

Bielenberg, (1993) added that academic and training communities have been continuously examining, assessing, criticizing, hallowing, and demonizing these new delivery methods as they appear. Without doubt, Distance Education is of the highest relevance and importance to educators, students, and all other stakeholders. It is changing the physical of academic establishments. Students can now learn from the comfort of their homes or offices with no need to commute to campuses. Cutting-edge data are easily accessible on compact discs (CDs), portable personal computers (PCs), and have taken the place of instantly obsolete books. Online classrooms and libraries are replacing traditional campus facilities. Rather than requiring students to travel to a specific physical classroom or library, the Internet has facilitated the delivery of nearly unlimited learning resources to students.

The provision of Open and Distance Education aimed at equipping practising primary school teachers in Zimbabwe is a phenomenon that had not been experienced before the establishment of the Zimbabwe Open University (ZOU) (Cohen, 1998). The coming on board of the ZOU which started as a centre for Distance Education (CDE) and later evolved into a University College of Distance Education initially offered a Bachelor of Educational Administration, Planning and Policy Studies degree (BEDEAPPS) to thousands of non-degreed primary school teachers. This then became the institution's first attempt to provide a teacher education-related qualification through open and distance education. The interest, the programme generated among many non-degreed teachers, especially primary school teachers, was quite overwhelming. This overwhelming response by primary school teachers logically called for an investigation to determine professional gains they accrued by studying for the BEDEAPPS degree programme. That became the basis of the investigation which revealed that Conventional mode of learning is almost the same as Distance Learning as far as student teacher performance is concerned (Magagula, 1998). This was a case study on the BEDEAPPS degree programme offered by the Zimbabwe Open University through the Open and Distance Learning strategy with

emphasis on its suitability as a further teacher education programme for primary school teachers in Zimbabwe.

Magagula, (1998) observed that before the establishment of the Centre for Distance Education (CDE), all non-degreed teachers who wanted to obtain degrees had to compete for a few places that were offered by the University of Zimbabwe's Faculty of Education. Those offered places had to apply for study leave since they had to use the Conventional Learning strategy that is characteristic of most Conventional Universities. Two outstanding characteristics of this kind of further teacher education strategy were extremely limited numbers of students that could be absorbed annually and their inconveniencing removal from their places of work for the duration of their studies. This meant that Zimbabwe had to come up with a strategy that would increase numbers and retain persons at their work places for the convenience of the teachers and their pupils.

As is the case with the conventional program at Domasi College of Education, Chakwera and Saiti, (2002) noted that student performance is evaluated at two stages namely: continuous assessment and final evaluation that is composed of End of Course examinations. The continuous assessment (formative) comprises written assignments and short tests administered during a residential session. But the end- of course examinations (summative) are administered twice annually, in April and July/ August, parallel to end of semester examinations in the conventional program. These end of- course examinations are prepared by the academic staff of Domasi College at the same time they set papers for their Convention students to ensure comparable standards. The same External Examiners are used to moderate re-score sampled scripts from the two tests to ensure that they are of comparable standards. While using the same test for the two groups would be ideal, it has not been tried because of logistical constraints. It is not possible to have the two groups together in the college to take examinations because of numbers. And to establish several centres at the same time would raise test administration costs to unbearable levels. The College is, however, satisfied that the tests are parallel and their results are comparable.

An internal study that compared performance of the two groups in various subjects revealed that the Distance teacher- learners performed just as well as conventional students (MoE, 2005) and, in some cases, they did better than the regular students. Two programmes were compared on the two semester assessments for the first cohort of the program at Domasi College of Education and it was revealed that a comparison test on the

first and second semester results were conducted. The whole group consisted of 294 students where 102 were females and 192 were males in the Distance program and of 175 students thirty 39 were females and 136 were males in the Conventional program. A t-test analysis was performed on the grades of the first and second semesters of 2001/2002 academic year in the courses of the following subjects: Biology, Human Ecology, Chemistry, Physics and Mathematics in the science program and History, Geography, Theology & Religious Studies, Linguistics, English and Education in the humanities program. The average for each course were compared at p=0.5. This comparison was done to find out whether there is a difference between the performances of the two groups. The results for the first semester show that 60% of the courses are not significantly different at the 0.05 alpha level. But in 40 % of the differences between the two groups are significant.

2.4 CONCLUSION

From the foregoing literature however, it has been clear that no study had been conducted to evaluate the perceptions of teachers who were trained through Conventional and Open and Distance Learning (ODL) at Domasi College of Education. Therefore, a research gap was evident in investigating the perceptions of teachers who were trained through Conventional and Open and Distance Learning (ODL) as far as teaching of Physical Science in schools is concerned. This study investigated and provided information to close the above mentioned research gaps.

CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

This chapter presents the methodology that was used in the study. This includes research design, area of study and target population, sampling techniques, data collection methods, data quality control, ethical issues and data analysis.

3.1 STUDY POPULATION

The study was carried out among selected Physical Science teachers in Central West Education Division who obtained their Diploma in Education through Conventional and Open and Distance training modes at Domasi College of Education.

3.2 SAMPLE SIZE

Overall 20 respondents participated in the study. 10 respondents were teachers who obtained their Diploma in Education through Conventional mode of learning. Ten respondents were teachers who obtained their Diploma through Open and Distance Learning.

SAMPLE SIZE FOR STUDENT TEACHERS SUMMARY

CONVENTION TEACHERS	OPEN AND DISTANCE LEARNING TEACHERS
10	10

3.3 SAMPLING TECHNIQUES

The sampling technique describes how population sample was selected in the study. Non probability sampling was used to select respondents. A total of 20 respondents participated. Their selection was done by Judgmental sampling or Purposive sampling. Specific attention was paid to inclusion of both male and female teachers in the study sample. Special attention was on inclusion selection thus equal number of male and female Physical Science teachers who were trained through Conventional and Open and Distance learning modes.

3.4 DATA COLLECTION METHODS

A number of tools were used during collection of data. Both primary and secondary data was collected and the major tools which were used include:

- A Self-administered questionnaire

A self-administered questionnaire was the major instrument that was used in data collection. Questionnaires were administered to selected Physical Science teachers. This helped to gather information regarding the perceptions of Physical Science teachers trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education. The questionnaires comprised of both closed and open-ended questions formulated by the researcher.

- Key informant Interview guide

Key informant interview guide was designed to capture qualitative information. The key informants for in depth interviews was conducted to selected Physical Science teachers. This was purposely intended to get more information about the perceptions of Physical Science teachers trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education.

3.5 DATA ANALYSIS

Data from the semi-structured interviews was entered in a computer and Statistical Package for Social Scientists (SPSS) programme was used to analyse it. The percentage number of respondents according to variables such as; sex, age, and so on was computed and presented using tables and analysed. Qualitative data was organized according to themes identified from research questions and analysed using content analysis. Data from focus interviews which was qualitative was organized, interpreted and presented and discussed. This data from the interviews was organised by putting the data which has similar opinion together and interpreted accordingly depending on the data gathered.

3.6 DATA QUALITY CONTROL

Validity and reliability of the research instrument was measured as follows:

3.6.1 VALIDITY OF INSTRUMENTS

Validity is the extent to which the instruments which were used during the study measure the issues they are intended to measure (Woodley, 2004). To ensure validity of instruments, the

instruments were developed under close guidance of the supervisor. After the questions were designed, they were pre-tested to one of the teachers in the sample. This helped to identify ambiguous questions in the instruments and be able to realign them to the objectives.

