USE OF INSTRUCTIONAL TECHNOLOGIES
IN TEACHER TRAINING COLLEGES IN MALAWI

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(ABSTRACT)

The use of instructional technologies has an impact on students' content acquisition and adds to class performance (Baylor and Ritchie, 2002). However, Beggs (2000) notes that research has shown that it is not only the technology that is important, but also how it is used that improves learning and increases pupils' interest. In view of this, since not much was known about the use of technologies in teacher training colleges in Malawi, this study was designed to establish how instructional technologies were used by tutors in those colleges. The technologies studied were chalkboards, flip charts, overhead projectors, videos, computers, and local resources from the environment. The research questions were (a) How often did tutors use instructional technologies in their teaching? (b)What reasons did tutors have for using and not using instructional technologies in their teaching? (c)How did college tutors perceive their competence levels in using instructional technologies? (d)What attitudes did the college tutors have towards the use of instructional technologies? (e)What did tutors consider important factors in influencing their use of instructional technologies?

The sample consisted of tutors from Karonga, Lilongwe, St. Joseph's, Blantyre, and Montfort Teacher Training Colleges, who completed a survey designed to address the research questions. In addition to the tutors, a snapshot study was conducted with faculty at Domasi College of Education to establish how use of computer technology was established and sustained and what lessons could be learned that could assist the teacher training colleges as they encourage computer use among their tutors.

The results of the survey that was conducted with the tutors revealed that there was infrequent use of higher order instructional technologies i.e. overhead projectors, videos, and computers, which was attributed to lack of training, unavailability of the technologies, and lack of maintenance. The failure to use the locally available resources by some of the tutors was attributed to lack of creative thinking as well as lack of initiative to use the local environment in their teaching. Constant training and peer support on how to use the instructional technologies are some of the lessons to be learned from Domasi College of Education. The study concludes with a suggested process for how government and the teacher training institutions can work collaboratively to maximize the use of instructional technologies in the teaching and learning process for prospective teachers. Several possibilities for further research on the use of instructional technologies have been highlighted.

DEDICATION

I dedicate this work to my parents Mr. and Mrs. Kadzera who endured several hardships to have me go to school. And to my dear wife Maria who persevered my absence when I was in the United States taking my studies.

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TABLE OF CONTENTS

List of Tables

List of Figures

CHAPTER 1

INTRODUCTION

Before the missionaries came, Malawians had their own ways of educating their youth. There were no formal schools but children were taught folk tales, legends, and tribal traditions. Under this system of education youth grew to become brave and skilled men and women; men became hunters, soldiers and craft workers, while women became good mothers and food gatherers and craft workers (Banda, 1982).

The beginning of formal education is traced to 1876 when the missionaries came to establish their mission stations. The first mission station was the Free Church of Scotland at Cape Maclear, and this group opened the Livingstonia Mission (Pachai, 1973). In the mid 1920s, government appeared on the education scene with more assistance and policy formulation. The department of education established in 1926 worked hand-in-hand with the missions, and more schools were introduced.

The education system, which resembles that of Britain, Malawi's colonial master, has three levels: primary school (elementary), comprised of standards 1-8; secondary school (high school), comprised of form 1-4; and tertiary education. Tertiary education embraces university programs, teacher training colleges, and technical education. There were six teacher training colleges during the time of this study: Karonga in the northern region, Kasungu, Lilongwe, and St. Joseph's in the central region, and Blantyre and Montfort in the southern region (see Appendix A). The teacher training colleges are run by government, except for St. Joseph's and Montfort colleges, which are run by the Catholic Church. However, these two colleges are grant aided and recruitment of tutors and their salaries come from government. Subsequent to this study, Montfort College became a Catholic University.

In the teacher training colleges, the faculty, called tutors, train primary school teachers. The teaching staff are organized in five academic departments: Foundation Studies; Languages, comprised of English and Chichewa; Mathematics and Science, which includes Mathematics, Science and Health Education, Agriculture, and Home Economics;

Social Studies includes Social Studies and Religious Education; and Practical Arts, which includes Creative Arts, Music, and Physical Education.

One important dimension in teacher education is related to the use of instructional technologies. My interest in technologies that enhance instruction in teacher education dates to when I was at the University of Malawi pursuing a course in Art, which later aided me in training primary school teachers on how to produce and use teaching and learning materials in the classroom. It was rewarding to work with student teachers. One role I played was to give them hands-on experiences on how to produce manipulatives, for example models of cars, houses, and ox-carts, using the piths of maize stalks. I would assign them a teaching skill, such as the introduction of an instructional topic using the materials they had produced. They would then have five minutes each to teach that introduction to other members of their class. These activities fascinated my students, as they were eager to produce more and see how they could incorporate them in a class situation. This experience also impressed upon me the importance of materials in instruction.

During my involvement in teaching of student teachers for fourteen years in teacher training colleges and orientations of Primary Education Advisors for three years, I observed variations in teaching approaches by the tutors, where some took the initiative to identify a variety of technologies and teaching materials for their lessons, while for others, the chalk and the boards were the only materials used. I always wondered, why the difference? The need for using instructional technologies became even more evident when I was involved in writing some topics for an art teacher's guide for standard six and in serving as a panel member for preparing art teachers' guides for standards one and three. The tasks were to assure that there were adequate explanations of the procedures for production of the materials so that the teachers using the guides would be able to follow and easily manage the production of the desired materials for their lessons. Ultimately, these experiences led to my study of the use of modern technology for instruction. It also led me to look more in depth at emergence of computers in teacher education.

Beggs (2000) pointed out that new technologies, when first encountered, bring mixed feelings of anxiety, fear, as well as frustration, which sometimes lead to not using the new technologies. I have observed similar reactions among tutors in the teacher training colleges, where the training of tutors did not fully materialize because the trained tutors who were

expected to train others were not knowledgeable enough to competently train others. As a result, some tutors took up the challenge and managed the frustrations they experienced as they learned how to operate computers for example, while others did not make any attempt. Geisert and Futrell (2000) also elaborated that "When the computers first appeared in the classrooms, teachers who used them tended to be those who enjoyed (or at least didn't mind) the challenges of communicating with a computer in its language (programming)" (p.19).

In addition to using more conventional instructional technologies teacher educators and teachers in Malawi still place emphasis on using local resources for teaching and learning materials. It is clear that the use of instructional materials of all forms continues to advance, and that there is need to keep pace with those developments. Thus, this study will focus on instructional technologies as they are used in teacher training colleges to enhance instruction and promote learning for prospective teachers.

Statement of the Problem

The use of instructional technologies in the classroom has the potential to help the teacher explain new concepts clearly, resulting in better student understanding of the concepts being taught. In a survey, to find factors that facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms, Baylor and Ritchie (2002) found that teachers valued the use of technologies in class and that it had an impact on students' content acquisition; the use of technology added to class performance. They went further, comparing traditional methods of teaching that focus primarily on imparting skills and knowledge with current approaches where "… many educators are stating the need to … prepare our students for a life that will be drastically different … [a life that will] need students to become creative problem-solvers, able to analyze a wealth of information to draw valid conclusions" (p. 400). Learning of this kind is more likely to take root when a variety of instructional technologies are used during instruction; that is, technologies that allow for hands-on experiences. Where resources are supplied for instructional use, teachers are expected to make use of them to support a smooth and meaningful flow of instruction and, consequently, promote the understanding of the content being taught. Smith and Nagel (1972) suggested that "Instructional media and materials are everywhere around us. They

are found within the student's total continuum of experience, from the concrete to the abstract, both outside and inside the classroom. They provide means whereby teachers teach (make possible the conditions for learning) and students learn" (p. 3).

However, availability of instructional materials does not automatically mean that learning will take place. In addition to availability, learning also depends on "the situation, the teacher, her/ (his) energy, her/ (his) imagination (and creativity), and those thirty or more unique personalities called a class" (Smith and Nagel, 1972, p. 5). Teacher initiative makes a difference. Beggs (2000) noted that, "Research has shown that it is not the technology itself but how the technology is used that improves learning and increases student interest" (p. 3 - 4). Thus technologies can be available, but if they are inappropriately used the students may not benefit from their use. Similarly the technologies can be available, but, if the tutors do not know how to use them, then learning that could have been enhanced by the use of the technologies will not occur.

Minimal use of instructional technologies was cited in Majed's survey (1996) on student teachers' use of instructional media. The results showed that, "although the majority of the respondents believed that instructional media made significant contributions in their teaching practices; instructional media are not being widely used in teaching" (p. 59).

Seavers (2002), a library media specialist at a high school in Florida, who was teaching practicing teachers how to use technology in their teaching, wondered when she went back into teaching if she was going to use technology as she instructed other teachers to do. She realized that she was able to integrate technology in her Mathematics lessons. However, despite being an expert, she also experienced the same problems the other teachers complained about which were "lack of planning time and additional duties and responsibilities that go beyond just teaching your subject" (p. 49).

Tutors in the teacher training institutions need to be effective teachers and good role models for teaching practices. Moreover the tutors' use of instructional technologies in their teaching is an essential component of a quality teacher education program. Tutors who use instructional technologies effectively will inevitably raise the quality of learning experience for that student teacher. Furthermore if student teachers are to become confident and competent users of different technologies in their own classes, then they need to see their tutors using various technologies in their instruction. Otherwise, when student teachers go to

their own schools, they may end up teaching "in the same way they were taught without using any instructional media" (Majed, 1996, p. 63). Kemp (2000) also supported the notion of tutors as role models: "In order for pre-service teachers to demonstrate [technology] competencies, teacher education faculty must, themselves, model the use of technology in their own teaching" (p. 11). It would appear that it is easy for tutors to be in the "do as I say, and not as I do" mode, where they encourage their student teachers to use instructional technologies and yet they, those who are supposed to show the student teachers how to use such technologies, do not use them.

Purpose of Study

The purpose of the study was to provide a description of the use of instructional technologies in teacher training colleges in Malawi. Realizing that use of instructional technologies enhances teaching and learning (Muyanda-Mutebi, and Yiga-Matovu, 1993), this study attempted to define the reasons for the inclusion or omission of instructional technologies by tutors in their instruction in teacher training colleges in Malawi. A survey administered to all tutors in the six teacher training colleges, was designed to collect data on factors pertaining to academic background, availability of technologies, ability to use identified technologies, frequency of using the technologies, and reasons for not using them. The description of the factors served as a basis for recommendations of policies and practices to be put in place to enhance the tutors' use of the technologies in their teaching. The results may also help the Ministry of Education, Science and Technology in planning for further development of modern technologies in teacher training colleges.

A snapshot study, i.e. a portrait of the emergence of computer use at Domasi College of Education, was also conducted. Domasi College of Education, a teacher training college for primary teacher educators and secondary school teachers, represents a special case among teacher training institutions because it has Internet access and computers available for faculty use. Thus it was selected for special study as a possible model for the other teacher training colleges. Wang, X, Wang, T. and Ye (2002) suggested that

> Knowing how much teachers understand about technology and instructional
> materials and how they use these technologies and materials in classrooms are

5

essential for staff development programs. Determining teachers' knowledge and usage levels of technology and instructional materials in the classrooms will help planners deliver effective in-service education programs, [which] can increase the likelihood that technology and materials resources will lead to success. (p. 3 - 4)

Research Questions

The study focused on what factors influence the tutors' use of instructional technologies in their teaching to student teachers? Specific guiding questions were as follows:

- How often did tutors use instructional technologies in their teaching?
- What reasons did tutors have for using and not using instructional technologies in their teaching?
- How did college tutors perceive their competence levels in using instructional technologies?
- What attitudes did the college tutors have towards the use of instructional technologies?
- What did tutors consider important factors in influencing their use of instructional technologies?

In addition to the above questions, the study also examined issues related to the emergence of computer use at Domasi College of Education. This special case provided a unique opportunity to understand the process of integrating a more complex form of instructional technology into teacher education in Malawi.

Definition of Terms

According to Tomei (2002), "Technology is the application of behavioral and physical sciences concepts and other knowledge to the solution of problems" (p. 6). Instructional technology is "the application of educational technologies to the solution of specific instructional problems," (p. 7) where educational technologies would mean, "the combination of instructional, developmental, managerial, and other technologies … applied specifically to the solution of educational problems" (p. 7). Stuart (1976) associates

instructional technology with some type of equipment and specifies that, "Radio, television, films and computers are instructional technologies" (p. 6). Beggs (2000) further defined instructional technology as "the use of technology to achieve an instructional objective" (p. 2).

In this study the term instructional technologies will be frequently used alongside instructional media and instructional materials to mean all the materials and equipment that are used to enhance the teaching and learning process. Since instructional technologies are many, this study will focus on the chalkboard, flip charts, overhead projectors, videos, computers, and use of local resources (TALULAR) which means, teaching and learning using locally available resources (Malawi Institute Education, 2004).

These instructional materials were selected because they are available in the teacher training colleges in Malawi and are expected to be used frequently. It should be appreciated that unlike in developed countries, where instructional technology focuses more on the use of computer hardware and software for teaching and learning, in developing countries like Malawi, the chalkboard, flip charts, overhead projectors, videos, and local resources are the main technologies being used in the teacher training colleges. Computers are just beginning to appear in teacher training colleges.

Limitations of the Study

A major limitation of the study was that the topic, instructional technologies, is very broad and cannot be fully covered in one study. Therefore, this study concentrated on those technologies that could or should be commonly used in the Malawi context. Limiting the study to these technologies does not rule out the importance and impact that other technologies play in the teaching and learning process.

Organization of the Study

The study is organized in five chapters. Chapter 1 presents an introduction to education in the Malawi context, the statement of the problem, definition of terms, purpose of the study, the research questions, and limitations of the study. The review of literature on topics regarding the use of instructional technologies is contained in Chapter 2. In Chapter 3

the methodology of the study is described. Presentation of the survey results for each teacher training college and the Snapshot Study of Domasi College of Education form the basis of Chapter 4. Chapter 5 contains the summary of results and what implications they have in teacher education. Recommendations are made on how to develop a national plan of action to ensure efficient use of instructional technologies in teacher training colleges. Finally, suggestions are made for what can be done in future research.