3.6.2 RELIABILITY

Reliability is the extent to which the measuring instruments produce consistent scores when the same groups of individuals are repeatedly measured under the same conditions (Woodley, 2004). The study administered one type of questionnaire to teachers and using Cronbach reliability test, Alpha values of 0.753 were attained implying that the tool was suitable for evaluating the perception of Physical Science teachers who were trained through Conventional and Open and Distance Learning at Domasi College of Education. Besides, most authorities accept the minimum alpha value of 0.5.

3.7 ETHICAL CONSIDERATIONS

At the onset of data collection, the researcher sought permission from The Education Division Manager for the West Education Division and also the researcher asked permission to the Head teachers where Physical Science teachers who were trained through Conventional and Open and Distance Learning were teaching. In addition, each questionnaire contained an opening introductory letter requesting for the respondents cooperation in providing the required information for the study. The respondents were further assured of confidentiality of the information provided and that the study findings would be used for academic purposes only. Respondents were also assured of their personal protection and that they had authority to refuse or accept to be interviewed.

CHAPTER 4

4.0 DATA PRESENTATION

4.1 INTRODUCTION

The role of teachers in achieving quality teaching and learning of Physical Science and the scientific literacy of students is of significant importance to science education. In this Chapter the researcher tries to present the responses he got from the two groups of teachers who were trained using different modes of teacher training- (Conventional and Open and Distance Learning) at Domasi College of Education. The chapter also got responses from the head of science department and head teachers perception on the two groups of teachers.

This Chapter is divided into sections according to questionnaire. The first section provides demographic information about the schools and teachers who participated in the study. The second section presents data collected from Physical Science teachers, heads of science department and head teachers which highlighted perceptions of Physical Science teachers trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education. The teacher questionnaire looked at the resources needed for effective science teaching and learning, factors that inhibit effective teaching and learning of science and provides teachers views about improving teaching and learning of science. The same section provides views of heads of science department and head teachers perceptions of Physical Science teachers trained through two different modes of training at Domasi College of Education.

4.2 DEMOGRAPHIC DATA

The population sample of 20 Physical Science teachers was asked to complete questionnaires. All the 20 respondents returned completed questionnaires.

The breakdown of the 20 population sample is as shown in the Table 4.1 below.

Table 4.1

Percentage of science teachers in CDSSs and boarding schools in the study (n=20) Category	N	Per cent
CDSS	16	80
Boarding Schools	4	20
Total	20	100.0

Data in Table 4.1 reveals that the majority of Physical Science teachers who participated in this study were from CDSS (80%) with 20% from boarding secondary schools. The sample of 20 Physical Science teachers comprised 13 males (65%) and 7 females (35%). The age distribution of teachers is summarised in Table 4.2.

Table 4.2: Age distribution of teachers according to teacher training mode

AGE	TEACHER TRAINING MODE	
	Conventional	Open and Distance Learning
≤ 39 years old	8 (80%)	3 (30%)
> 39 years old	2 (20%)	7 (70%)

Note: Numbers in parentheses indicate column percentages.

The first research question on demographics addressed the differences in characteristics of the two groups teachers who were trained through open and distance learning and through conventional method. The two characteristics that were studied in this research project were gender and age.

There was no significant difference between the number of males and females who attained their Diploma in Education through each program, open and distance learning and conventional mode of teacher training. Teachers attained their teaching qualification through conventional program was comprised of 50% females and 50% males, while the distance programs were comprised of 37.5% females and 62.5% males.

The second characteristic was age. The respondents were grouped into 2 age groups. Those teachers who were 39 years and below and those who were older than 39 years. Table 4.2 shows the Chi-square value for this information. The analysis of the differences of age

between the two groups was statistically significant. The table above shows that many teachers who obtained their Diploma in Education through ODL were older than teachers who attained their Diploma in Education through Conventional mode of teacher training.

Table 4.2 shows that 80% of teachers who were trained through conventional mode of teacher training were between 20 and 39 years while those who were trained through open and distance learning 70% of teachers were above 39 years.

The summary of teachers' years of teaching experience is presented in Table 4.3

Table 4.3

Teachers' years of teaching experience (n=20)

Category	Conventional trained teachers	Open and distance trained teachers
3 years and below	4	0
4-10 years	4	3
Above 10 years	1	6

Data in Table 4.3 indicate that nearly two-thirds of teachers who were trained through open and distance learning had more than 10 years of teaching experience while the majority of teachers who were trained through conventional mode of training had less than 10 years teaching experience.

On the challenges Physical Science teachers face in teaching the subject (Physical Science)

The study reveals that 90% of teachers supported hands-on learning; many were concerned with their limited backgrounds and experience in teaching Physical Science. They indicated that the major obstacle to their teaching was their lack of experience more specifically teaching topics that involve hands on experience. The majority of teachers who had these experiences were those trained though open and distance learning. Most of these teachers needed assistance on the utilization of some instructional materials needed for some teaching.

When asked how their teaching experience help in teaching Physical Science?

Teacher A *indicated that science teachers construct ideas from their experience about how to teach Physical Science. Teachers entering Science Teaching Methods Courses also bring ideas about how to teach Physical Sciences as well as about how to use several teaching resources, namely teaching laboratory practical. A Science teacher has the knowledge to construct new ideas from previous experience. This helps him/her to teach very effectively.*

Another teacher who the researcher labelled as ***Teacher B*** *indicated that gaining experience with the hands-on approach is critical to feeling comfortable with teaching of science. Ideally, experience would be obtained before exposing students to hands-on lessons. One way to continue to be introduced to hands-on ideas is by annually attending SMASSE training where a lot of teachers gain more knowledge from fellow teachers who are more experienced in teaching Science. It was also revealed by teacher B that during SMASSE inset a lot of ideas are shared during their presentations and different activities are included and are often presented in such a way that they were participating actively, thereby gaining a lot of knowledge as far as teaching science is concerned. Additionally teacher B indicated that they acquired more knowledge through departmental school based inset, peer coaching, and just diving in with your students using the multitude of resources available focusing on hands-on activities.*

When asked about on how they handle hands-on learning in Physical Science the following teachers indicated the following ideas

Teachers A *revealed that he prepare himself to teach hands-on science by participating with other teachers under the guidance of experts in the area of science methods, curriculum, and resources. Such preparation, accompanied by some practical experience teaching science is often the most effective way to gain proficiency with hands-on science in the shortest time.*

However ***teacher B*** *revealed that the most effective way to revolutionize the teaching of Physical Science is to involve a complete school staff in the process of curriculum reform so that they have investment in the course of study and support from the other teachers in the school. The staff should make a commitment to hands-on methods and seek the resources and guidance needed to bring the curriculum objectives to reality. The school should provide the teaching materials and the in-service training necessary to implement the program. Periodic*

staff meetings to share successes and troubleshoot problems should be a regular part of the business of education. A recognition of the fact that a vital science program will require continual in-service and updating is essential. The job is never done – Physical Science is dynamic.

***Teacher C** argued that to become a quality hands-on, material based, inquiry approach, student-cantered teacher by becoming that kind of learner! Roll up your sleeves, dig in, get your hands-on, and allow your childlike curiosity to support your wonder and investigations into things that truly interest you; especially the most common events and things in everyday life. Do not let habituation set in! Push yourself to always be searching, testing, open-minded, and a critical thinker. Do not be afraid to invent ideas based on real evidence and have your own unique ways of seeing things. Treat knowledge as tools to continue to grow ever more profound ideas and not as a final answer or as a weapon to squash other's equally profound ideas.*

***Teacher D** concurred with others by indicating that teachers should strive to value the serious thinking of your students and encourage dialogue to discuss different ways of explaining things. Encourage the growth of ideas by focusing on new learning opportunities presented by each new idea. Also there is a need of inviting students to join teachers in learning adventures as active and confident colleagues in learning.*

When asked how teachers gain experience in hands-on approach both groups of teachers gave very interesting responses.

Teachers who were trained through ODL

*One of the teachers labelled **Teacher A** indicated the need for the experience teachers to observe other teachers using hands on approach. The other teacher labelled B indicated the need for inexperience teachers to talk to the experienced teachers on the approach. The third teacher indicated the need to observe learners as they were working*

Those who were trained conventionally indicated that teachers gain experience on the hands-on approach by attending departmental workshops and in-service activities that promote the use of hands-on.

The other conventionally trained teacher indicated that practicing teachers gained experience with hands-on methods by using hands-on science lessons in their classrooms with their students. Teachers prepared themselves to teach hands-on science as individuals - without guidance. Many resources were within the financial reach of teachers and they gather their own materials and plunged in. This avenue was not the most productive, but worked

From the above responses it was clearly shows that teaching experience really had an impact on how to deliver effectively. Teachers who had vast experience were able to teach effectively as compared to teachers whose teaching experience was limited. However experience should go together with mastery of content.

When asked about the factors which contributed to the difficulties of teaching and learning of Physical Science in schools

It was clearly shown that 95% of teachers who were trained through both conventional and open and distance learning indicated the following as factors that contributed to the difficulties of teaching and learning of Physical Science.

1. Lack of relevant instructional materials
2. The subject's wide coverage
3. Lack of suitable textbooks
4. Shortage of professionally trained teachers
5. Too much work load on the teachers
6. Students' lack of interest
7. Lack of Science laboratories in the CDSSs
8. Most of the concepts were difficulty for teachers to teach effectively because they did not understand them.
9. Lack of in-service programmes

Although the majority of teachers who were trained through open and distance learning reported that difficulties in teaching science were because they had no vast experience in conducting laboratory sessions since during their college time they were not conducting frequent laboratory sessions hence facing problems to teach Physical Science. This also reveals that the majority of teachers who were trained through open and distance faced

challenges in conducting laboratory practicals. This shows that mode of teacher training contributed to teacher performance in schools.

When asked about the challenges teachers experienced during the first year of teaching Physical Science in their schools

It has been argued that new teachers bring varying backgrounds, motivations and experiences levels to their initial teaching experience. Their view of the profession and their role in it was shaped by their motivations, as well as by the context in which they begin their work. Beginning teachers enter classrooms today with high expectations for themselves and for their students. Beginning teachers are traditionally expected to assume the same responsibilities as experienced teachers, and are often assigned the most difficult and challenging students, those that they are more experienced colleagues do not want to teach. There is no staging or levels of responsibilities as there is in many other professions. It should not be a surprise that new teachers often speak of just trying to survive during their initial years in the classroom.

The following were some of the answers from the respondents both teachers who were trained through open and distance learning and conventional mode of teacher training.

*One of the teacher who was labelled **teacher A** said that first year of teaching was too stressful. He was not given a syllabus or materials to work with. There were too many students and not enough desks or books. "I really didn't know what I was expected to teach".*

Another teacher labelled B indicated that he was hired late, after school started. He missed the early orientation because he was the last one hired, I got students taken out of other classes. They really didn't want to leave their friends.

Another teacher indicated that he knew how important it was for his students to do well in class. He post expected standards on the board and they talked about them. He told them what they were supposed to be learning in each lesson. He wanted his students to do well.

Another teacher indicated that her first-year mentor was incredible. She showed her how to set up the laboratory practical, classroom, develop lessons, and gave her many teaching tips. When she was getting ready for the first class, she came in and helped her get everything in order. She has become her real friend.

Most of these new teachers expected that they would be successful. Many were highly motivated and felt they would positively influence student learning. Others were less certain about teaching as a career choice. However, all of the new teachers would help to shape the educational future of our nation. Together they would directly influence the learning of many students over the course of their careers.

When asked about the support the teachers receive in their first year of teaching

The majority of teachers who were trained through both groups mentioned the following as the support they were given professionally in their first years of teaching physical science.

1. Personal and Emotional Support

Their first years of teaching were stressful as beginning teachers face the emotional challenges of adapting to a new workplace and new colleagues from simply figuring out where things were located to learning policies and procedures, finding kindred spirits, and, generally speaking, getting the lay of the land. Fatigue is another constant for new teachers. "Free" time during their official workday is scarce and planning and other preparation invariably spills over into their personal time. The effort of planning every lesson from scratch, teaching with unfamiliar materials, and, often, teaching at an unfamiliar grade level drains even the most energetic new teachers. Compounding all this is the inherent isolation of individual teachers sequestered in their individual classrooms.

2. Task- or Problem-Focused Support

Beginning teachers mentioned about the need to help them know how to approach new tasks and in solving specific problems that cropped up in their teaching. They needed support even for the tasks they were undertaking for the first time such as developing lesson plans, planning what to say at back-to-school night, deciding what goes in the grade book to determine grades at the end of twelve weeks. Despite the older teachers or experienced teachers indicate that they could help the beginning teachers, but they never provided such help.

When asked about how the teacher should prepare and conduct laboratory class sessions, one teacher said a science teacher must seek to attain certain objectives during a particular practical lesson. So it is very important for the teacher to have a focus. Teaching and learning of Physical Science to be meaningful there is a need to conduct laboratory practical.

Teacher labelled A indicated that a teacher should

- *Know the material to be covered in the lesson, prepare questions to be presented to the students.*
- *The teacher must familiarise him/herself with the laboratory and what is in the laboratory.*

The other teacher labelled **B** mentioned that

- *The need for the teacher to formulate the objectives for the lab sessions very clear for the learners to know*
- *The teacher must be informed what they are expected to come up with at the end of the lab session*

Another teacher labelled **C** indicated that

- *The teacher should keep introductory comments succinct, indicate how the lab relates to the previous lessons, and what the procedure entails.*
- *Each lab session should start with explanations. Present any theory that needs to be discussed, explain the experiment, and take questions.*
- *Anticipate problems and practice explaining procedures or difficult theories.*

Another teacher further indicated that

- *The teacher should give himself time to set up the lab. A teacher needed to arrive at school early and make sure that the lab is properly set up for the day's experiment.*
- *Clearly communicate course policies to the students. Outline your grading methods, the course requirements, and how students should write and submit their results.*
- *Review safety policies and explain how to use and care for laboratory equipment.*

From the responses it showed that most Physical Science teachers especially those who went through conventional teacher training mode knew how to prepare for laboratory practical but they revealed that sometimes they can prepare for a laboratory practical but due to lack of expertise and resources they ended up being unsuccessful. Despite the fact that practical work

is a unique source of teaching and learning in Physical Science, it was widely acknowledged that laboratory equipment are lacking in most schools. For instance, 50% of teachers concluded that practical work was difficult to organize as a result of lack of apparatus. Some of the obstacles militating against effective science practical include lack of funds and teachers inability to improvise. Also 90% of teachers reported lack of college experience in addition to lack of equipment for laboratory work contributes to practical failure especially those who were trained through open and distance mode of teacher training.

When asked if one had professional satisfaction of teaching?

In general, teachers chose teaching over other options as a desirable professional. While some complained of lack of monetary compensation and opportunity for advancement, these deterrents were usually overlooked because teachers seek other rewards and satisfactions.

Each year teachers are produced a certain number of newly minted professionals. It was reported that due to the particular circumstances, the annual influx of newcomers to the teaching profession needs to rise dramatically in the coming decade more especially in Physical Science. Physical Science teachers were hired in large numbers in the 1990 to teach a booming student population, these veterans have started reaching the natural end of their careers. But either way, many schools throughout the country can look forward to a significant influx of new teachers in the coming years with the coming of private universities a situation that presents both a challenge and an opportunity. From the student responses it shows that the majority of teachers who were trained through open and distance mode of teacher training were recruited as temporary teachers during time of free primary education 1994 as the majority of them were jobless. Then after some time they were assigned to go and teach in CDSSs, it is when they thought of upgrading themselves through in enrolling as open and distance learners and Domasi College of Education.