CHAPTER 2

LITERATURE REVIEW

In this chapter issues in the area of instructional technologies have been discussed, including reasons for using instructional technologies, adaptation to change, factors influencing teacher's use of instructional technologies, and barriers to using technologies. A discussion of research related to specific instructional technologies in this study -- chalkboard, flip charts, overhead projectors, video, and computers – is also included. Similarly an elaboration on the need to use locally available resources for instruction is offered as an instructional technology that is unique to the rural African context. Because resources are scarce, the production and use of local resources are emphasized in pre-service and in-service programs in Malawi.

Reasons for Using Instructional Technologies

The use of instructional technologies has several advantages for both the teacher and the students. Instructional technologies motivate students, capture their attention, and help explain complex concepts.

Instructional Technologies for Motivation

The word motive comes from a Latin root meaning "to move" (Charles and Senter, 2002), hence a drive or desire to perform tasks. Teachers strive to bring this desire in their students so they will fully engage in instructional activities and develop in-depth understanding of concepts. Motivation appears in two forms, intrinsic and extrinsic.

Intrinsic motivation. Noels, Clement and Pelletier (1999) looked at intrinsic motivation as a performance of an activity simply for the pleasure and satisfaction that accompanies the action. When students are intrinsically motivated, teachers do not have to worry because students are tuned for success. Bullock, and DeStefano (2001) also emphasized that "Students [who are] intrinsically motivated more easily learn on their own

because their stick and or carrot are internal" (p. 152). Porter (1997) suggested that approaches to new technologies should be developed with an open mind. The challenges that come with new technologies should be seen as opportunities for growth and improvement, and not as obstacles.

    Extrinsic motivation. In the absence of intrinsic motivation, extrinsic motivation can be used to bring students in and keep them involved in lessons. Charles and Senter (2002) contended that "… when teachers speak of motivation as a component of a lesson, they refer to what they do to attract students' interest and engage them more or less willingly in the work provided" (p. 66). The use of technologies, which students can easily manipulate to obtain a required end product, can generate the desire to learn and do more. Resources that students can associate with their everyday life also help to generate that desire to do more.

Instructional Technologies for Capturing Students' Attention

    Instructional technologies capture and sustain students' curiosity and attention throughout their lessons. Williams (1991) noted that the use of the overhead projector "enables the teacher to maintain complete classroom control and interest in a lesson" (p. 26). This control is also effective when the teacher wants to direct the students' attention either to the technology being used, or the information being displayed by the technology, or to the teacher. By switching on the overhead projector, the students' attention is directed to the information being displayed and to the teacher when the overhead projector is switched off (Williams, 1991). This ability to direct students' attention helps to maintain their concentration either on the information being displayed or to the explanation being given by the teacher when the overhead projector is switched off.

    This concentration by the students on what is going on helps them to follow the lesson and learn whatever concepts are being explained. Such attention also helps teachers sense the readiness of students to understand what is being taught.

Instructional Technologies for Explaining Concepts

    Using instructional technologies, the teacher can explain concepts that would be difficult to elaborate orally. When students see the material, its mechanism, and its function,

teachers are saved the hard explanation and students easily understand what the teacher is talking about (Ministry of Education, 1995).

Furthermore, instructional technologies help pupils acquire listening and observational skills that assist in their understanding of complex concepts. About the use of videos, Majed (1996) asserted, "the use of technology makes possible increased individualized instructional opportunities which enable the teacher to have adequate spare time for preparation of instruction that will meet the needs of the learners" (p. 59). When teachers use technologies in their teaching and students are involved in the use of those technologies and notice the relationship and relevance of what the teacher is teaching and the technologies being used, the students' attitudes towards learning gets improved, and that prepares them for the technologically oriented society (Majed, 1996).

Adaptation to Change

For tutors in the teacher training colleges to start using instructional technologies in their teaching, they need to appreciate how helpful the technologies are to themselves as well as to the students. This appreciation and the desire to start using the technologies demand a degree of change in teachers' perceptions and attitudes towards use of technology. It is, therefore, important to highlight how this change process can be effected.

The notion of change implies doing something different from the way it was done previously, and this change should have a positive effect on the implementer himself or herself (Madison, 2003). Change affects the setting of the organization or the institution in its leadership, resources and culture. It also affects the attitudes, values and beliefs of the people who are the change agents (Hope, 1997). Weller (1996) viewed change as a process to transform people's knowledge, attitudes, and behavior about the value of embracing something new or achieving something more beneficial. Unfortunately, when change is proposed, "there are forces which both support and resist [the] change" (Weller, 1996, p. 25). The advent of technology in education has been received with mixed feelings by teachers, some of whom are still comfortable with the old [traditional] ways of teaching, while to others technology is a challenge worth meeting head-on. Madison (2003) reported: "Rather than clinging tenaciously … to my past teaching repertoire, I gladly embraced these

11

new ideas, resources, methods, and tools" (p. 38). It is this type of thinking that gives hope that change is going to take place.

However, a decision to change comes after a serious scrutiny of the situation is done. J. Bennett and L. Bennett (2003) observed:

> … when one is confronted with new technology, he or she goes through an adoption decision process in which he or she gathers information, tests the technology, and then considers whether it offers sufficient improvement to warrant the investment of time and energy that is required to add it to his or her repertoire of skills. (p. 55-56)

For this scrutiny to occur and for change to take place, Weller (1996) suggested that four elements must be present:

- external conditions (having adequate resources and the dedicated commitment of top management);
- internal conditions (subordinates seeing the need, being willing to change);
- triggering events (external or internal pressures to change caused by dissatisfaction, innovations, or organizational renewal); and
- a well-designed change strategy (a comprehensive plan delineating the transformation process which includes the participation of the key …subordinates). (p. 25)

It is well known that when resources are available and the administrators/management is committed to implementation, change effects can be noticed. Runkel and Schmuck (1994) remarked on this effect: "Demonstrated commitment on the part of the principal … facilitates the change process and makes change easier to accept" (p 12). More seriously is the willingness of the subordinates to participate in the change process. Even when the resources are available or the management shows its commitment, if the implementers do not see the need or are not willing to participate, no change can take place. Such a situation reflects the old adage, "You can take a horse to the river, but you cannot force it to drink." It is not only the perceptual and attitudinal aspects of the participants, for example their confidence and readiness to persist through frustrations, that must be addressed but also these must be coupled with good planning procedures in order to bring about change (Weller, 1996).

12

Factors Contributing to Use of Technologies

The use of instructional technologies should be backed up with "…encouragement, ready access to technology, training, and support before they take steps towards enhancing how and what they teach with the use of technology" (Brace and Roberts, 1996, p. 324). Spodark (2003) called this an enabling environment that caters for, "universal student access, reliable networks, multiple opportunities for training, and consulting, and a faculty ethos which values experimentation and toleration of falters" (p. 16). There are several factors that contribute to the use of technology. According to reviewed studies, when these are put in place, teachers are more likely to use technology.

Training

Training instills new skills and abilities to perform tasks which were not possible previously. It provides confidence in teachers in undertaking their duties. Ochs (1993) observed that, "While training is an investment in the skill and productivity of programs, companies (administrators) tend to look at only costs and programmers often see only loss of production time" (p. 105). Although sometimes books may be available for teachers to read about how to produce and use instructional materials, "good training courses are almost always superior because they effectively drill concepts into a format that is easy to master" (Ochs, 1993, p. 105). The National Library Power Program, which was soliciting ideas from teachers about media specialists, asked teachers what instructional assistance they would desire from the library media specialists. Their responses showed that they "would like to be trained to use the emerging instructional technologies effectively … including information about how to motivate their students" (Turner, 1996, p. 209). Training on the use of instructional technologies can be done in both pre-service or initial training programs and in-service programs.

Pre-service training. When tutors are undergoing training at the university to become tutors, they need to be exposed to how different technologies are operated and how they can be used in a classroom situation. Practical experiences in actually using those technologies should be part of their training when they are in college, and also when they go for their teaching practice. Likewise, student teachers should also be exposed to this training

on the use of technologies. Supervisors should see them using the technologies so that when they qualify they should be able to use them in their classrooms.

In-service training. Just as the administrators of Middle Tennessee State University organized symposiums and conferences for the faculty on how technology is and can be used in course work (Brace and Roberts, 1996), so do tutors in the teacher training colleges need properly organized workshops and seminars with several presenters for hands-on experiences. In this way they learn to produce some of the technologies and how to use them in a classroom. Brace and Roberts (1996) noted that, "Lack of training creates a barrier to faculty's use of technology in general. Faculty requires hands-on experience [through] workshops and orientations that are offered at convenient times" (p. 327).

In addition to the initial training on use of technology in the classroom in Orange County, California, which increased teachers' technology skills and assisted them in meeting their own individual learning goals in the follow-up hours, teachers were also responsible for attending any additional technology workshop or conference provided by the district or any organization (Ivers, 2002). This requirement provided more chances for exposure to the technologies, hence improving proficiency and competence in using those technologies. Ivers contended that, "… the more confident teachers feel about using technology, the more likely they will apply what they have learned in the classroom, as well as pursue additional learning opportunities" (p. 4).

Availability

For tutors to use instructional technologies in their teaching, the technologies should be made available. As will be elaborated later in the chapter, teaching materials can be substituted, they can be improvised and still deliver the same message. But there are some technologies that cannot be substituted and cannot be improvised, for example, overhead projectors and computers. Such materials need to be supplied by the institution or the Ministry of Education. Hope (1997) reiterated that, "For technology to be exploited in an environment, it must first exist" (p. 4).

Unfortunately, just as Majed (1996) remarked, "… decision makers in the Ministry of Education do not emphasize the importance of instructional media in schools … due to tight budgets… instructional media do not come in their priorities, or that they do not know

the importance of instructional media in the teaching/learning process" (p. 65). Such a lack of emphasis is unfortunate given that research demonstrates the positive impact technology has on learning. Campbell and Varnhagen (2002) stated that, "Instructional and learning technologies are playing an increasingly important role in postsecondary education" (p. 31).

From the classroom point of view, the adequacy of the classroom can facilitate the use of some instructional technologies. In a survey, "Student Teachers' Use of Instructional Media," Majed 1996) found that over half of the respondents indicated that facilities in the classrooms were not adequate. For example, to use overhead projectors requires a supply of electricity. In Malawi, the inadequacy of facilities in teacher training college classrooms may result because the power sockets have been vandalized or are not there at all. Furthermore, the intermittent supply of electricity from the power station has an impact on the use of technologies that need electricity.

Support

Different support systems have to be put in place to enable continuity and sustainability when new skills are learned. For example, adequate implementation of use of instructional technologies requires support from the administration, such as financial allocation for technical support and training as well as monitoring and encouraging faculty to use technology in their classes. It is important that administrators take the initiative to organize in-house discussions and sharing of ideas on how some of the technologies can be incorporated in the classrooms. Hope (1997) observed that, "Leadership must foster an environment where teachers are encouraged to be creative and to explore new innovations like technology. Without leadership with a vision, technology can not reach its potential in schools" (p. 3).

Another source of support comes from members of staff as they support peers in the use of instructional technologies. Beggs (2000) affirmed the need for such support: "… as instructors [teachers] first use instructional technology, the friendly, helping hand of support … can make the experience easier" (p. 3). Peer support can be one of the easiest and most available ways that teachers can get help, but it also calls for collaboration with colleagues, where those who know how to work with a particular technology are willing to render the support needed. Such support is possible when all members of staff have a common goal

15

and work as a team (Hope, 1997). This collegial bond allows for a free and open exchange of experiences and knowledge among teachers (Weller, 1996). This support can be in the form of technical support, for example, for computer hardware and its peripherals or for software applications, and may include "acquisition of assistance, installation and configuration of equipment and applications, and troubleshooting of hardware and software" (Brace and Roberts, 1996, p. 328). Such assistance could also center on how to operate certain equipment, like video or overhead projectors.

Access

Some instructional technologies are designated in special rooms like computer labs and audio-visual rooms where overhead projectors and video equipment are kept. These special rooms need to be easily accessed by members of staff when they need to use a particular technology. Brace and Roberts (1996) also emphasized that, "Faculty need access to technology of all types," and give examples like, "networked computer, audio-visual equipment … must be readily available," (p. 326). It should be noted, however, that availability and accessibility are slightly different because sometimes the equipment may be available at the teacher training colleges but kept under strict rules. Brace and Roberts (1996) recommend a check-out system that makes technology available and accessible any time and everywhere. Such accessibility enhances lesson preparation and delivery as well as eliminating the frustrations that teachers may have if they cannot access a particular technology that they have planned to use.

Barriers to the Use of Instructional Technologies

In addition to training, adequate supplies, support from administrators and peers, and access to instructional technologies, which influence the use of instructional technologies, there can also be barriers that impede the use of technologies (Alston, Miller, and Williams, 2003; Beggs, 2000; Hope, 1997; Weller, 1996; Majed, 1996; Brace and Roberts, 1996; and Turner, 1996).

16

Lack of Preparation Time

Sammons (1994) observed that teachers who already have too much class work and school responsibilities may find that instructional technologies require additional time to learn and to prepare for using them in the classroom. They may feel that they have no extra time to spare to facilitate their use of technology.

Lack of Incentives

Research has shown that minimal or lack of incentives for the teachers who sacrifice their time to integrate technology in their classes contributes significantly to teachers unwillingness to use technology. In a survey conducted at Hollins University in 2000 on obstacles to technology integration, "70% [of respondents reported] that there were no outside incentives provided to initiate these changes" (Spodark, 2003, p. 20). Hope (1997) asserted that, "Recognizing and rewarding teachers will enhance technology's integration in the teaching and learning process" (p. 5) and suggested several ways of how this can be done:

- pay stipends to teachers to explore educational computing and related, technologies,
- provide technology role models for teachers,
- lend various configurations of technology to teachers for their use,
- encourage and praise to teachers for using technology,
- schedule convenient technology staff development sessions, and
- set aside time during the workday for teachers to explore computers and related technology. (Hope, 1997, p. 6)

Five Instructional Technologies

The survey in the teacher training colleges concentrated on the five instructional technologies i.e. chalkboard, flip charts, overhead projectors, video and computers. This section aims at elaborating on these technologies regarding what they are and their use. Use of teaching and learning using locally available resources (TALULAR) will also be discussed.