The challenge, of course, is to give these newcomers the kind of support needed if they are not only to remain in the profession, but to develop into the kinds of educators able to teach to today's high standards. The definition of effective teaching has changed greatly in recent years. Today's teachers are expected to help the most diverse student population in our history meet the highest education standards we have ever set. And, in the process, they are expected to serve all students equally well.

The Level of Job Satisfaction of the Science Teachers based on factors related to work and working conditions. The researcher sought information on the level of job satisfaction of the science teachers based on factors related to work and working conditions. First the research question sought information from teachers whether they would leave teaching if they acquired another job. This data is presented in table 4.5.

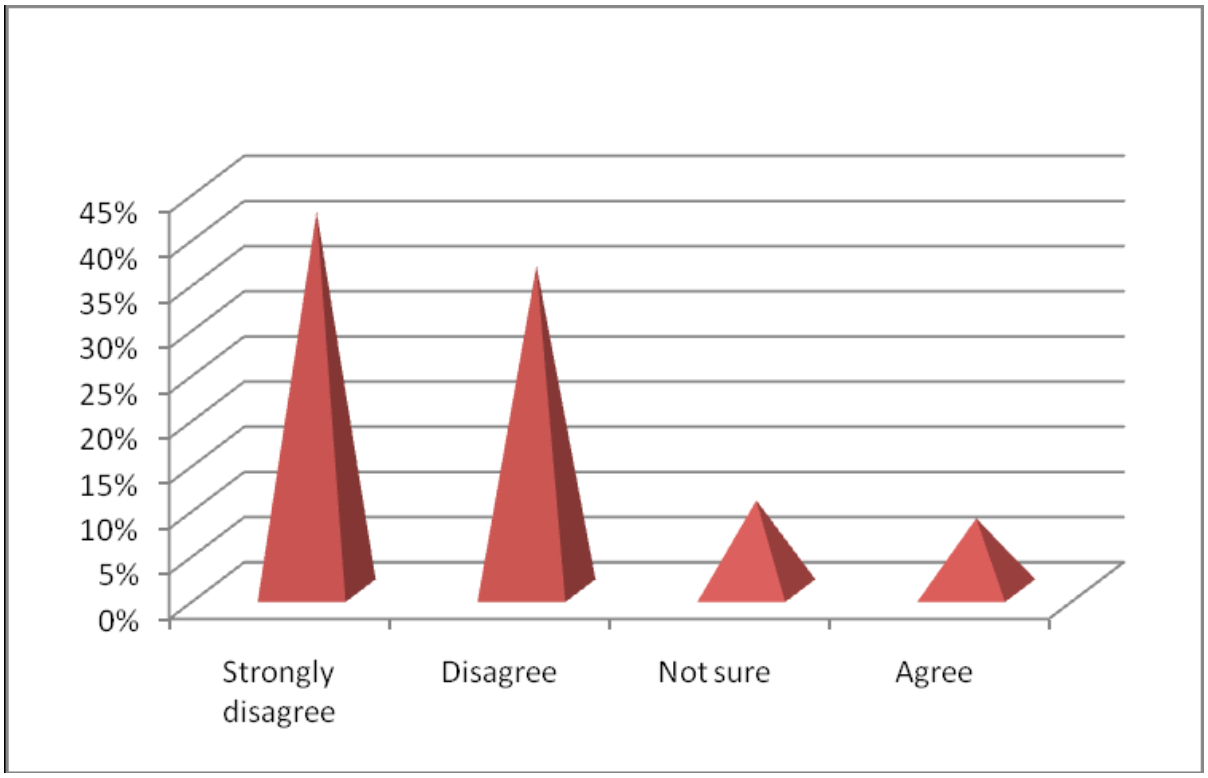


Figure 4.5 Teachers' Responses on Job Satisfaction

According to Table 4.5, majority of teachers (88%) felt that they would leave teaching if given an opportunity to serve other departments within the formal sector. However, only 12% of teachers indicated that they would not leave teaching. This could imply that majority of Physical Science teachers were dissatisfied with teaching profession. The issue of poor pay in the teaching profession as noted later in this study was one of the major factors which explained this. These findings concur with Karen and Myers (2005) who argued that one of the major reasons for teachers exit from the profession was lack of job satisfaction and poor remuneration. Njoka (2002) in her study on factors that caused dissatisfaction among HODs in Embu District indicated poor pay as being the most important job factor towards motivation and job satisfaction of HODs. While attrition could be described as leaving the workforce for any number of reasons (e.g., retirement, moving to a new location, contract not

renewed), those in education often link attrition to teachers who were leaving the work force in their first five years for greener pastures (Ingersoll ,2001). Further, when asked if they were satisfied with teaching, majority of teachers indicated that they were not. The information was presented in Figure 4.5.

Figure 4.5 reveals that only 12% of teachers were satisfied with teaching, further confirming that teaching was unpopular among Physical Science teachers. This may impact negatively on teacher's productivity. Umme (1999) concurs with this view and argues that a dissatisfied teacher can become irritable and may create tensions which can have negative influence on the students' learning process and it consequently affects their academic growth.

During data collection, teachers were asked how Physical Science lessons were being handled in the schools.

The following was what was indicated whenever learning becomes abstract or passive, whenever key skills were not explicitly demonstrated and practiced, whenever the mastery student felt unable to display a high degree of competence on work assigned, whenever the work of the classroom becomes isolated from the physical world, practical applications, real-world relevance, or clear expectations, some Mastery learners' motivation will lag. As they become less motivated or more uncertain, Physical Science teacher revealed that learners were likely to:

1. Withdraw from classroom participation to conceal their perceived lack of competence.
2. Produce minimal work—just enough to get by—because they no longer felt that they could be successful or that the content of the curriculum will be useful to them in the real world.

As long as learning was focused on demonstration and frequent practice more especially in Physical Science, learners would display a high degree of attention and would be able to focus for long periods on the task at hand. Under these conditions, their ability to focus can be extraordinary. However, the longer they were asked to be passive, the more abstract and conceptual the content, the more disconnected instruction is from something they can do, the greater the difficulty learners will have sustaining attention.

The following were also responses on how *Physical Science lessons were being handled in the schools.* Possible Solutions that were mentioned by 98% of both groups Physical Science teachers indicated that

- Begin lessons by presenting both the long-term goal and the short-term objective
- Another teacher indicated that there is a need to strengthen the connection of tasks assigned to applications in the real world, especially to careers.
- Provide input in short bursts with frequent stopping points for practice.
- Use visual organizers to provide an overview of the long-term task.
- Find ways to measure progress and record the results visually with the learner.

However research questions to head teachers and head of science department on w*hat kind of support the Physical Science teachers needed from the school administration.*

The head teachers and head of science department indicated that Physical Science teachers mostly needed teaching and learning resources for them to work effectively. However, the majority of head teachers more especially from the CDSSs revealed that they fail to meet all demands of Physical Science teachers due to limited funds as most of these schools are not cost centres.

When head teachers and heads of science department were asked if Physical Science teachers were provided with some form of continuing education as staff development.

This study revealed that 90% of the head teachers mentioned that the teacher is the most important tool in any educational endeavour. But then, they continued saying that, the teacher has to be helped because there is so much he or she has to catch up, and this is especially true for science teachers. Citing one priority programme of Ministry of Education of SMASSE whereby teachers were expected to attend SMASSE inset where they were likely to learn different skills and teaching approaches, how to handle some topics in Physical Science. This programme is done once in a year initially it was supported by Japanese government and Ministry of Education promised to continue this programme. Some head teachers also mentioned of departmental inset where teachers within a school help each other on how to handle some topics.