The Chalkboard

The chalkboard, which is a commonly used teaching and learning resource in Malawi schools, facilitates teaching and learning in almost every lesson. Williams (1991) pointed out that "the flexibility, availability, and versatility (of the black and white boards) are a definite boon to the classroom teacher" (p. 14). He further elaborated the advantages of using the chalkboard:

- they are freely available in most classrooms;
- they need no power (except in the case of electronic white boards);
- they are user friendly (if you have chalk);
- they can display a large number of colors ;
- they can be used with a variety of other materials for a broad range of teaching strategies. (Williams, 1991, p. 14)

Wankat and Oreovicz (2001) also added that chalkboards "are excellent for recording permanent information such as assignments, notices, and outline of the present class" (p. 40).

In Majed's survey on student teachers' use of instructional media, one of the questions he wanted to find out was the frequency of use of instructional media. Results showed that chalkboards were used extensively as compared to other instructional media (Majed, 1996).

Flip Charts

"Though not the most sophisticated visual aids available in today's technology, flip charts are certainly one of the most popular. They are simple, inexpensive, versatile, and when used with thoughtful creativity, [they are] highly effective" (National Audio-visual supply, 1992, p. 4). Wallace (2000) also looked at flip charts as "… easy to use … effective, portable, familiar, [and] inexpensive…" (p. 2). Wankat and Oreovicz (2001) looked at flip charts as helpful to students when they are organizing their group ideas for presentations to the whole class.

Other advantages of using flip charts were given by National Audio-visual Supply (1992). Because flip charts are placed in front of the class, they enable teachers to maintain eye contact with students, which helps teachers observe students' reactions and thus make it

possible to change teaching strategies during a presentation. The teacher is able to control the charts, and can write or draw on them as the explanation is in progress. Recording of students' comments on the flip charts helps students to build their ideas in the lesson. Just like overhead transparencies, flip charts can be prepared in advance, can be written on during the lesson, and can be stored for future use.

Although one of the advantages is that materials for flip chart production are inexpensive and readily available (National Audio-visual Supply, 1992), in the Malawian context chart paper is expensive and, therefore, usually not readily available.

Overhead Projectors

The National Audio-visual Supply (1992) defined overhead projector as "a simple device that projects transparent materials of any type on a screen, within a normally lit room" (p. 5). Although Meilach (1985) saw overhead projectors and transparencies as ideal for presentation to small groups, the National Audio-visual Supply (1992) observed that teachers can use different projection screens depending on the number of the participants and size of the room.

Teachers need to use overhead projectors since there are advantages for both the teacher and the students. Stratton (1994) noted, "The judicious use of overheads in presentations is essential to captivate the audience and improve their perceptions of what the speaker is saying" (p. 5). Just like the flip chart, the overhead is placed in front of the students, giving teachers eye contact with students and enabling teachers to check students' reactions and change the presentation pattern. The teacher can write or draw on the transparency, thus enabling development of ideas as the lesson is in progress. The projector does not require special skills, and since it is easy to use, the teacher is able to control it. Students can also be involved by filling in blank spaces on the transparencies or to present their work in class. Use of transparencies saves time in that they can be prepared well in advance; they can be used as a quick reference, and also easily stored for future use (Burmark, 1997; Muyanda-Mutebi and Yiga-Matovu, 1993; National Audio-visual Supply, 1992; Williams, 1991; MacDonald, 1989).

Use of Video

Video is one of the resources that can be used for teaching and learning purposes. Williams (1991) remarked, "It all begins when someone sees a need for a (video) program on a particular topic and has some ideas on how that need might be met" (p. 112). He continued by posing questions that must be considered when deciding to produce a video program, such as, "For whom is the program being made? How old are they? What do they know already? Do you want specific feedback during the program or at the end?" (Williams, 1991, p. 112).

At the teacher training colleges, videos can be used when tutors want to show students various teaching strategies and skills. For example, video taping demonstrations of micro-teaching and video taping of specific lesson skills of introduction, questioning, reinforcement, explanation, and closure/conclusion can be done in the ideal situations of what the student teachers are expected to do. These skills can be shown to the students followed by discussions on the skills viewed before they practice them with their peers and at the primary demonstration schools.

Use of Computers

Computers are widely used for a variety of operations, such as writing through word processing, class presentations, data analysis, retrieving of information and communications (Heinich, Molenda, Russell, and Smaldino, 2002). In a survey of teachers' perceptions of the effects of technology on students' performance, the respondents indicated strong agreement that technology had a positive effect on the students' performance (Hurley and Mundy, 1977). It is interesting, however, to note that, even in the developed countries despite the noted effectiveness of technology, not all teachers are competent and willing to infuse technology in their classes. Thompson (2000) observed that some universities still use traditional methods of teaching while others have seen the need to respond to the changing world and are using the new technologies in their instruction.

It should be noted that currently tutors in the teacher training colleges in Malawi, even those who know how to operate the computers, have not yet used them for instructional purposes. However accessibility to this technology, allowing the tutors to "type tests, record grades … create handouts and transparences … and printed materials is a crucial first step in

the [tutors] use of technology in the classroom" (Brace and Roberts, 1996, p. 326). In all situations, it is necessary to provide computer training within a social support network and to encourage teacher empowerment over a period of time. Such training will help enhance teachers' comfort level with computers.

Use of Local Resources (TALULAR)

Wankat and Oreovicz (2001) in their article, "Turning Back the Clock," looked at the expenses incurred for purchasing modern technologies and the time needed to learn how to use them. They concluded that such technologies do not improve teaching or increase learning if proper learning principles are not followed. They suggested "trying simpler, inexpensive techniques that are effective and take little time to use" (p. 40).

It is with Wankat and Oreovicz's thinking that Malawi is currently emphasizing teaching and learning using locally available resources (TALULAR), which sometimes may not cost any money or very little money. The use of local resources is usually associated with improvisation where, when the original material is not available, a teacher devises a substitute. Teacher Development Unit (undated) gave an example of a globe made from clay or bamboo, which can be used to explain or illustrate rotation of the earth. Emphasis here should be on the ability to make the item to look like and function in the same way that the original material does, which helps students to have a true picture of the situation.

Teacher Development Unit (undated) noted comments from teachers about using improvisation through TALULAR:

- "… by making the aid myself I actually understand the topic better!" "I made aids with the help of my pupils, they learnt so did I …we learnt how they work by making them."
- "It promotes creativity and encourages other more practical skills"
- "More relevant to learners when you use local materials."
- "Improvisation sets a good example to pupils and inexperienced teachers. If we do it they may see the benefit." (p. 22)

It is this creativity and practical skills that tutors need so that they can be able to pick any piece of junk and produce a teaching material. At the Malawi Institute of Education (MIE) the department of Education Materials Development and Resources Centre

(EMDRC) is a service department supporting the members of staff with resources in the other departments and sections. Since one of its duties is to assist school and teacher development, the institution conducts workshops and seminars for in-service teachers and supervisors to address this mission statement, "improving quality of education through curriculum reform, research and in-service of implementers and managers" (Nurden, 2005 p. 4). However, these skills also need to be developed in the teacher training colleges so that tutors can learn to produce their own teaching materials.

Summary

In this chapter the reasons for using instructional technologies have been presented. Despite instructional technologies helping to capture pupils' attention and explaining concepts (Malawi Ministry of Education, 1995), literature has shown that it takes the willingness of the teachers to adapt to change in using instructional technologies in their teaching. However, for those teachers who are ready to use instructional technologies, literature reports that they face challenges of lack of adequate training, availability, accessibility and support from peers and administrators (Hope, 1997; Turner, 1996; and Ochs, 1993).

CHAPTER 3

METHODOLOGY

Instructional technology has been shown to have positive impact on teaching and learning in classrooms (Baylor and Ritchie, 2002). However little is known about the use of instructional technology in teacher education in Malawi. For this study, instructional technologies were defined as all the materials and equipment that are used to enhance the teaching and learning process, specifically chalkboards, flip charts, locally available resources, overhead projectors, videos, and computers.

The purpose of this study was to survey tutors in the teacher training colleges to determine what instructional technologies were available in the teacher training colleges, what technologies tutors used in their teaching, and problems tutors encountered during lesson delivery in relation to the use of instructional technologies, such as availability and accessibility of the technologies, and the tutors' perceived competence in using the technologies. These data provided a basis for making recommendations on what needs to be put in place to enhance the use of the instructional technologies in teacher training colleges. The following research questions guided the investigation:

1. How often did tutors use instructional technologies in their teaching?

2. What reasons did tutors have for not using technologies in their teaching?

3. How did college tutors perceive their competence levels in using instructional technologies?

4. What attitudes did college tutors have towards use of instructional technologies?

5. What did tutors consider important factors in influencing their use of instructional technologies?

Additionally, Domasi College of Education served as the basis for a snapshot study that described its experience in introducing the use of computers at the college. This chapter explains the procedure for both the survey methodology and the snapshot study methodology. The survey methodology is organized in five sections: the survey population and sample selection; the survey instrument, which describes the format and construction of the survey, the rating scale used, and validity and reliability; pilot testing of the survey; data

collection through the inventory and survey data; and data analysis procedures. The snapshot study methodology is organized in four sections: faculty and student interviews, class observations, staff survey, and data analysis procedures.

Gaining access to do the study involved first writing a letter to the Ministry of Education (see Appendix B) asking for permission to conduct research in all teacher training colleges and Domasi College of Education. The letter was also copied to all principals of the institutions. When permission was granted by the Ministry of Education, principals of the institutions and the participants from each of the teacher training colleges and participants from Domasi College of Education were personally contacted. All the participants agreed to participate by signing the consent form (see Appendix C).

Survey Population

The population for the survey was derived from the six teacher training colleges in Malawi; however, Kasungu Teachers College was used for pilot-testing the survey instrument. The actual survey population came from the five other teacher training colleges; namely Blantyre Teachers College, Karonga Teachers College, Lilongwe Teachers College, Montfort Teachers College, and St. Joseph's Teachers College. All tutors in the five teacher training colleges were eligible to participate in the survey. Table 3.1 shows the number of tutors per college, number of tutors who participated, and the participation percentage.

There was a high participation percentage (84.2%) for the survey because the instrument was delivered and administered in the colleges in person by the researcher. The fifteen tutors who did not participate were those who were actually out of the college for various reasons when the questionnaire was being administered.

Survey Instrument

Survey research requires the construction of a survey instrument to enable the researcher to collect data for use to make generalizations on pertinent issues under study. This is done under a specific procedure. Sudman and Bradburn (1982) emphasized that these procedures must be followed in order to develop a good survey.

Table: 3.1: Survey participation percentage

College	Number of tutors	Number participated	Participation percentage
Blantyre T.T.C.	21	19	90.4%
Karonga T.T.C.	19	16	84.2%
Lilongwe T.T.C.	19	16	84.2%
Montfort T.T.C.	21	17	80.95%
St. Joseph's T.T.C.	15	12	80%
Total	**95**	**80**	**84.2%**

Format and General Construction

The survey instrument (see Appendix D) was comprised of six sections and forty-one items, some of which were adopted and transformed from Medlin's (2001) dissertation, *The Factors that May Influence a Faculty Member's Decision to Adopt Electronic Technologies in Instruction*, and Majed's (1996) survey, "Student Teachers' Use of Instructional Media," while other items were constructed to address the Malawian context.

To get an overview of the personnel that were in the teacher training colleges and their subject distribution, the first section asked demographic information of the participants about their gender, age, highest qualification, and teaching subject. The second section, which had six items, dealt with frequency of use of instructional technologies such as chalkboard, overhead projectors. These data helped to answer research question 1. The third section of the survey had six items and addressed reasons that tutors had for not using technologies in their teaching, reasons such as lack of training or inaccessibility of the technologies. These data helped to answer research question 2. Section four had eight items aimed at eliciting participants' perceived competence levels in using the selected instructional technologies. These items provided data for research question 3.

The fifth section with eight items collected the participants' attitudes towards use of instructional technologies. Items included such statements as "teaching materials help elaborate difficult concepts" and "the challenge of learning about computers is exciting" to which the respondents checked their level of agreement or disagreement. Research question 4 was answered by these items. The sixth section had nine items dealing with the degree of importance of selected factors on influencing tutors' use of instructional technologies. Such items included "training" and "access to resources." These items answered research question 5.

Rating Scale

The survey items provided a variety of rating scales. Section two had a four-point Likert scale measuring frequency of use of instructional technologies with a scale 1=never to 4= all the time. Section three had five categories identifying participants' reasons for not using or seldom using technologies, with a rating of 1= not applicable, 2= lack of training, 3= lack of infrastructure, 4= not available, and 5= not accessible. Section four had a four-

point Likert scale on which participants reported their perceived level of competence in using the selected instructional technologies with the rating of 1=little or no competence to 4=very competent. Section five had a four point Likert scale, measuring how participants 1=strongly disagree (SD) to 4=strongly agree (SA) with statements regarding their attitudes towards use of instructional technologies. Section six, which measured the importance of selected factors on influencing tutors' use of instructional technologies, had a four-point Likert scale with a rating of 1 representing "Not important" to 4 representing "very important."

Validity and Reliability

Validity and reliability in surveys should be part of the priorities for consideration in research. Weems and Onwuegbuzie (2001) looked at how choice of mid-point categories and item wording (positively or negatively) can affect the validity and reliability of a survey. It is true that mid-point categories have pros and cons. They provide a place for respondents who genuinely do not know. But sometimes because of the ambiguity of the categories, the neutral positions seem to be the safe place to be. Either way, the reliability and validity are affected. Similarly, the positive and negative wording of the items has pros and cons. Although some researchers believe that following this pattern may discourage a response set (Weems and Onwuegbuzie, 2001, and Majed, 1996), it also depends on the interpretation and literacy level of the sample responding to the instrument. The instrument that was used in this study had no mid-point category. This arrangement was to challenge the respondents to give an opinion on the questions posed. The survey, however, had in section five both negatively and positively worded items. Since the researcher was dealing with tutors in the teacher training colleges, who are knowledgeable, it was anticipated that interpretation would not be a problem.