When head teachers and heads of science department were asked to find out what the heads know about the teachers on in-service training.

Most head teachers pointed out that although teachers perceptions and attitudes toward in-service training could be taken as both an input and output indicator of quality. Positive perceptions and attitudes make for successful programs. If measured before or at the beginning of a training program, then they can be quality indicators of input. Measured at the end of the training, they could be indicators of output or effects of the program. The difference between post training and pre-training scores is definitely an indicator of outcome of the training. Head teachers also revealed that the in-set training mostly aims at three indicators related directly to desired characteristics of trainers. They are:

1. Subject mastery,
2. Verbal ability, and
3. Attitudes and values.

Another instrument by which the trainers were rated by the trainees is one which assessed them in regard to:

1. Mastery of the subject matter,
2. Motivational skills,
3. Evaluation skills, and
4. Personal attributes.

When asked to indicate how teachers trained at Domasi performed school administrators indicate the following

Head teachers highly expect Physical Science teacher to perform equally in schools since both group of teachers attend same in-set service on division level. In this case head teachers mentioned of SMASSE in-set service. The Relevance of the Project has been evaluated as high because the need for improvement of education quality has continued to be in line with the Malawian Government's development policy and Japanese Government's aid policy to Malawi, and continues to be in line with the needs of the Malawian people. The Japanese aid policy towards Malawi also includes the enhancement education quality as one of its priority assistance areas. In addition, one of the focus areas of the *Japan's Education Cooperation Policy 2011-2015* is to provide quality education for all by comprehensively improving the learning environment, including teacher training. The Project is also in line with the *Yokohama Action Plan*, adopted at the Tokyo International Conference on Africa

Development (TICAD) IV (2008). Based on these policies, Japan has been implementing capacity development projects targeting mathematics and science teachers in Africa; thus Japan has ample empirical and technical advantages in strengthening secondary level mathematics and science education.

*When head teachers and heads of science department were asked to indicate and identify what kind of support the administration give to their teachers. It was revealed that a*lmost 70% of head teachers tried their best to buy at least basic materials required for laboratory activities hence simplifying delivering of instructional material on the part of Physical science teachers. This was also concurred by head of science department. In additional to this almost 90 % of head teachers feel like in assisting to find laboratory materials there is a high possibility that students are really motivated as far as learning of Physical Science is concerned. However, some heads of department mostly from CDSSs indicated that sometime the school administration fail to buy necessary teaching and learning materials due to financial constraints their schools face. Hence jeopardising education quality.

When head teachers and heads of science department were asked to indicate the teacher behaviour of teachers that affected the teaching Physical Science.

Head teachers and head of science department stated that the incidence of teacher misconduct and unprofessional behaviour of teachers in general has increased over the past years. This was partly attributed to the poor preparation of teachers following the introduction of the fast track in-service teacher training education programme in this case they referred teachers who were trained through open and distance learning, which pays relatively little attention to professional ethics. More generally, unprofessional behaviours such as excessive drinking and sexual relations with students are seen as being symptomatic of low morale and poor motivation.

Data on the number of disciplinary cases handled by the ministry is hard to find because of poor record management. However, the perception of head teachers is that the Ministry of Education is overwhelmed with disciplinary cases, which usually involve issues to do with teachers' sexual misconduct with pupils and fraud particularly involving salaries, substance abuse (drug and alcohol), and theft of teaching and learning materials (Bonga 2005). Bonga

partly attributed this to weaknesses in management and inspectorate systems and low teacher morale resulting from heavy workloads and poor incentive structures. All these will jeopardise teacher performance more specifically Physical Science teachers who were either trained through open and distance or conventional teacher training modes.

Although, some head teachers and head of department revealed that sometimes they really support Physical Science teachers but the conditions in which most teachers are working are daunting and very challenging, especially in most CDSSs. Lack of facilities such as staffrooms, classrooms, Science laboratories, teaching and learning materials are clearly demotivating.

When head teachers and heads of science department were asked to indicate what kind of motivation Physical Science teachers get from school administration.

The majority of head teachers and head of science department who participated in this study stated that working environment in the majority of schools is deplorable with dilapidated school structures, insufficient teaching and learning materials. Poor housing conditions, lack of housing, large classes, undisciplined and unruly students have all added their toll on teachers' motivation. In addition most Physical Science teachers usually have high teaching loads and it is not uncommon in such schools for teachers to handle more than one class. Physical Science teachers are faced with large and unmanageable classes. Class sizes of more than 100 pupils per class are common in Malawi particularly in the junior classes.

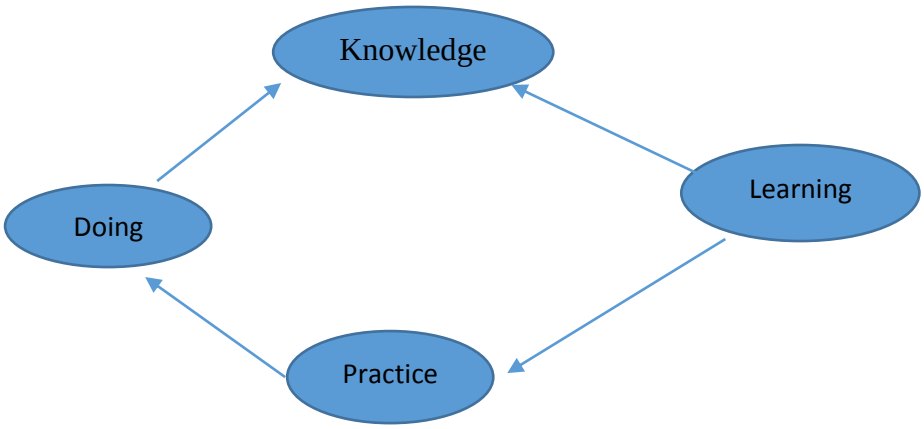
Understandably teachers in such school often seek a transfer to 'better' schools. Most head teachers and head of departments mentioned that teachers can ask for transfers because of lack of teaching and learning materials and staff room facilities. High transfer rates are symptomatic of widespread teacher discontentment with working conditions and generally low motivation. Inadequate and ineffective supervision is also major factor. Almost 70% of Physical Science teachers mentioned that school leaders and management have not helped teachers to be positive about their schools and work. Where leadership is positive, teachers have higher morale. But this is contrary, when a Physical Science teacher ask for the school management more especially the head of department to purchase teaching and learning materials for the teacher to conduct practical in return teachers are always given a negative response hence jeopardising their morale in teaching Physical Science. This applies both teachers who were trained through open and distance and conventional teacher training modes.

When head teachers and heads of science department were asked to indicate if Physical Science teachers had the satisfaction and intention to remain in the teaching profession.

The head teachers and heads of science department concurred that teaching profession is no longer commands high status and teachers are undervalued by society. Low salaries and poor working conditions have contributed to the eroding status of the teaching profession. In the past teaching was a much sought after profession, but teaching is now widely regarded as 'employment of the last resort'. The lack of vocation among the majority of teachers is quite evident. As a result, teachers leave the profession whenever opportunities for more prestigious and better paying jobs arise. The low status of the profession has also meant that it is unable to attract better, qualified students to join teaching profession since students themselves see when they are learning Physical Science which most teachers do theory not practical. However, some head teachers respondents believe that the new political dispensation, which has brought in 'new freedoms' is partly responsible for the declining status of the teacher in the community. In particular, they point to teachers being improperly dressed and engaging in unprofessional behaviour (including drunkenness and sexual misconduct).