To ensure content validity, the content of the questions addressed the research questions specifically. In addition, a panel of four faculty members from Virginia Polytechnic Institute and State University went through the questionnaire items and made recommendations for improving the clarity of wording. The reliability of the instrument was determined from the results of the pilot testing where sources for response errors in the instrument were identified and corrected.

Pilot Testing

Pilot testing "is a small scale implementation of the draft questionnaire (survey) that assesses: questionnaire (survey) clarity, questionnaire (survey) comprehensiveness, and questionnaire (survey) acceptability" (Rea and Parker, 1997, p. 28-29). Sudman and Bradburn (1982) emphasized the need for pilot testing because "every questionnaire (survey) must be tested and refined under real-world conditions" (p. 282). Rosier (1988) asserted that surveys "should be adequately pre-tested … to check that the respondents understand the meaning of the questions or statements, to gauge whether test items are at an appropriate level of difficulty" (p. 109).

The items needed to be clear so that respondents would not have difficulty in trying to understand what the questions meant. The items needed to be relevant according to the objectives of the study; they needed to be complete and not redundant. Furthermore, they needed to be of an appropriate length and written so as to make respondents feel their privacy was not being jeopardized (Rea and Parker, 1997). Since the pilot testing was administered by the researcher, it provided an opportunity, apart from the written comments that participants had submitted, to "discuss the questionnaire (survey) with the respondents after the pilot testing … [was] over to discover whether any of the questions were unclear or difficult to answer" (Sudman and Bradburn, 1997, p. 284). This approach helped the researcher to make corrections and address other shortfalls in order to make an appropriate instrument for the actual research population.

The draft survey was pilot tested with 26 participants from Kasungu Teachers College. The pilot testing was done in a real-world condition (Sudman and Bradburn, 1982) because the participants resembled those that would be in the main study. Rea and Parker (1997) claimed that "It is only required that the pre-test respondents bear a reasonable resemblance to the study's actual working population" (p. 27). Participants were given an opportunity to offer comments on the structure of the questions, i.e. clarity, relevance, level of difficulty, and length of the survey.

After the pilot testing, there were several changes that needed to be made to the instrument. Item 2 in section one, which looked at the age ranges of participants, was

lowered from 30-35 years to 20-25 years because there were some respondents in the pilot test who were below 30 years of age. In item 4, which asked for the current teaching subject of participants, respondents ended up ticking all the subjects that they taught. The item was rephrased to "what teaching subject do you teach most of the time? Please tick one." This direction led participants to tick one subject, in which they had the most periods. Where participants had equal number of periods in two subjects, they were advised, during the administration of the survey, to make a choice between the two.

Section 6, which looked at instructional technologies used in teacher training colleges, was completely deleted because the items were seeking similar information as that of section 2 for frequency of use of technologies. Furthermore, although the instructions said "use one number only once" participants felt it was not proper to give a number 3, for example, to a technology which they never used. As a result they ended up writing several zeros (0) or ones (1) on all technologies that they never used. Therefore, this section was replaced by a new one – "reasons for not using/seldom use of technologies" that came immediately after section 2 (see Appendix D for the survey as administered).

Data Collection

Data concerning instructional technology were collected in two ways, a school inventory and a survey instrument.

The Inventory

The researcher met with the principals of the teacher training colleges and in collaboration with the store's clerk and/or the person in-charge of the audio-visual center took stock of what instructional technologies the colleges had. The inventory centered only on the technologies under study i.e., chalkboards, flip charts, overhead projectors, videos, and computers (see Appendix E). This inventory helped to establish what technologies were available to compare with respondents' responses on which technologies were used and which ones were not, i.e. to justify whether the non-use of the technologies was because they were not available, not adequate, or other reasons. Additionally, an unstructured interview emerged during the filling in of the inventory sheet to find out more information about the condition of the technologies as well as their location.

The Survey Data

There are several ways that surveys can reach respondents for completion. A researcher can contact respondents by mailing the surveys to them and wait for their responses. The advantages with mail out surveys are that the researcher is able to reach participants who are scattered and cannot easily be met in person, and also that respondents have ample time to think of the answers (Ary, Jacobs and Razavieh, 2002, Fowler, 2002, Rea and Parker, 1997,). On the other hand, mailing has a disadvantage because in many cases response rate is low, and the researcher must make several attempts to remind participants to respond (Ary, Jacobs and Razavieh, 2002, Fowler, 2002, Rea and Parker, 1997).

In this study the researcher administered the survey in person, i.e. moved from one college to the other. Despite the time and expense incurred, this approach helped the researcher to have a high response rate (Ary, Jacobs, and Razavieh, 2002), since the surveys were collected immediately after completion. Another advantage was that since the respondents were clustered at their working places, it was possible to get almost all respondents at the same time and allow them to fill in the surveys at the same time. In addition, as Ary, Jacobs, and Razavieh (2002) put it, "the researcher is present [and can] provide assistance or answer questions" about the items (p. 385). The presence of the researcher helped because he was able to go through the completed surveys and where a respondent forgot or skipped an item, he/she was asked to fill in the missing information, and hence all items in the survey were responded to and had no missing data.

The fear expressed by Rea and Parker (1997) that administering surveys in person confronts the researcher with a strange environment was not relevant because most of the respondents in the teacher training colleges are people with whom the researcher had worked from time to time.

Data Analysis Procedures

When data were collected using the survey, checking was done for completeness of the surveys. Data were entered into the Statistical Package for the Social Sciences (SPSS) for analysis. Demographic aspects were covered in questions 1-4 regarding sex, age,

qualifications and teaching subjects of respondents to get an overview of the personnel that were at the teacher training colleges when the survey was administered. Frequencies and percentages were calculated for the survey.

Snapshot Study Methodology

Domasi College of Education (DCE) is a college of education for secondary school teachers and currently the site of a new bachelor's degree program for training college tutors who will teach primary school teachers in the teacher training colleges. Because there has been some advanced technology introduced for instruction and other uses, DCE was used as a special case to attempt to ascertain processes and procedures that one college in Malawi used to facilitate the use of computers. Thus, an examination was done through interviews with the deputy principal, the computer lab assistant, and two members of staff, and two class observations of the two members of staff at Domasi College who use computers in their instruction. Faculty were surveyed, and a non-formal interview was also conducted with students in the computer lab.

Merriam (2001) commented on the importance of such a component that "discovery, insight, and understanding from the perspective of those being studied offers the greatest promise of making significant contributions to the knowledge base and practice of education" (p. 1). Seidman (1998) also remarked that "…the root of in-depth interviewing is an interest in understanding the experience of other people and the meaning they make of that experience" (p. 3). The interviews were semi-structured to give a chance to the researcher to probe with additional questions where the explanation was not clear. This approach also gave the participants flexibility to express themselves and provide further explanation of their experiences. Seidman (1998) observed that, "If given a chance to talk freely, people appear to know a lot about what is going on" (p. 2). This research approach took the pattern that Merriam (2001) and Creswell (1998) have recommended, in that the investigator needs to spend a substantial amount of time in the natural setting of the study and with intense contact with the participants.

The snapshot study was chosen to gain an understanding of how the faculty was using technology, what advantages they had experienced, what problems they were

31

encountering, and what they needed to effectively use technology. Just as Merriam (2001) remarked that "Insights … from case studies (in this context "a snapshot study") can directly influence policy, practice and future research" (p. 19), the information accumulated from other data sources provided data for a description of the observations and interviews. The links between what technologies tutors used in teacher training colleges and how advanced technology was used at Domasi College of Education may help provide a way forward for the teacher training colleges.

Data Collection for the Snapshot Study

Although the researcher was then a faculty member at DCE, he was not on the faculty when computer technology was initiated at the college. However, since becoming part of the faculty, he had worked in the faculty computer lab and attempted to facilitate computer use for faculty. The data collection for the snapshot study consisted of interviews, class observations, and a survey

Interviews. Two members of staff and the lab assistant were interviewed and audio-taped for transcription. The following served as guiding questions when collecting data from these interview informants at Domasi College of Education:

1. When did computer use start at Domasi College of Education?
2. Why did computers come to Domasi College of Education?
3. How has computer use developed, and what is keeping it going?
4. How are computers being used at Domasi College of Education?
5. What vision does the institution and faculty have regarding use of computers?
6. What needs to be done to sustain the use of computers by faculty at Domasi College of Education?

Also, an informal interview was conducted with students in the computer lab to find out what they were doing in the lab and their views on computer use, i.e. regarding frequency of their use of the computer lab, why it was important to learn computer use, and how they could improve their computer competence**.**

Class observations. Two faculty members, Mr. P, and Mr. Jim (pseudonyms), who taught computers skills to their students, were observed. In each lesson they were teaching computer basics to their students. The observations were to identify what subject was being

taught and how the computers were used in the lessons. The two members of staff were chosen because they were the members of staff who were teaching students some computer basics at the time data were collected.

The survey. A survey was conducted for the members of staff at DCE. The ten item survey wanted to establish the demographics of the participants on gender, age, highest qualifications and the faculty (department) they belonged to. Responses were also sought on faculty's perceived competence levels in using computers, how they had gained their computer knowledge, what they used computers for, their last computer training, and whether they gave assignments to students that required computer use. This last item was in part open ended to allow those members of staff who gave assignments to their students to indicate the type of assignments. For those who did not give assignments, an option of "not applicable" was given. The survey was not pilot tested since it was seen to be straight forward; however, it was checked and passed by a panel of four faculty members from Virginia Polytechnic Institute and State University (see Appendix F).

Data Analysis Procedures for the Snapshot Study

The interview data were transcribed and read to identify common and main issues just as Merriam (2001) pointed out that, "As you read down through the transcript, … you jot down notes, comments, observations, …potentially relevant, or important to your study," (p. 181). Curriculum, training, availability, maintenance/sustainability made up some of the main issues under discussion. Following the lesson observations, there was opportunity to get explanations of how the faculty used the computers for teaching. Frequencies and percentages were calculated from the ten-item survey of faculty. This information helped to make "naturalistic generalizations … that people can learn from either for themselves or for applying it to a population of cases" (Creswell, 1998, p. 154).

Summary

This chapter has described the methodology for studying the use of technologies at the teacher training colleges in Malawi, which included the description of the population and

sampling procedure, the format and construction of the survey instrument and the interview questions, pilot testing for the survey, procedures for data collection and how data were analyzed. The chapter also has explained how data were collected from faculty and students at Domasi College of Education through interviews, class observations and survey, and the analysis process. These data were used to develop a portrait of how Domasi College of Education initiated faculty use of computers and how computers were currently used in classroom instruction at the college.

CHAPTER 4

DATA ANALYSIS

The purpose of this study was to give a descriptive analysis of use of instructional technologies by tutors in teacher training colleges in Malawi. This was based on what technologies were available, their frequency of use, reasons for not using some of the technologies. Also the tutors' competence levels, attitudes, and factors that would influence the tutors' use of instructional technologies were ascertained. This chapter focuses on the analysis of the collected data from the survey of the five Teacher Training Colleges (TTCs), as well as interviews, observations and a survey from Domasi College of Education, where lecturers (faculty) began using computers to assist in their instruction in 1997.

Use of Technologies at the Teacher Training Colleges

A detailed description of each college is provided, followed by the inventory of the technologies available in the colleges. An analysis of the data for each college in response to the survey questions on frequency of use of technologies, reasons for not using technologies, competence levels, and attitudes towards use of technologies and important factors that can influence use of technologies is then given. A summary of survey findings is provided for each TTC. Following the analysis of each college, similarities and differences between colleges are discussed as a way of identifying patterns across colleges regarding the use of instructional technologies.

<u>Blantyre Teachers College</u>

Blantyre Teachers College is located about five kilometers southwest of Limbe town, close to the foot of Soche Hill, in the Southern Region of Malawi. The college is close to Soche Hill Secondary School and Kapeni Demonstration Primary School, where student teachers from the college do their initial classroom teaching practice supervised by tutors. In

addition to the classrooms, there are also special rooms, such as the science laboratory, home economics, woodwork shop, the library and a recreational hall. The college campus was originally Soche Hill College and was a facility for training secondary school teachers. When those training services were moved to Chancellor College, Domasi College (which was at the Malawi Institute of Education and was a site for training primary school teachers) moved to Soche Hill College in 1973 and was named Blantyre Teachers College for primary school teachers. It has a capacity of 540 students. Of the 21 tutors at Blantyre Teachers College, 19 participated in the survey.

Table 4.1 shows that tutors at Blantyre Teachers College were comprised of 12 males and 7 females, with 12 of them between 31 and 45 years old. Over half of the tutors had a bachelor's degree. The expected number of tutors per subject ranges from 1 to 7; however, table 4.1 reflects a shortage of staff in Mathematics, Foundation Studies, Physical Education, Religious Education, and Creative Arts. The college has five departments: Foundation Studies had two members of staff; Languages, comprised of English and Chichewa, had four members of staff: Mathematics and Science, comprised of Mathematics, Science and Health Education, Agriculture, and Home Economics, had eight members of staff; Social Studies, comprised of Social Studies and Religious Education, had four members of staff.