For teaching and learning of Physical Science to be meaningful a teacher had to explain to students and student should be learning their after do and practice what they have leant and this is followed by acquisition of knowledge.

Figure below illustrates how knowledge is acquired



In a nut shell, this chapter gathered information about perceptions of Physical Science teachers trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education as far as teaching and learning of Physical Science is concerned. In addition, the researcher also determined if there were differences in the two groups on teacher background. Therefore, this chapter presented the data collected from the chosen respondents.

CHAPTER 5

5.1 DISCUSSION OF FINDINGS, IMPLICATIONS, AND RECOMMENDATIONS

The deficit of research on perception of Physical Science teachers who were trained through conventional system and open and distance mode of training at Domasi College of Education and the conflicting results obtained in some of studies establishes the importance of developing studies to answer the question of whether open and distance learning is a viable alternative for conventional mode of teacher training. For this reason, the purpose of this study was to determine the perception of Physical Science teachers who were trained through conventional system and open and distance mode of training. Research questions were created to determine the perception of Physical Science teachers who were trained through conventional system and open and distance mode of training. The first research question was used to determine if the two groups differed by the background characteristics of gender and age.

Existing data were collected on each teacher and the statistical analyses that were used included descriptive statistics to describe the demographic characteristics of the sample, the table was used to determine frequency differences in the two groups.

Based on the research methodology and the data collected the statistical analyses were performed to answer each research question and the results were reported. The student background characteristics of gender and age were studied in this research project. There was no statistically significant difference between the number of males and females who were involved in this study in each of the two groups, open and distance and conventional mode of training. However, there was a statistically significant difference in age between the two groups. 80% of the teachers who attained their Diploma in Education through conventional system were 39-years-old or younger, while 70% of the open and distance teachers were greater than 39- years-old. This information clearly shows that teachers who attained Diploma in Education through open and distance learning are older than those attaining the same qualification through conventional mode of teacher training. Those who attained their Diploma through open and distance learning initially the majority of them were already primary school teachers due to lack of teachers in CDSSs they were promoted to teach in these CDSSs without proper qualification.

Examining the students' perception, their responses on the nature of science and roles of practical work in science learning, the study shows that 86% of the respondents were of the opinion that it was more challenging to teach science without any practical work. In support of this finding Millar (2004, 2010), sees practical work as an essential component of science teaching and learning, both for the aim of developing student' scientific knowledge and that of developing students' knowledge about science. The study also reveals that 92% of the teachers believed that practical work will help students learn how to use experimental tools. This is corroborated by Millar (2010) who opine that learning is not discovery or construction of something new and unknown; rather it is making what others already know your own. The results presented on all other statement on this issue indicated that teachers who were both trained through open and distance learning and conventional mode of teacher training agreed to all the roles of practical work in teaching science.

Furthermore, it was revealed that the majority of teachers who were trained through conventional mode of teacher training thought that teaching Physical Science without use of practical work is more difficult as compared to their counter parts who were trained through open and distance learning as this group revealed that they do not have enough experience on conducting laboratory practicals. Almost all the teachers were of the view that it is essential for Physical Science to include practical work even though most schools especially CDSSs have no laboratories and these schools are mostly taught by teachers who were trained through open and distance learning.

Participants attempted to be more responsive to student needs and interests and to work with the different ways students learn, and focused on hands-on activities to engage their students in class effectively. To facilitate student success, participants suggested that encouraging classroom participation and communicate high expectations to students that ensure students understanding that participation in class is crucial to their academic success.

Additionally, participants expressed the perspective that respect displayed in teacher student interactions promoted instructional support. Communication styles and well organized and managed classrooms were developed to create a more supportive and engaging learning environment for students. Participants in open and distance mode of training expressed that their teacher preparation and professional development did not consistently address the social and pedagogical relevance of their teaching science to diverse learners. For the participants,

their classroom experiences provided more guidance and the tools needed to teach diverse learners. As a result, they worked to develop interactions with their students that were personalized and responsive to individual needs. The daily interactions with their students shaped and were a primary source of professional knowledge development.

Accordingly, the study drew attention to the observation that their teaching experiences helped the participants to make sense of student demographics and classroom and school dynamics. The participants expressed that teaching was not a linear, one-way sharing of knowledge. The interactions with their students required that they adapt to evolving student needs, interests, and feedback. In this study, it is offered that the participants are intuitive social constructivists (McRobbie & Tobin, 1997). The participants recognize the complex set of interactions and social constructions shaping their students' perspectives and how these influences impact science teaching and learning. The participants found themselves addressing teaching across student diversity based on their own understanding and through dialogue with peers more especially those who were trained through conventional mode of teacher training. The findings indicate that the participants' teaching experiences gave them opportunities to extend their own active teaching, and to integrate and align best practices in their classrooms. Therefore, the participants discussed and explained their teaching as related to a number of considerations such as perceived student characteristics, family and community support, students' daily life and future goals.

In addition, national and local standards direct and shape curriculum and instruction. Participants who obtained their Diploma in education through open and distance mode of training described that curriculum and instruction pacing guides offered less autonomy in teaching and learning and teachers participating in the study shared examples of creative ways they engaged their students in science. A primary practice was hands-on activities that in most cases teachers who were trained through conventional were exposed to. These participants offered illustrative descriptions such as hands-on, inquiry-based, interactive projects, and explorations as characteristics of their approaches to instruction.

Additionally another assertion is that there are gaps organizationally and conceptually between science education and culturally responsive pedagogy. The participants articulated and described in-depth qualitatively different forms of learning and ways they approach when they are teaching. For example, the participants learn about Physical Science through their

own praxis. Participants espoused that these interactions and the understandings they gained from them supported them in more effectively meeting individual student needs and interests resulting in improved science achievement for their students in schools. Participants explored different teaching strategies in which students are active and in which the focus is more on student participation and learning. With teaching strategies, participants told of using modified curriculum and instruction to meet class size, perceived student characteristics, family and community support, daily life and future goals, and national and local standards.

Yet, we know that the first year of teaching is a sobering experience for most new teachers, and that, over the course of one year, teachers experience a decreased strength of belief in their own efficacy and in the learning potential of their students (Harris and Associates, Inc., 1991). Nearly every study of retention in the teaching profession identifies the first three years as the riskiest on the job, the years in which teachers are most likely to leave. The dropout rate is highest among teachers in hard-to-staff, urban schools, which have the most difficulty both attracting and then retaining fully certified teachers (Ingersoll, 2001). Some Physical Science teachers revealed that the early years of teaching are often characterized by a "sink-or-swim" or "survival" mentality because we have often failed to provide for careful support and thoughtful development of teaching expertise over time.

Results from frequency analyses indicated a difference between the attitudes of Stayers, Movers, and Leavers in regards to occupational choice and school working conditions. However, the mean proportion of science teachers hardly satisfied with their occupational choice and working conditions is most similar between Stayers and Leavers. This finding suggests that teachers who choose to leave the profession entirely often have similar levels of satisfaction as those teachers who choose to stay. Equally interesting is the finding that Movers have the lowest proportions of satisfaction. This result suggests that dissatisfaction does not necessarily lead science teachers to leave the profession entirely, but rather to move between schools. Taken together, these results suggest that teachers' satisfaction with working conditions is associated with school-level retention but not necessarily with professional retention. If science teachers are satisfied with occupational choice and working conditions, this may influence decisions to remain in current schools but not in the profession.

The results of risk analyses indicate no statistically significant associations between science teachers' satisfaction and the decision to remain in the teaching profession. These results suggest that reform policy intended to change the working conditions of schools, although very important and necessary, are not likely to be associated with science teacher retention in the profession. Regardless, schools have an obligation to provide both a comfortable working environment for teachers and an environment conducive to student learning, regardless of influence on teacher retention.