The Inventory

Table 4.2 shows the technologies and their numbers available at Blantyre Teachers College. However, according to the officer responsible for these technologies, the chalkboards needed repainting and some rotating chalkboards were not rotating properly, hence needed repairing. The five reams of flip charts were distributed one to each of the five departments for a school session. Because departments varied in size, the distribution ratio ranged from six sheets per individual for those departments that had more tutors to 50 sheets per individual for the departments that had few tutors. It should, however, be noted that these numbers were lower when tutors were co-opted to teach some subjects that had no tutors available. Of the four overhead projectors available, only one was working. The other three had no bulbs; furthermore, there were no felt pens, and sockets in some classrooms

Table 4.1: Demographics (Blantyre Teachers College)

Gender	Age		Highest Qualification		Teaching Subject		Expected no. of tutors
		Freq.		*Freq.*		*Freq.*	
Male (12)	31-35	(4)	Diploma (8)		Mathematics	(1)	3
Female(7)	36-40	(4)	Bachelors (11)		English	(3)	4
	41-45	(4)			Social studies	(4)	3
	46-50	(3)			Foundation studies	(2)	7
	51-55	(2)			Agriculture	(1)	2
	56 or more	(2)			Chichewa	(1)	2
					Music	(1)	1
					Science/health	(3)	3
					Physical Education	(0)	1
					Religious Education	(0)	1
					Creative Arts	(0)	1
					Home Economics	(3)	2

Freq. = Frequency

Table 4.2: Inventory (Blantyre Teachers College)

Instructional Technologies	Number
1. Chalkboard	21
2. Flip charts	5 reams
3. Overhead projectors	4
4. Video projection equipment	2
5. Computers	5

were vandalized, making it impossible to use equipment requiring electricity. The two video projection equipment sets were not working because their terminals and tubes were burnt, and of the five computers, only three were working. Two computers were in the library and accessible to tutors, while one was in the principal's office and connected to e-mail service. Two computers were not working because their programs were corrupted by viruses. The equipment that was not working was kept in the storeroom in the library.

Survey Results

The first survey question addressed the reported frequency of tutors' use of technologies at Blantyre Teachers College. Data in table 4.3 show that all of the tutors used the chalkboard either occasionally or all the time and that 16 of the 19 tutors used local resources either occasionally or all the time. Over half (10 of 19) of the tutors either never used or seldom used the flip charts, and more than three-fourths of the tutors (15 of 19) reported never using or seldom using overhead projectors. Even more rarely used were video projection equipment and computers, with 17 of the tutors reporting that they never or seldom used video projection and 18 reporting never or seldom using computers. These responses revealed that the chalkboard and local resources were the most frequently used technologies among the tutors at Blantyre Teachers College. However, there were maintenance problems that no doubt affected the use of charts, overhead projectors, videos and computers. Using local resources for instruction has been an on-going emphasis in teacher training. Tutors in all the subjects except Chichewa reported using local resources. The computers located in the library were used by Social Studies, Science, Home Economics and Mathematics tutors.

Table 4.4 documents the results of survey question 2. More than half the tutors (11 of 19) did not use flip charts because they were not available. But according to the officer responsible for the college equipment, each department had a ream of chart paper for the academic year; however, the access and quantity were uneven because departments varied in size (see Inventory). Over half of the participants did not use overhead projectors because of lack of infrastructure. This agreed with the report by the officer in charge of the equipment that sockets in some classes had been vandalized; felt pens were not available; few transparencies were available; and some of the overhead projectors had no bulbs. Twelve

39

Table 4.3: Frequency of use of technologies (Blantyre Teachers College)

Technology	Never		Seldom		Occasionally		All the time	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Chalkboard	0	0	0	0	1	5.3	18	94.7
Flip chart	8	42.1	2	10.5	7	36.8	2	10.5
Overhead projectors	11	57.9	4	21.1	4	21.1	0	0
Video projection equipment	12	63.2	5	26.3	2	10.5	0	0
Computers	14	73.7	4	21.1	1	5.3	0	0
Local resources	1	5.3	2	10.5	9	47.4	7	36.8

N=19

Freq. = frequency

Table 4.4: Reasons for not using technologies (Blantyre Teachers College)

Technology	Not applicable		Lack of training		Lack of infrastructure		Not available		Not accessible	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Chalkboard	19	100	0	0	0	0	0	0	0	0
Flip chart	6	31.6	0	0	1	5.3	11	57.9	1	5.3
Overhead projectors	3	15.8	1	5.3	10	52.6	1	5.3	4	21.1
Videos	0	0	2	10.5	5	26.3	6	31.6	6	31.6
Computers	2	10.5	10	52.6	3	15.8	3	15.8	1	5.3
Local resources	15	78.9	3	15.8	1	5.3	0	0	0	0

N=19
Freq. = frequency

of the nineteen tutors did not use video projection equipment because it was either not available or not accessible. This number was reasonable in that the inventory revealed that there were two sets of video projection equipment but none were working because their terminal and tubes were burnt. However, video tapes in science, mathematics, and micro teaching lessons were available and were kept in the library.

Over half of the tutors reported that lack of training for computer use was the reason for not using computers. However, there were two tutors -- one in Social Studies and one in Mathematics -- who said they used a computer frequently and, therefore, checked "not applicable" for lack of training. Although local resources are seen as being readily available and easy to use, three tutors -- one in Chichewa, one in Social Studies, and one in Home Economics -- indicated that lack of training was the reason for not using local resources. Given that the uses of locally available resources are to be emphasized in teacher training colleges, it is important to note that 15 percent of the tutors felt they lacked the training needed to incorporate this aspect into their instruction.

Survey question 3 dealt with the tutors' competence levels in the use of technologies. Responses in table 4.5 show that all tutors reported either above average or very competent in the use of the chalkboard, and more than half (13 of 19) of the tutors produced teaching materials using local resources. It should, however, be noted that two of the tutors in Social Studies and Chichewa, who indicated lack of training as a reason for not using local resources (table 4.4) were the same tutors who reported little/no competence in producing such materials. Additionally, a Home Economics tutor also indicated in table 4.5 having little or no competence in the use of local resources.

On the other hand, thirteen tutors contended that they had little/no competence in the use of computers for class work, while only 10 of them said they had little or no competence in using computers for personal work. This indicated that there were more tutors using computers for personal work than for class work.

Survey question 4 dealt with tutors' attitudes towards use of instructional technologies. Responses from participants in table 4.6 show that all or over half of the tutors either agreed or strongly agreed with the statements that indicated the use of the chalkboard as being important (19 of 19), production of teaching materials requires too much time

Table 4.5: Competence levels (Blantyre Teachers College)

Activity	Little/no competence		Average competence		Above average competence		Very competent	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Use the chalkboard in my teaching	0	0	0	0	2	10.5	17	89.5
Operate an overhead projector in my teaching	3	15.8	9	47.4	5	26.3	2	10.5
Prepare flip charts for use in class	5	26.3	2	10.5	7	36.8	5	26.3
Use flip charts during lesson presentation	3	15.8	4	21.1	5	26.3	7	36.8
Produce teaching materials using local resources	3	15.8	3	15.8	5	26.3	8	42.1
Use computers to assist with class work	13	68.4	4	21.1	2	10.5	0	0
Use computers for personal work	10	52.6	3	15.8	5	26.3	1	5.3
Show a video during teaching	6	31.6	5	26.3	3	15.8	5	26.3

N=19
Freq. = Frequency

Table 4.6: Attitudes towards use of instructional technologies (Blantyre TTC)

Item	Strongly disagree		Disagree		Agree		Strongly agree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Using the chalkboard is very important	0	0	0	0	4	21.1	15	78.9
Producing teaching materials requires too much time	1	5.3	3	15.8	6	31.6	9	47.4
Teaching materials help elaborate difficult concepts	0	0	0	0	4	21.1	15	78.9
Overhead projectors are easy to operate	0	0	4	21.1	13	68.4	2	10.5
Learning about computers is very difficult	3	15.8	11	57.9	4	21.1	1	5.3
The challenge of learning about computers is exciting	0	0	0	0	10	52.6	9	47.4
Videos are difficult to use in the class	4	21.1	8	42.1	7	36.8	0	0
Local resources are a good substitute for some commercial teaching materials	1	5.3	0	0	7	36.8	11	57.9

N=19
Freq. = Frequency

(15 of 19), teaching materials help to elaborate difficult concepts (19 of 19), and local resources are good substitutes for some commercial teaching materials (18 of 19). The agreement by the tutors to the statement that "production of teaching materials requires too much time" is problematic when set against tutors' views that the function of teaching materials is "to elaborate difficult concepts" and that "local resources are good substitutes to some commercial teaching materials." It may be possible that these conflicting attitudes could lead to situations where the lack of preparation of teaching materials for instruction could hinder students' understanding of course concepts.

More than half the tutors also either agreed or strongly agreed with the statements "overhead projectors are easy to operate" (15 of 19) and "the challenge of learning about computers is exciting" (19 of 19). Although the self-reports of their competence levels were very low in use of computers and videos (table 4.5), almost three-fourths (14 of 19) of the tutors either disagreed or strongly disagreed with the statement "learning about computers is very difficult," while more than half of them (12 of 19) either disagreed or strongly disagreed with the statement "videos are difficult to use in the class." These expressed views were an indication that tutors believed that given a chance to learn how to use the computers and videos, they could do it.

Table 4.7 shows responses to survey question 5 on what factors can influence tutors' use of technologies. Responses from the participants indicate that over half of the participants valued all items as being either important or very important factors that could influence them to use technologies in their teaching. This agrees with what Ochs (1993) said on the need for training, that "…good training courses are almost always superior because they effectively drill concepts into a format that is easy to master" (p.105). The need for access to technologies expressed by participants was also emphasized by Brace and Roberts (1996) who said, "Faculty need access to technology of all types" (p. 326). Three fourths of the tutors checked peer support (17 of 19) and workshops and seminars (16 of 19) as either important or very important in influencing the use of technologies for instruction. Brace and Roberts (1996) also emphasized this point: "Faculty requires hands-on experience [through] workshops and orientations that are offered at convenient times" (p. 327).

Table 4.7: Factors that influence use of technologies (Blantyre Teachers College)

Item	Not important		Somewhat important		Important		Very important	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Training	0	0	0	0	3	15.8	16	84.2
Availability of resources	0	0	2	10.5	5	26.3	12	63.2
Administrative support	0	0	2	10.5	6	31.6	11	57.9
Peer support	0	0	2	10.5	7	36.8	10	52.6
Access to resources	0	0	0	0	4	21.1	15	78.9
Workshops and seminars	0	0	3	15.8	6	31.6	10	52.6
Personal interest in instructional technologies	0	0	0	0	2	10.5	17	89.5
Personal interest in improvement in my teaching	0	0	0	0	2	10.5	17	89.5
Personal interest in enhancing students' learning	0	0	0	0	2	10.5	17	89.5

N=19
Freq. = frequency

Summary for Blantyre Teachers College

During the time of this study, Blantyre Teachers College had more male than female tutors and had a shortage of tutors in all the subjects except for Social Studies, Music, Home Economics, and Science and Health Education. The inventory of their available technologies revealed some shortages that affected the frequency of use of some technologies, for example flip charts, felt pens, and bulbs for overhead projectors. Maintenance was another problem, for example having bulbs for overhead projectors and having workable sockets in the classrooms.

In addition to the unavailability of some technologies, other reasons given for not using certain technologies were inaccessibility and lack of training. Competence levels, which were high in the use of chalkboard, flip charts, and local resources, were low in the use of video and computers. However, tutors' disagreement with the statements, "videos are difficult to operate" and "computers are difficult to learn," was an indication that they felt they could learn how to use those technologies if given the opportunity. All factors listed in the survey were selected by the tutors as important in affecting their use of technologies; however, training, personal interest, and accessibility were rated high. It has been noted that training was still needed on how to use local resources.

Karonga Teachers College

Karonga Teachers College is located about four kilometers west of Karonga town in the Northern Region of Malawi off Chiweta − Karonga road. As you enter the college campus, you pass through a demonstration school where student teachers take their initial teaching experience in the classroom. The administration block which is south of the car park, has the male hostels behind it. The classrooms which are on the western side of the car park also have tutors' office where they prepare for their lessons and give assistance to students who have academic problems. The dining and recreational hall, which is on the northern side of the car park, is close to the science laboratory and home economics rooms, and behind the hall are the female hostels.

The college opened in 1988 and has an enrolment of 300 students. Just like the other colleges, Karonga has also five departments: Foundation Studies had three tutors;

Languages comprised of English and Chichewa had two tutors; Social Studies comprised of Social Studies and Religious Education had two tutors; Science and Math department, which is comprised of Mathematics, Science/ Health Education, Home Economics, Agriculture, had eight tutors; and Practical Arts made up of Creative Arts, Music and Physical education had one tutor. Of the 19 tutors at Karonga Teachers College, 16 participated in the survey. Tutors at Karonga Teachers College who participated in the survey were fifteen males and one female, with half of them between 46 and 50 years old. Over half of the tutors were diploma holders. Adequate staffing was only in Science/Health Education, which had more tutors than required and Creative Arts; the rest of the subjects had acute shortage of staff (see table 4.8).

The Inventory

Table 4.9 shows the technologies and the quantities that are available at Karonga Teachers College. The inventory assisted in tallying and comparing the availability and use of the technologies as reported by the tutors.

According to the officer responsible for the technologies, all the sixteen chalkboards were in good condition. The six reams of flip chart paper were distributed about one ream for each of the five departments. Of the six overhead projectors available, four were working; the two that were not working had no bulbs and were kept at the storeroom. There were no transparencies and felt pens to go with the overhead projectors. Of the two video projection sets, one was working. According to the officer responsible, the one that was not working had just developed a technical fault. It was also reported that there were in the audio-video rooms tapes for microteaching lessons. The three computers that were available were all working. One was being used by the secretary to the principal, while the remaining two that were in the administration block were accessible to the tutors.

Survey Results

The first survey question dealt with frequency of use of technologies by the tutors. Responses of participants in table 4.10 reveal that all the tutors used the chalkboard all the time and local resources either occasionally or all the time. Thirteen of the 16 tutors

Table 4.8: Demographics (Karonga Teachers College)

Gender	Age _Freq._	Highest qualification _Freq._	Teaching subject _Freq._	Expected no. of tutors
Male (15)	26-30 (1)	Diploma (9)	Mathematics (2)	3
Female (1)	36-40 (1)	Bachelors (5)	English (2)	4
	41-45 (3)	Other (2) (diploma in lab science, certificate in English)	Social studies (2)	3
	46-50 (8)		Foundation studies (3)	7
	51-55 (3)		Creative arts (1)	1
			Science/health (5)	3
			Home Economics (1)	2
			Music (0)	1
			Chichewa (0)	2
			Physical education (0)	1
			Religious education (0)	1
			Agriculture (0)	2

Freq. = Frequency

Table 4.9: Inventory (Karonga Teachers College)

Instructional Technologies	Number
1. Chalkboards	16
2. Flip charts	6 reams
3. Overhead projectors	6
4. Video projection equipment	2
5. Computers	3

Table 4.10: Frequency of use of technologies (Karonga Teachers College)

Technology	Never		Seldom		Occasionally		All the time	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Chalkboard	0	0	0	0	0	0	16	100
Flip chart	2	12.5	11	68.8	2	12.5	1	6.3
Overhead projectors	9	56.3	6	37.5	1	6.3	0	0
Videos	12	75.0	3	18.8	1	6.3	0	0
Computers	9	56.3	3	18.8	4	25.0	0	0
Local resources	0	0	0	0	5	31.3	11	68.8

N=16
Freq. = frequency

reported either seldom using or never using flip charts. The fact that only one ream was issued to each department for the whole school session, no doubt was a major factor in not using flip charts. Similarly, almost all of the tutors (15 of 16) reported either seldom or never using overhead projectors or videos. Again, having no felt pens or transparencies available made it difficult for the tutors to use the overhead projectors. Three-fourths of the tutors (12 of 16) either seldom or never used computers. However, with two working computers available to tutors, yielding a ratio of 1 to 8, tutors could have taken turns to be on the computer if they had wanted.

The second survey question elicited responses concerning reasons for not using technologies. Data in table 4.11 show that less than half the tutors (7 of 16) did not use the overhead projectors and slightly more than half (9 of 16) did not use videos because they were not accessible. Although the inventory showed that there were four overhead projectors in working condition, there was lack of felt pens and transparencies. Three-fourths (12 of 16) of the tutors did not use the flip charts because they were not available. Although the inventory shows there were six reams of chart paper, which was slightly more than one ream per department, it is evident that survey participants felt it was the same as not being available. Half of the participants (8 of 16) indicated 'lack of training' as a reason for not using computers.

The third survey question (Table 4.12) examined the competence levels of tutors in using technologies. Tutors' responses showed that they all (16 or 16) believed they have either above average competence or very competent in using the chalkboard for teaching and in the production of teaching materials using local resources. The majority of respondents also rated themselves as having above average competence or very competent in operating an overhead projector (11 of 16) and preparing and using flip charts (13 of 16). Slightly over half of the tutors (9 of 16) reported having either above average competence or very competent in showing videos during teaching.

On the other hand, almost all the tutors (15 of 16) reported either average or 'little/no competence' in use of computers to assist with class work or for personal work. Although percentages for not using and seldom using flip charts, overhead projectors, and videos were very high (table 4.10), the self-reported very competent levels of the same (table 4.12) show that tutors believed they possessed the skills. Apparently, what was needed was to make

Table 4.11: Reasons for not using technologies (Karonga Teachers College)

Technology	Not applicable		Lack of training		Lack of infrastructure		Not available		Not accessible	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Chalkboard	16	100	0	0	0	0	0	0	0	0
Flip chart	1	6.3	0	0	2	12.5	12	75.0	1	6.3
Overhead projectors	0	0	3	18.8	3	18.8	3	18.8	7	43.8
Videos	0	0	4	25.0	1	6.3	2	12.5	9	56.3
Computers	1	6.3	8	50.0	1	6.3	1	6.3	5	31.3
Local resources	14	87.3	1	6.3	0	0	1	6.3	0	0

N=16
Freq. = frequency

Table 4.12: Competence levels (Karonga Teachers College)

Activity	Little/no competence		Average competence		Above average competence		Very competent	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Use the chalkboard in my teaching	0	0	0	0	2	12.5	14	87.5
Operate an overhead projector in my teaching	5	31.3	0	0	4	25.0	7	43.8
Prepare flip charts for use in class	0	0	3	18.8	5	31.3	8	50.0
Use flip charts during lesson presentation	0	0	3	18.8	5	31.3	8	50.0
Produce teaching materials using local resources	0	0	0	0	6	37.3	10	62.3
Use computers to assist with class work	9	56.3	6	37.5	0	0	1	6.3
Use computers for personal work	8	50.0	7	43.8	0	0	1	6.3
Show a video during teaching	4	25.0	3	18.8	5	31.3	4	25.0

N=16
Freq. = frequency

them more available and accessible. The number of tutors (12 of 16) who reported either seldom using and not using the computer in table 4.10 agreed with the lack of competence for the same (table 4.12), which was attributed to lack of training by half of the tutors (8 of 16).

The fourth survey question looked at the tutors' attitudes towards use of instructional technologies. Data in table 4.13 show that all tutors (16 or 16) either agreed or strongly agreed with statements that indicated "using the chalkboard is very important"; "teaching materials help to elaborate difficult concepts"; "local resources are a good substitute for some commercial teaching materials"; and "the challenge of learning about computers is exciting." More than three fourths of the participants either agreed or strongly agreed with the statement, "overhead projectors are easy to operate" (14 or 16); and they also believed that "producing teaching materials requires too much time (13 of 16). More than half of the tutors (11 of 16) either disagreed or strongly disagreed with the statements, "learning about computers is very difficult" and "videos are difficult to use in the class." Despite reporting little or no competence in use of computers (table 4.12), respondents felt that learning about computers was not difficult and half of them (8 of 16, table 4.11) claimed the need for training to equip them with the necessary skills.

One attitude that appears problematic is the belief that production of teaching materials requires too much time, an attitude held by more than three fourths of the tutors. Yet, they also expressed unanimity about the importance of teaching materials in elaborating difficult concepts.

The last survey question focused on factors that influence use of technologies. Responses in table 4.14 show that high percentages of the tutors valued all items as being very important with "training" as the most highly rated (93.8%). The one exception was the value placed on "peer support" which was rated important by 10 of the 16 respondents.

Table 4.13: Attitudes towards use of instructional technologies (Karonga TTC)

Item	Strongly disagree		Disagree		Agree		Strongly agree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Using the chalkboard is very important	0	0	0	0	2	12.5	14	87.5
Producing teaching materials requires too much time	1	6.3	2	12.5	3	18.8	10	62.5
Teaching materials help elaborate difficult concepts	0	0	0	0	1	6.3	15	93.8
Overhead projectors are easy to operate	0	0	2	12.5	7	43.8	7	43.8
Learning about computers is very difficult	1	6.3	10	62.5	5	31.3	0	0
The challenge of learning about computers is exciting	0	0	0	0	10	62.5	6	37.5
Videos are difficult to use in the class	3	18.8	8	50.0	3	18.8	2	12.5
Local resources are a good substitute for some commercial teaching materials	0	0	0	0	1	6.3	15	93.8

N=16
Freq. = frequency

Table 4.14: Factors that influence use of technologies (Karonga Teachers College)

Item	Not important		Somewhat important		Important		Very important	
	Freq	%	Freq.	%	Freq.	%	Freq	%
Training	0	0	1	6.3	0	0	15	93.8
Availability of resources	0	0	0	0	5	31.3	11	68.8
Administrative support	0	0	2	12.5	4	25.0	10	62.5
Peer support	0	0	1	6.3	10	62.5	5	31.3
Access to resources	0	0	0	0	5	31.3	11	68.8
Workshops and seminars	0	0	0	0	4	25.0	12	75.0
Personal interest in instructional technologies	0	0	0	0	3	18.8	13	81.3
Personal interest in improvement in my teaching	0	0	0	0	4	25.0	12	75.0
Personal interest in enhancing students' learning	0	0	0	0	3	18.8	13	81.3

N=16
Freq. = frequency

Summary for Karonga Teachers College

This section has dealt with demographic issues of Karonga Teachers College that showed, for example, that there were more male than female tutors and a shortage of tutors in all the subjects except for Science and Health Education and Creative Arts. The inventory described what technologies were available, but also showed shortfalls in overhead projectors having no bulbs, felt pens and transparencies. The frequency of use of these technologies was more on the chalkboard and local resources and less on flip charts, video, overhead projectors and computers, which can be attributed to the unavailability, inaccessibility and lack of training. Although there was less frequency of use of video and overhead projectors, competence levels for the same were high. Factors rated as very important for influencing the use of technologies were availability, accessibility, personal interest, workshops, and seminars. There was also an interesting contradiction concerning production of teaching materials using local resources, i.e. tutors reported such production requires too much time but they believed that teaching materials are very important in teaching concepts.

Lilongwe Teachers College

Lilongwe Teachers College is about two kilometers west off the Lilongwe – Kasungu road from Kanengo en route to Area 25. The college has a demonstration primary school where student teachers do their initial classroom teaching practice. All the buildings have slanting roofs. In addition to the classrooms there are also special rooms like the library, science laboratory, home economics, and a wood workshop that was not working due to lack of equipment. Apart from the staff room where tutors meet for discussions, they have offices within the classroom area for preparation of their class work and also conduct discussions with students who have difficulties with academic work. The administration block, which is upstairs, has the dining hall and male hostels behind it. The recreation hall and female hostels are on the eastern side, with the library and classrooms on the western side. The college was opened in 1971 and has a student capacity of 540. Of the 19 tutors at the college 16 participated in the survey.

Tutors at Lilongwe Teachers College were comprised of 11 male and 5 female, with more than half (9 of 16) of them between 41 and 50 years old. Half (8 of 16) of the tutors were diploma holders. According to the expected number of tutors there were shortages in all the subjects except for Agriculture, Music, and Science/Health Education (see table 4.15).

The Inventory

Table 4.16 shows the technologies that were available at Lilongwe Teachers College. The officer responsible for these technologies stated that of the 27 chalkboards 21 needed repainting. There were no flip charts available at the college. Of the nine overhead projectors, five were working. However, there were no felt pens, and few transparences were available. Four of the non-working overhead projectors had no bulbs so were kept at the storeroom in the library. There was one video projection set, and it was working. All four computers were working. One was in the principal's office, and the remaining three computers were in the library, accessible to the tutors.

Survey Results

Survey question 1 dealt with how frequent tutors used technologies that were available. Table 4.17 shows that all the tutors (16 of 16) used the chalkboard all the time and three fourths (12 of 16) of them used local resources either occasionally or all the time. Despite flip charts being unavailable as per the inventory, flip charts were used occasionally by half of the tutors (8 of 16), implying that when the charts are available their use was occasional. On the other hand, almost all tutors (15 of 16) either seldom used or never used overhead projectors or videos. More than three fourths of the tutors (13 of 16) seldom used or never used computers even though three computers were available for use in the library.

The second survey question focused on reasons for not using technologies. Responses in table 4.18 show that three fourths of the tutors (12 of 16) did not use flip charts and about the same number (11 of 16) did not use videos because they were not available. This agreed with the inventory, which showed that there were no flip charts and only one set of video projection equipment. Almost three fourths of the participants (11 of 15) did not

Table 4.15: Demographics (Lilongwe Teachers College)

Gender Freq.	Age Freq.	Highest qualification Freq.	Teaching subject Freq.	Expected no. of tutors
Male (11)	26-30 (1)	Diploma (8)	Mathematics (2)	3
Female (5)	36-40 (2)	Bachelors (6)	English (2)	4
	41-45 (5)	Masters (2)	Social Studies (2)	3
	46-50 (4)		Foundation Studies (3)	7
	51-55 (2)		Agriculture (2)	2
	56 or more (2)		Chichewa (1)	2
			Music (1)	1
			Science/Health (3)	3
			Home Economics (1)	2
			Physical Education (0)	1
			Creative arts (0)	1
			Religious Education (0)	1

Table 4.16: Inventory (Lilongwe Teachers College)

Instructional Technologies	Number
1. Chalkboards	27
2. Flip charts	0
3. Overhead projectors	9
4. Videos	1
5. Computers	4

Table 4.17: Frequency of use of technologies (Lilongwe Teachers College)

Technology	Never		Seldom		Occasionally		All the time	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Chalkboard	0	0	0	0	0	0	16	100
Flip chart	2	12.5	6	37.5	8	50.0	0	0
Overhead projectors	8	50.0	7	43.8	1	6.3	0	0
Videos	12	75.0	3	18.8	1	6.3	0	0
Computers	13	81.3	0	0	3	18.8	0	0
Local resources	1	6.3	3	18.8	4	25.0	8	50.0

N=16

Freq. = frequency

Table 4.18: Reasons for not using technologies (Lilongwe Teachers College)

Technology	Not applicable		Lack of training		Lack of infrastructure		Not available		Not accessible	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq	%
Chalkboard	16	100	0	0	0	0	0	0	0	0
Flip chart	1	6.3	1	6.3	2	12.5	12	75.0	0	0
Overhead projectors	1	6.3	2	12.5	11	68.8	0	0	2	12.5
Videos	0	0	1	6.3	1	6.3	11	68.8	3	18.8
Computers	0	0	7	43.8	2	12.5	2	12.5	5	31.3
Local resources	13	81.3	3	18.3	0	0	0	0	0	0

N=16
Freq. = frequency

use overhead projectors due to lack of infrastructure. This could be attributed to the inadequacy of transparencies and unavailability of felt pens as indicated in the inventory. Three fourths of the tutors (12 of 16) cited either lack of training or accessibility as reasons for not using computers. However, the three computers located in the library were accessible to the tutors as described in the inventory.

Survey question 3 dealt with competence levels of tutors in using technologies. Data in table 4.19 indicate that all participants (16 of 16) reported being either above average or very competent in using the chalkboard. Approximately three fourths of them expressed above average or very competent in the preparation and use of flip charts (11 or 16) and in the production of teaching materials using local resources (13 or 16). On the other hand, approximately three fourths of the tutors had either average competence or little or no competence in use of computers to assist with class work (14 of 16), use of computers for personal work (12 of 16), and showing a video during teaching (11 of 16). The differences in the competence levels on the use of the computers indicate that twice as many tutors were able to use a computer for personal work as compared to using a computer to prepare materials for class work.

The fourth survey question dealt with tutors' attitudes toward the use of instructional technologies. Responses in table 4.20 show that all the respondents (16 of 16) either agreed or strongly agreed with the statements, "using the chalkboard is very important" and "teaching materials help elaborate difficult concepts." Almost all tutors (15 of 16) either agreed or strongly agreed that "the challenge of learning about computers is exciting" and "local resources are a good substitute for some commercial teaching materials." Three fourths (12 of 16) agreed or strongly agreed that "producing teaching materials takes too much time."