The results revealed that Physical Science teachers do not have uniform attitudes about job satisfaction. For example, more than 80% of the Physical Science teachers in the study indicated satisfaction with both occupational choice and colleagues. This finding indicates that the majority of science teachers are satisfied with the routine of teaching and interactions with colleagues. However, teachers indicated less satisfaction with administrative communication, and recognition for teaching efforts. For these school conditions only few teachers indicated satisfaction. This finding suggests that the feeling of satisfaction wanes as influences from outside the classroom intervene. Also, few teachers were least satisfied with science program contributions to the development of students, support for informal science, and science facilities and equipment. We conclude that these factors are all program related and that the current condition of science programs in many schools is negatively associated with teachers' job satisfaction.

Overall, these results suggest that Physical Science teachers are hardly satisfied with occupational choice and professional colleagues. Feelings of satisfaction begin to diminish as teachers think about administration, lack of continuing education opportunities, and facilities and equipment. As a result of these findings, Physical Science teachers' reform policy should focus on

1. Increasing communication between administration and teachers themselves,
2. Improving science programs,
3. Upgrading facilities and equipment, and
4. Increasing support for informal science.

The influence of demographic variables on the level of job satisfaction of science teachers was captured using the gender and teaching experience of teachers and head teachers.

Most of the head teachers suggested that there is a link between poor motivation and low levels of job satisfaction among teachers and their performance and professional conduct. Both the Head teachers and head of Science department who participated in this study observed that low morale has reduced performance of Physical Science teacher who were trained either through open and distance and conventional mode of teacher training and has resulted in teachers finding excuses to absent themselves from school. The majority observed that teacher absenteeism is a serious problem in schools and is on the increase. A key issue is that teachers are frequently engaged in secondary employment activities to supplement their incomes. The following comments from interviewees are typical:

1. *Teacher absenteeism is high. Teachers go vending or get secondary employment. For example, few teachers go for marking MANEB examination papers nowadays. They say it's better to do other jobs.*

2. *In urban areas, teachers are finding ways of getting out of the classroom, even during lesson time. Vending keep things going.*

3. *Teacher absenteeism is a big problem. Teachers get involved in secondary activities e.g. chicken rearing and this affects their performance.*

The most common activities are vending and private tutoring in urban areas and farming in rural areas. The necessity to engage in additional income generation activity distracts teachers from their normal teaching activities and affects their performance. Teachers become less committed to their work as shown by lack of proper lesson planning and general preparedness for classes. Existing research evidence further corroborates the views expressed by stakeholder respondents. A number of studies have reported that teacher absenteeism is on the increase and that low staff morale is one of the reasons contributing to this (Kadzamira et al 2001, Ndalama 2004). A study on teacher absenteeism and attrition covering over 3,000 teachers in four districts found that the extent of absenteeism depended on school location and age and professional grade of the teacher with rural school registering higher absenteeism rates than urban schools and older teachers and teachers in higher professional grades less likely to have been absent from school than younger teachers and teacher in lower professional grades (Moleni and Ndalama 2004). The study linked the lower absenteeism rates among teachers in higher professional grades to issues of teacher motivation and remuneration.

The practicals across all schools in Malawi are standardized. However, many of these practicals require advanced equipment, which many public schools such as the participating schools lacked. There is likelihood that many schools in the study area also under-resourced in terms of laboratory equipment. The question can be posed as to how the schools allow for optimum performance and effective teaching and learning, if resources are not available.

The availability of resources in schools for both theory and practical lessons is essential for the success of the subject. Learners must have textbooks available to them in order to engage in self-activities and self-learning. Every learner should be in possession of a text book. The availability of equipment for the practical aspect is essential to help learners put the theory into practice. One of the principles of Physical Science is learning through hands on experience; clearly this principle is not met in most schools. Teachers who participated in this study revealed that in their schools they had no adequate teaching and learning materials more especially laboratory materials hence teaching and learning in most cases become ineffective. In additional, majority of teachers who were trained through open and distance learning revealed that they were only good on theory not on practical aspect hence teaching is also likely to be affected negatively.

Many head teachers from the schools studied complained of too large classes. Practicals and theory lessons in large classes, together with limited resources, become very difficult and more time was spent on disciplining learners rather than teaching and learning. Smaller classes benefit all learners; however, learners who perform poorly in various subjects would benefit the most. When the class size is too large, learners tend to lose focus on the task because instruction is focused on the class as a whole rather than on individual learners (Blachford et al 2011). Smaller class sizes benefit learners since they have adequate materials at their disposal.

CONCLUSION

It can be concluded that the importance of practical work in science is widely accepted by students in schools and it is acknowledged that practical work can promotes the engagement and interest of students as well as developing a range of skills, science knowledge and conceptual understanding. Research also suggests that students design better investigations when they actually carry them out than when only asked to write a plan (Apu, 1988). Based on the findings of this study, it is therefore recommended that Government should make provision for practical work in Physical Science in Malawi to allow students to be exposed to

practical work involve in science learning. The curriculum developers should also incorporate laboratory activities and practical work in to the curriculum of Open and Distance Learning at Domasi College of Education to enable students to gain necessary experience and skills that will make them compete adequately with their counterparts from conventional mode of training. The challenge facing ODL institutions is to ensure that subject matter knowledge is well-integrated with pedagogical knowledge. This calls for colleges or universities offering in-service and pre-service teachers' science programmes to find common grounds on how to integrate and blend the two knowledge bases in their science programmes. The challenge is enormous for ODL institutions as they are offering science through open and distance learning. ODL institutions fail in providing some of the generic classroom practices which may result in producing not so competent Physical Science teachers.

5.2 FUTURE RESEARCH

Beyond this study, the considerations that must be given to inquiry of teaching Physical Science to diverse learners should involve an examination of theoretical perspectives and practical experiences that support exemplary teaching and mentoring of diverse learners.

Future research should include a more diverse group of teachers. For example, future research should include the voices and perspectives of male teachers and underrepresented women, with the inclusion of linguistic, racial, and cultural diversity in the science fields.

Finally, an examination of the influences on the learning process of students matched with teachers of similar backgrounds should be explored. It is the norm for majority-society children. However, little understanding exists about the role this plays, or should play, in teaching diverse students, particularly in content areas such as Biology, Chemistry, and Physics. The complexities of diversity challenge not only teachers but also our society and world as a whole. Although it is impossible to match students and teachers of similar backgrounds and experiences and perhaps not advisable, it is important to capture what we know and can learn about differences and how this understanding can contribute to more effective ways of teaching. Future studies can inform us of what matched experiences can add to the learning process and what is missing in its absence.

5.4 RECOMMENDATIONS

Based on the findings of this research on perception of Physical Science teachers who were trained through conventional and open and distance teacher training mode by schools in Central West Education Division, the researcher recommends that schools ensure that:

- Text books are made available to all learners. Should funds not be available, the schools need to embark on some sort of fundraising activity to ensure that resources such as text books are available for effective teaching and learning to take place.
- Physical Sciences laboratories are in working order with the necessary equipment.
- The laboratory reflects the subject being taught and creates a positive teaching and learning environment.
- Head teachers should provide more support to Physical Science teachers
- Learners are appropriately assisted with regards to the selection of subjects
- Physical Sciences class sizes are kept to a minimum as far as possible.
- Physical Sciences learners do pure mathematics.
- Children regularly engage with the parents.
- Activities are provided which stimulate the cognitive development of every learner.
- Revisiting the Physical Sciences curriculum with the possibility of separating physics and chemistry into two separate subjects.
- Ministry of Education officials should visit schools to assess the laboratory status of schools.
- Adequate funding for new updated text books in line with the current syllabus.
- Physical Science books should be written in proper.
- Parents should also be active stakeholders in the provisioning and upgrading of their children's education systems. Parents are expected to:
- Be actively involved in their children's academic process, by regular monitoring of their children's performance.
- Encourage their children to read more, thus improving language. By reading learners would develop a better understanding of words and meaning. To assist learners with this aspect parents should ensure that their children have adequate reading material.