However, almost all tutors (15 of 16) either disagreed or strongly disagreed with the statement "learning about computers is very difficult," while almost three fourths (11 of 16) either disagreed or strongly disagreed with the statement "videos are difficult to use in the class." Such responses may indicate that tutors just need to be given the opportunity to learn these technologies.

64

Table 4.19: Competence levels (Lilongwe Teachers College)

Activity	Little/no competence		Average competence		Above average competence		Very competent	
	Freq.	%	Freq.	%	Freq	%	Freq	%
Use the chalkboard in my teaching	0	0	0	0	4	25.0	12	75.0
Operate an overhead projector in my teaching	4	25.0	5	31.3	2	12.5	5	31.3
Prepare flip charts for use in class	0	0	5	31.3	3	18.8	8	50.0
Use flip charts during lesson presentation	1	6.3	4	25.0	4	25.0	7	43.8
Produce teaching materials using local resources	0	0	3	18.8	7	43.8	6	37.5
Use computers to assist with class work	13	81.3	1	6.3	2	12.5	0	0
Use computers for personal work	8	50.0	4	25.0	3	18.8	1	6.3
Show a video during teaching	9	56.3	2	12.5	2	12.5	3	18.8

N=16,
Freq. = frequency

Table 4.20: Attitudes towards use of instructional technologies (Lilongwe TTC)

Item	Strongly disagree		Disagree		Agree		Strongly agree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Using the chalkboard is very important	0	0	0	0	2	12.5	14	87.5
Producing teaching materials requires too much time	0	0	4	25.0	7	43.8	5	31.3
Teaching materials help elaborate difficult concepts	0	0	0	0	0	0	16	100
Overhead projectors are easy to operate	0	0	2	12.5	9	56.3	5	31.3
Learning about computers is very difficult	5	31.3	10	62.5	1	6.3	0	0
The challenge of learning about computers is exciting	0	0	1	6.3	5	31.3	10	62.5
Videos are difficult to use in the class	3	18.8	8	50.0	5	31.3	0	0
Local resources are a good substitute for some commercial teaching materials	1	6.3	0	0	4	25.0	11	68.8

N=16
Freq. = frequency

Survey question 5 dealt with factors that influence tutors' use of technologies. Data in table 4.21 show that all the participants (16 of 16) rated as either important or very important the following factors: training, availability of resources, access to resources, and personal interest in improving teaching, and personal interest in enhancing students' learning. As in other colleges, peer support as a factor in using technologies was rated lower in importance than other items.

Summary for Lilongwe Teachers College

The section has focused on the demographic setup of Lilongwe Teachers College, showing, for example, that there were more male than female tutors and a shortage of tutors in the subjects except for Agriculture, Music and Science and Health Education. The tutors reported competence levels that were high in the use of the chalkboard, flip charts and local resources and low in the use of video and computers. Participants rated training, personal interest, availability and access to resources as very important factors to influence them to use technologies

Montfort Teachers College

Montfort Teachers College is run by the Catholic Church and is located about fifteen kilometers east of Limbe town off the Limbe –Midima road. The administration block is close to the car park. West of the administration block are the blind and deaf sections, where children with sight and hearing problems learn. There is also a police unit and a demonstration primary school. On the northern side of the administration block are classrooms , which are attached to staff offices. On the eastern side of the administration are the staff room, library, dining hall and hostels, while staff houses are south of the administration block. The college opened its doors in 1961 as a small college graduating forty students per year. The figures rose as infrastructure improved in 1981 to 210 students, 300 students in 1983 and 540 students from 1998 to date. Although the college is run by the Catholic Church, tutors are employed and paid by the government. Of the 21 tutors, 17 participated in the survey.

Table 4.21: Factors that influence use of technologies (Lilongwe Teachers College)

Item	Not important		Somewhat important		Important		Very important	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Training	0	0	0	0	1	6.3	15	93.8
Availability of resources	0	0	0	0	2	12.5	14	87.5
Administrative support	0	0	2	12.5	4	25.0	10	62.5
Peer support	1	6.3	2	12.5	8	50.0	5	31.3
Access to resources	0	0	0	0	2	12.5	14	87.5
Workshops and seminars	0	0	1	6.3	3	18.8	12	75.0
Personal interest in instructional technologies	0	0	1	6.3	4	25.0	11	68.8
Personal interest in improvement in my teaching	0	0	0	0	4	25.0	12	75.0
Personal interest in enhancing students' learning	0	0	0	0	1	6.3	15	93.8

N=16
Freq. = frequency

Table 4.22 data show that tutors at Montfort Teachers College are comprised of 10 male and 7 female, with many of them between 36 and 40 years old. Twelve of the 17 tutors had bachelor's degrees. Just like the other colleges, Montfort College has five departments: Foundation Studies with two tutors, Social Studies with five tutors, Math and Science four tutors, Languages with six tutors and no single tutor for the Practical Arts department. There was an acute shortage of tutors in all the subjects except for English, Chichewa, and Social studies.

The Inventory

Table 4.23 shows the technologies that are available at Montfort Teachers College. The officer responsible for these technologies stated that of the 28 chalkboards some needed repainting. There were no flip charts available at the college. All four Overhead projectors were working with transparences available; however, there were no felt pens to go with the transparencies. All three video projection sets were working. The six computers were operable; two of them were accessible to the tutors in the library, and other computers were at the administration.

Survey Results

The first survey question addressed the frequency of tutors' use of technologies. Table 4.24 shows that all tutors (17 of 17) used the chalkboard all the time and used local resources either occasionally or all the time. Despite having no flip charts according to the inventory, over half of the tutors (10 of 17) indicated that they used flip charts either occasionally or all the time. This usage suggests that, when the charts are available, tutors use them. On the other hand, almost all tutors reported either seldom or never using overhead projectors (16 of 17), seldom or never using videos (15 of 17). Computer use was also low with 14 or 17 tutors reporting seldom or never using computers.

Table: 4.25 shows that 5 of 17 tutors never used overhead projectors or videos because of lack of training. Similarly, lack of training was expressed by 7 tutors as a barrier to the use of computers. Despite the availability of overhead projectors as per the inventory,

69

Table 4.22: Demographics (Montfort Teachers College)

Gender Freq.	Age Freq.	Highest qualification Freq.	Teaching subject Freq.	Expected no. of tutors
Male (10)	31-35 (1)	Diploma (5)	Mathematics (2)	3
Female (7)	36-40 (7)	Bachelors (12)	English (4)	4
	41-45 (2)		Social studies (5)	3
	46-50 (3)		Foundation studies (2)	7
	51-55 (3)		Agriculture (1)	2
	56 or more (1)		Chichewa (2)	2
			Science/health (1)	3
			Physical education (0)	1
			Creative arts (0)	1
			Religious education (0)	1
			Music (0)	1
			Home economics (0)	2

Table 4.23: Inventory (Montfort Teachers College)

Instructional Technologies	Number
1. Chalkboards	28
2. Flip charts	0
3. Overhead projectors	4
4. Videos	3
5. Computers	6

Table: 4.24: Frequency of use of technologies (Montfort Teachers College)

Technology	Never		Seldom		Occasionally		All the time	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Chalkboard	0	0	0	0	0	0	17	100
Flip chart	1	5.9	6	35.3	8	47.1	2	11.8
Overhead projectors	15	88.2	1	5.9	1	5.9	0	0
Videos	13	76.5	2	11.8	2	11.8	0	0
Computers	12	70.6	2	11.8	3	17.6	0	0
Local resources	0	0	0	0	7	41.2	10	58.8

N=17
Freq. = frequency

Table: 4.25: Reasons for not using technologies (Montfort Teachers College)

Technology	Not applicable		Lack of training		Lack of infrastructure		Not available		Not accessible	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Chalkboard	17	100	0	0	0	0	0	0	0	0
Flip chart	7	41.2	3	17.6	1	5.9	4	23.5	2	11.8
Overhead projectors	0	0	5	29.4	2	11.8	7	41.2	3	17.6
Videos	2	11.8	5	29.4	2	11.8	4	23.5	4	23.5
Computers	1	5.9	7	41.2	1	5.9	3	17.0	5	29.4
Local resources	14	82.4	2	11.8	0	0	0	0	1	5.9

N=17
Freq. = frequency

7 of the respondents indicated that they did not use overhead projectors because they were not available. This finding is probably attributed to the unavailability of felt pens as shown in the inventory.

Although in table 4.24, 8 of 17 the tutors reported using flip charts occasionally rather than all the time because of the unavailability of the flip charts (see inventory), they checked "not applicable" when citing a reason for not using technologies (table 4.25). This incongruence may be explained by the fact that the vast majority of tutors (14 of 17) rated themselves as either above average or very competent levels in using flip charts.

Survey question 3 dealt with competence levels of tutors in using technologies. Participant's responses in table 4.26 show that all tutors rated themselves as either above average or very competent in the use of the chalkboard. Similarly, the vast majority of them reported above competence or very competent in preparation of flip charts (13 of 17), using flipcharts (14 of 17), and producing teaching materials using local resources (14 of 17).

On the other hand, a large number of tutors have either average or little or no competence in operating overhead projectors (12 of 17), in using computers to assist with class work (14 of 17), in using computers for personal work (14 of 17), and in showing a video during teaching (14 of 17). This pattern of the competence levels agreed with the pattern on the frequency of use of the technologies in table 4.24, where more than three fourths of the tutors indicated they either seldom or never used the video, overhead projectors, and computers, and all tutors indicated either occasionally or all the time using local resources and the chalkboard.

Survey question 4 dealt with tutors' attitudes towards use of instructional technologies. Responses in table 4.27 show that all the respondents either agreed or strongly agreed that teaching and learning materials helped to elaborate important points. Other attitudes that rated highly were the use of the chalkboard as being very important (16 of 17) and local resources as being good substitutes for some commercial teaching materials (16 of 17). As in the other colleges, tutors (11 of 17) either agreed or strongly agreed that producing teaching materials requires more time.

All 17 tutors viewed the challenge of learning about computers as being exciting, although the competence level they reported was little (table 4.26). Many of those same tutors (12 of 17) either disagreed or strongly disagreed with the statement, "learning about

74

Table: 4.26: Competence levels (Montfort Teachers College)

Item	Little/no competence		Average competence		Above average competence		Very competent	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Use the chalkboard in my teaching	0	0	0	0	3	17.6	14	82.4
Operate an overhead projector in my teaching	8	47.1	4	23.5	3	17.6	2	11.8
Prepare flip charts for use in class	0	0	4	23.5	5	29.4	8	47.1
Use flip charts during lesson presentation	0	0	3	17.3	7	41.2	7	41.2
Produce teaching materials using local resources	0	0	3	17.6	3	17.6	11	64.7
Use computers to assist with class work	12	70.6	2	11.8	2	11.8	1	5.9
Use computers for personal work	8	47.1	6	35.3	0	0	3	17.6
Show a video during teaching	6	35.3	8	47.1	2	11.8	1	5.9

N=17
Freq. = frequency

Table 4.27: Attitudes towards use of instructional technologies (Montfort TTC)

Item	Strongly disagree		Disagree		Agree		Strongly agree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Using the chalkboard is very important	1	5.9	0	0	3	17.6	13	76.5
Producing teaching materials requires too much time	3	17.6	3	17.6	6	35.3	5	29.4
Teaching materials help elaborate difficult concepts	0	0	0	0	5	29.4	12	70.6
Overhead projectors are easy to operate	1	5.9	8	47.1	7	41.2	1	5.9
Learning about computers is very difficult	2	11.8	10	58.8	4	23.5	1	5.9
The challenge of learning about computers is exciting	0	0	0	0	10	58.8	7	41.2
Videos are difficult to use in the class	4	23.5	6	35.3	7	41.2	0	0
Local resources are a good substitute for some commercial teaching materials	0	0	1	5.9	6	35.3	10	58.8

N=17
Freq. = frequency

computers is very difficult," suggesting they were ready to learn computer use. This also agreed with lack of training as being their reasons for not using computers (see table 4.25). About half the tutors (9 of 17) either disagreed or strongly disagreed with the statement, overhead projectors are easy to operate, which also reflected their opinion that they had little or no competence in the use of the overhead projectors (see table 4.26).

The fifth survey question focused on the degree that selected factors influenced tutors' use of technologies. Responses in table 4.28 show that all tutors (17 of 17) valued as being either important or very important the following factors: training, availability of resources, personal interest in instructional technologies, and personal interest in enhancing students' learning. Again, as in the other colleges, peer support ranked least with slightly over three fourths of the tutors (13 of 17) believing it was either important or very important.

Summary for Montfort Teachers College

This section dealt with the demographic issues of Montfort Teachers College, which showed that there were more male tutors than females and that there were shortage of tutors in all the subjects except for English, Chichewa, and Social Studies. Although the inventory showed that all the technologies were functioning except for having no flip charts and felt pens, it did not have a positive impact on the frequency of use. There was one tutor who reported occasionally using an overhead projector; the others either seldom or never used them. Two tutors occasionally used videos and three occasionally used computers. Most tutors reported that lack of training and unavailability were two major reasons for not using overhead projectors, videos, and computers. They also reported low competence levels in those same three technologies. Training, availability, and personal interest were some of the factors that would enable their use of instructional technologies.

Table 4.28: Factors that influence use of technologies (Montfort Teachers College)

Item	Not important		Somewhat important		Important		Very important	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Training	0	0	0	0	4	23.5	13	76.5
Availability of resources	0	0	0	0	5	29.4	12	70.6
Administrative support	0	0	2	11.8	6	35.3	9	52.9
Peer support	0	0	4	23.5	7	41.2	6	35.3
Access to resources	0	0	2	11.8	5	29.4	10	58.8
Workshops and seminars	0	0	1	5.9	3	17.6	13	76.5
Personal interest in instructional technologies	0	0	0	0	3	17.6	14	82.4
Personal interest in improvement in my teaching	0	0	1	5.9	3	17.6	13	76.5
Personal interest in enhancing students' learning	0	0	0	0	4	23.5	13	76.5

N=17
Freq. = frequency

St. Joseph's Teachers College

St. Joseph's Teachers College, run by the Catholic Church, is located about ten kilometers east of Dedza town off the Dedza – Ntcheu road. North of the main gate are classes which are attached to staff offices, followed by the library and the staff room. The administration block is north of the staff room. Positioned north of the administration are arts and science laboratories, while the hall and the hostels are on the eastern side of the administration block. The college has also a demonstration primary school just before the main gate where student teachers do their initial classroom teaching experience Just like Montfort College, tutors at St. Joseph's Teachers College are employed and paid by the government. The college opened in the mid thirties and its enrolment is roughly between 300 and 350 students per year. The college had 15 tutors and 12 participated in the survey.