SUMMARY

Distance learning is now a part of higher education, including professional education. It can be postulated, that as technologies improve, open and distance learning will continue to be seen as a method of Degree or Diploma obtainment. In addition, many believe that open and distance learning in education will help alleviate the shortages of qualified teachers. However, there is a concern that distance learning is a poor substitute for traditional on-campus learning. This research project was chosen by the researcher to try and ascertain whether open and distance learning could be used successfully as an alternative to conventional mode of teacher training by analysing perceptions of teachers trained through both modes of teacher training. Through this study, the researcher has shown that open and distance learning sometimes can be a successful alternative to traditional on-campus teacher education. Therefore, open and distance learning can be used to educate those individuals, who due to life commitments, cannot travel to an academic institution to obtain their desired diplomas provided all negative perception which were revealed by the teachers are ironed out.

As an Educationalist, it was imperative to discover if Domasi College of Education teachers who were trained through open and distance learning performed as well as their on campus counterparts. Through this research project, it was discovered that more things should be done to make open and distance mode of teacher training to be more successful at Domasi College of Education.

REFERENCES

Barth, R. (1990). *Distance education as a source of upgrading in rural areas.* San Francisco: Jossey-Bass.

Beckmann, C.E., Senk, S.L., & Thompson, D.R. (1997). Assessment and grading in high school mathematics classroom. *Journal for Research and Mathematics Education*, Volume 28(2), 187-215

Bezuk, N.S. Cathcart, W.G. Vance, J.H., & Pothier, Y. M. (2001). *Learning mathematics in elementary and middle schools*. Columbus: Merrill Prentice Hall.

Bielenberg, J.E. (1993). *How a teacher's beliefs and knowledge inform practice.* Paper presented at the annual meeting of the National Association for Research in Science Teaching, Atlanta: Georgia.

Brooks, J., & Brooks, M. (1999). *In search of understanding: The case for constructivist classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.

Chakwera, E and Saiti, F. (2002).Training Teachers Through The Distance Mode: The Experience of Domasi College of Education In Malawi. Paper presented at New England Educational Research Organization (NEERO) conference, Northampton.

Chimwenje, C. (1998) *Effectiveness of the Distance Education in Malawi: Student outcomes.* Paper presented at the distance education Symposium for the Mzuzu University.

Cohen, S. et al, (1998). *The Information Resource Management Program: A Case Study in Distance Education*. http://www.columbia.edu/~sc32/cmrevisedjpae.htm

Dlamini, B.M. (1998). *An Overview of the Key Issues in the Provision of University Education in Swaziland* in C. Magagula (2nd Ed) *Issues on University Education in Swaziland. A Report on National Seminar held at the University of Swaziland*, Kwaluseni Campus

Fozar, B. I., & Kumar, L. S. (2007*). Mobile learning and student retention*. *International Review of Research in Open and Distance Learning, 8*(2), 1-16. http://www.irrodl.org/index.php/irrodl/article/view/345/927

Howell, S. L., Laws, R. D., & Lindsay, N. K. (2004). *Revaluating course completion in distance education. Avoiding the comparison between apples and oranges*. *The Quarterly Review of Distance Education,* Volume *5*(4), 243-252.

Joyce, B. & Showers, B. (1995). Student achievement through staff development (2nd Ed.). New York: Longman.

Keegan, D. (1990). *Foundations of Distance Education.* (2nd Ed.). London: Routledge.

Kosnick, C. (2000). *Looking back: Six teachers reflect on the action research experience in their teacher education. Action in teacher education*. Volume 22 (2), 133-142.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.

Magagula, C.M. (1998). *Distance Education as an Alternative Strategy for Providing University Education in Swaziland*. In C. Magagula (2nd Ed). *Issues on University Education in Swaziland.* A Report on National Seminar held at the University of Swaziland, Kwaluseni Campus.

Makhubu, L.P. (1998). *Welcome Remarks*. In C. Magagula (ed.) *Issues on University Education in Swaziland.* A Report on National Seminar held at the University of Swaziland, Kwaluseni Campus.

Merriam, S. (1991). *Case study research in education: A qualitative approach*. San Francisco: Jossey-Bass.

Meyer, K. A. (2002). *Quality in distance education: Focus on on-line learning*. ASHE-ERIC Higher Education Report Series.

Ministry of Education (MOE, 1999), *Policy and Investment Framework (PIF)*, Lilongwe: Ministry of Education.

Msiska, F. G. (2003). The Use of Distance Education for Teacher Training and Development in Malawi: Models, Practices, and Successes. Malawi: Mzuzu University

Sanders, D. H., & Robert, K. S. (2000). *Statistics: A first course.* (6th Ed.). USA: McGraw-Hill Higher Education.

University of Swaziland. (1986). *Survey of Manpower*. Mbabane: Kingdom of Swaziland.

Woodley, A. (2004). *Conceptualizing student dropout in part-time distance education: anthologizing the normal. Open Learning, 19*(1), 47-63.

Appendices

Appendix A

QUESTIONNAIRE FORM

THE PERCEPTIONS OF PHYSICAL SCIENCE TEACHERS TRAINED THROUGH TWO DIFFERENT MODES OF TRAINING- (CONVENTIONAL AND OPEN AND DISTANCE LEARNING) AT DOMASI COLLEGE OF EDUCATION.

Dear Respondent,

I am Christopher Salagi, a Master of Education in Teacher Education Degree student at Mzuzu University. I am doing my research to find out the perceptions of Physical Science teachers trained through two different modes of training- (Conventional and Open and Distance Learning) at Domasi College of Education. I would appreciate if you could help me by completing this questionnaire. The information you will provide will be treated with all the confidentiality. Thank you in advance for your help.

DEMOGRAPHIC DATA

Please tick in appropriate box.

1. Gender

☐ Male ☐ Female

2. Age

☐ 20 - 29 years ☐ 40 - 49 years

☐ 30 - 39 years ☐ 50 & above

3 Mode of Teacher training attended

☐ Conventional System ☐ Open and Distance Learning

4. Mode of fees payment

☐ Government Sponsored

☐ Self-Sponsored

☐ Scholarship

5. Number of years you have been teaching?

☐ 1 year to 3 years

☐ 4 years to 10 years

☐ More than 10 years

QUESTIONS

1. What are the challenges Physical Science teachers face in teaching the subject (Physical Science?

_____

_____

_____

_____

_____

_____

2. How does your teaching experience help you in teaching Physical Science?

_____

_____

_____

_____

_____

_____

3. How do you handle hands-on learning in Physical Science?

_____

_____

_____

_____

_____

4. How teachers gain experience in hands-on approach?

_____

_____

_____

_____

_____

5. What are some of the factors which contributed to the difficulties of teaching and learning of Physical Science in schools

_____

_____

_____

_____

_____

6. What are challenges teachers experience during the first year of teaching Physical Science in their schools

_____

_____

_____

_____

_____

7. What support teachers receive in their first year of teaching from school administration?

_____

_____

_____

_____

_____

8. How should teacher prepare and conduct laboratory class sessions?

_____

_____

_____

_____

_____

9. Do you have professional satisfaction of teaching?

_____

_____

_____

_____

_____

10. How do Physical Science lessons are being handled in the schools.

_____

_____

_____

_____

_____

END OF QUESTIONAIRE