In Table 4.29 tutors at St. Joseph's Teachers College were comprised of six males and six females, with many of them between 41 and 50 years old. Half of the tutors have bachelors or master's degrees. Just like the other colleges St. Joseph's College has five departments: Foundation Studies with three tutors, Social Studies with one tutor, Languages with two tutors, and Practical Arts with two tutors. There was an acute shortage of staff in all the subjects except for Creative Arts and Music which had the expected number of tutors.

The Inventory

Table 4.30 shows the technologies that are available at St. Joseph's Teachers College. Comparisons will be made on the available technologies and how tutors are using them.

The officer responsible for the technologies stated that all 18 chalkboards needed repainting. No flip charts were available at the college. Of the five overhead projectors available, only two were working, the rest had no bulbs. Furthermore there were no felt pens and transparencies to go with the overhead projectors. One video projection set was working. The four computers available were all working and distributed as follows: one in the library, one in the conference room accessed by tutors, one in the general office, and the last one in the principal's office. The videos and overhead projectors were kept in the audio-visual room.

Table 4.29: Demographics (St. Joseph's Teachers College)

Gender	Freq.	Age	Freq.	Highest qualification	Freq.	Teaching subject	Freq.	Expected no. of tutors
Male	(6)	31-35	(2)	Diploma	(6)	Mathematics	(2)	3
Female	(6)	36-40	(2)	Bachelors	(4)	English	(1)	4
		41-45	(3)	Masters	(2)	Social studies	(1)	3
		46-50	(3)			Foundation studies	(3)	7
		51-55	(2)			Agriculture	(1)	2
						Creative arts	(1)	1
						Chichewa	(1)	2
						Music	(1)	1
						Home economics	(1)	2
						Physical education	(0)	1
						Religious education	(0)	1
						Science/health	(0)	3

Table 4.30: Inventory (St. Joseph's Teachers College)

Instructional Technologies	Number
1. Chalkboards	18
2. Flip charts	0
3. Overhead projectors	5
4. Videos	2
5. Computers	4

Survey Results

Table 4.31 indicates how frequently tutors use technologies. Responses show that all the participants used the chalkboard and local resources either occasionally or all the time. On the other hand, more than three fourths (10 of 12 of the participants either seldom used or never used flip charts. This agreed with the unavailability of the charts as per the inventory. The reported use of the other technologies was similarly low: all never or seldom used videos, almost all (11 or 12) never or seldom used overhead projectors, and nine tutors never or seldom used computers.

The second survey question dealt with tutors' reasons for not using technologies. Responses in table 4.32 show that 11 of 12 tutors did not use flip charts and half did not use overhead projectors because they were not available. This agreed with the information on the inventory, which showed that flip charts were not available. Although there were two overhead projectors working there were no felt pens and transparencies.

Four of the twelve tutors did not use video because, despite having one that was working, it was not accessible to them, despite it being in the audio-visual room attached to the library. Also, even though there were two computers that were accessible to tutors, more than half of them (8 of 12) did not use them because of lack of training.

Survey question 3 dealt with tutors' levels of competence on the use of technologies (see table 4.33). Responses show that all participants were either above average or very competent in using the chalkboard; almost all (11 of 12), in producing teaching materials using local resources; and three fourths (9 of 12) in using flipcharts during lesson presentation. It should be noted that, although a sizable majority (10 of 12) of the participants indicated seldom or never using flipcharts (table 4.31), their competence level here showed that they knew how to use the charts. Unavailability was the problem. Half of the tutors believed themselves to be above average in the preparation of flip charts, use of flip charts, and producing teaching and learning materials using local resources. Less than half of the tutors were at average competence in operating overhead projectors during teaching and using computers for personal work.

However, more than half reported little or no competence in using computers to assist with class work and a third had little or no competence in showing a video during

Table 4.31: Frequency of use of technologies (St. Joseph's Teachers College)

Technology	Never		Seldom		Occasionally		All the time	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Chalkboard	0	0	0	0	0	0	12	100
Flip chart	6	50.0	4	33.3	1	8.3	1	8.3
Overhead projectors	7	58.3	4	33.3	1	8.3	0	0
videos	9	75.0	3	25.0	0	0	0	0
Computers	4	25.0	5	41.7	3	33.3	0	0
Local resources	0	0	0	0	5	41.7	7	58.3

N=12
Freq. = frequency

Table 4.32: Reasons for not using technologies (St. Joseph's Teachers College)

Technology	Not applicable		Lack of training		Lack of infrastructure		Not available		Not accessible	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Chalkboard	12	100	0	0	0	0	0	0	0	0
Flip chart	1	8.3	0	0	0	0	11	91.7	0	0
Overhead projectors	0	0	0	0	4	33.3	6	50.0	2	16.7
Videos	0	0	2	16.7	3	25.0	3	25.0	4	33.3
Computers	3	25.0	8	66.7	0	0	1	8.3	0	0
Local resources	12	100	0	0	0	0	0	0	0	0

N=12
Freq. = frequency

Table 4.33: Competence levels (St. Joseph's Teachers College)

Activity	Little/no competence		Average competence		Above average competence		Very competent	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Use the chalkboard in my teaching	0	0	0	0	1	8.3	11	91.7
Operate an overhead projector in my teaching	1	8.3	5	41.7	2	16.7	4	33.3
Prepare flip charts for use in class	1	8.3	4	33.3	6	50.0	1	8.3
Use flip charts during lesson presentation	1	8.3	2	16.7	7	58.3	2	16.7
Produce teaching materials using local resources	0	0	1	8.3	6	50.0	5	41.7
Use computers to assist with class work	7	58.3	4	33.3	1	8.3	0	0
Use computers for personal work	4	33.3	5	41.7	2	16.7	1	8.3
Show a video during teaching	4	33.3	3	25.0	3	25.0	2	16.7

N=12
Freq. = frequency

teaching. This can be attributed to the failure to use the technologies due to lack of training and inaccessibility, hence having no or less competence in using them.

The fourth survey question focused on the tutors' attitudes towards use of technologies (see table 4.34). According to the responses, all tutors either agreed or strongly agreed that the following statements were important or very important: "using the chalkboard is very important, teaching materials help elaborate difficult concepts, and thechallenge of learning about computers is exciting." Almost all the tutors (11 of 12) also either disagreed or strongly disagreed with the statement, "videos are difficult to use in the class." And more than half (.7 of 12) disagreed or strongly disagreed that "videos are difficult to use in class." Such responses suggested that tutors would welcome opportunities to learn to use these technologies.

The last survey question dealt with factors that influence use of technologies. Responses in table 4.35 show that all the participants rated five of the items as being either important or very important: training, availability of resources, administrative support, access to resources, and personal interest in improvement in my teaching.

Summary for St. Joseph's Teachers College

This section looked at the demographic issues of St. Joseph's Teachers College which showed that there were equal number of male and female tutors and a shortage of tutors in all the subjects except for Creative Arts and Music. The inventory showed that there was lack of charts, bulbs, felt pens, and transparencies. This affected the frequency of use which was more on the chalkboard, and local resources. Lack of training also affected the use of the technologies. The tutors at St. Joseph's rated their competence levels as low in computer, video, and overhead projector use while high in chalkboard, charts and TALULAR use. The tutors also rated their attitudes as positive on the learning and using the various technologies. They also rated highly the need for training, availability, accessibility, and personal interest as important factors to enable them to use the technologies.

Table 4.34: Attitudes towards use of instructional technologies (St. Joseph's TTC)

Item	Strongly disagree		Disagree		Agree		Strongly agree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Using the chalkboard is very important	0	0	0	0	4	33.3	8	66.7
Producing teaching materials requires too much time	4	33.3	0	0	6	50.0	2	16.7
Teaching materials help elaborate difficult concepts	0	0	0	0%	1	8.3	11	91.7
Overhead projectors are easy to operate	0	0%	1	8.3	6	50.0	5	41.7
Learning about computers is very difficult	1	8.3	6	50.0	5	41.7	0	0
The challenge of learning about computers is exciting	0	0	0	0	2	16.7	10	83.3
Videos are difficult to use in the class	5	41.7	6	50.0	1	8.3	0	0
Local resources are a good substitute for some commercial teaching materials	0	0	1	8.3	3	25.0	8	66.7

N=12
Freq. = frequency

Table 4.35: Factors that influence use of technologies (St. Joseph's Teachers College)

Item	Not important		Somewhat important		Important		Very important	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Training	0	0	0	0	2	16.7	10	83.3
Availability of resources	0	0	0	0	2	16.7	10	83.3
Administrative support	0	0	0	0	6	50.0	6	50.0
Peer support	0	0	2	16.7	7	58.3	3	25.0
Access to resources	0	0	0	0	3	25.0	9	75.0
Workshops and seminars	0	0	2	16.7	1	8.3	9	75.0
Personal interest in instructional technologies	0	0	1	8.3	0	0	11	91.7
Personal interest in improvement in my teaching	0	0	0	0	3	25.0	9	75.0
Personal interest in enhancing students' learning	0	0	1	8.3	3	25.0	8	67.7

N=12
Freq. = frequency

Analytic Perspectives across Colleges

This section focuses on the main issues crosscutting all the colleges pertaining to the use of instructional technologies. Looking at the presented data, it was evident that the instructional technologies were not being used to the fullest in all the teacher training colleges. I have categorized these technologies into three types: common, creative, and higher-order technologies. The common technologies are chalkboards and flip charts. These are categorized as common technologies because chalkboards are readily available and flip charts are fondly used by the tutors. The second category is creative technologies. These are technologies that are produced, using locally available resources (TALULAR). Although some of the resources could easily be picked from the environment and used directly without any transformation, such as stones and leaves, many TALULAR instructional materials need tutors and teachers to show self-initiative and be creative. For example, to produce a globe for a world map requires local glue, bamboo, and mashed paper (pulp). Such tedious construction is, no doubt, why many of the respondents indicated that "use of local resources requires too much time." The third category is the higher-order technologies comprised of overhead projectors, videos, and computers. These technologies are mechanical or electronic in their operations and require maintenance and training to use; therefore, during the time of this study, the data demonstrated that they are not commonly used by the tutors in all the colleges.

It was evident that almost all the colleges had the same number of technologies except for chalkboards at Karonga and St. Joseph's Teacher Colleges (see table 4.36), which was due to the smaller size of those colleges. Three of the five colleges had no flip charts; however, even in those colleges where the charts were available, chart paper was insufficient with usually only one ream distributed per department for the whole year. Although the numbers of the higher-order technologies appeared adequate, the actual working ones were few, except for Montfort College where overhead projectors, videos, and computers were all in good working condition.

Table 4.36: **Summary of inventory across colleges**

College	Chalkboards	Flipcharts	Overhead projectors		Videos		Computers	
			No.	Working	No.	Working	No.	Working
Blantyre T.T.C.	21	5 reams	4	1	2	0	5	3
Karonga T.T.C.	16	6 reams	6	4	2	1	3	3
Lilongwe T.T.C.	27	0	9	5	1	1	4	4
Montfort T.T.C.	28	0	4	4	3	3	6	6
St. Joseph's T.T.C.	18	0	5	2	2	1	4	4

Within each category of technologies – common, creative, and higher-order – there were issues that cut across all colleges as far as training, availability, and challenges were concerned. On the other hand, there were some differences among the colleges in those same areas.

Basic Technologies

Training. In the basic technologies, although training was not featured highly among tutors' responses, training should be important because there are procedures for proper use of the chalkboard and strategies for using the chalkboard to facilitate student learning. For example the proper layout of work on the chalkboard, which demands sectioning of the chalkboard, writing from left to right, with appropriate illustrations on the right side of the chalkboard. Furthermore, appropriate use of flip charts enhances use of various teaching methods, such as group work, where students discuss a given topic and record their discussions on a chart paper, make presentations to the whole class.

Availability. Availability of the basic technologies is important because the training done on how to use them could be meaningless if the skills learned are not used. Another factor in having basic technologies available is the maintenance of the chalkboard. In all teacher training colleges chalkboards were available; however, some needed repainting and repairing. For example, the rotating chalkboards at Blantyre Teachers College needed repairing because the levers used for rotating the boards were broken**.** Flip charts were scarce (three of the five colleges did not have flip charts – that's more than scarce; they're nonexistent) in all the colleges except for Blantyre and Karonga Teacher Colleges, which had five and six reams respectively. This unavailability hampered the use of that technology, which necessitated that tutors stick to the use of the chalkboard all the time.

Challenges. The unavailability of some of these basic technologies meant that teaching strategies were limited; there was little variety of teaching methods used. Furthermore, when tutors rely primarily on the chalkboard for instruction, they are not serving as good role models for their students. The unavailability of flip charts is centered on the inadequate funding from government. According to the responsible officer for these technologies at Blantyre Teachers College, charts were made available when students were preparing and going for teaching practice since there were funds located for the exercise.

91

However, when such use has not been integrated into the tutors' on-going course instruction, it may be difficult for their students to easily transfer strategies for using flip chart materials effectively.

Creative Technologies

Training. In the creative technologies category where there is use of the resources in the local environment, the issue of training was highlighted by four of the five colleges. Training is important here because to transform the local resources and produce a teaching material requires creativity and skills, which can be gained through training. In the same context, there was an assertion that producing teaching resources requires too much time. Bringing in training will make the tutors have the needed skills, hence need little time to produce the required teaching resources.

Availability. There was no problem with the availability of the resources since the resources were already there in the environment. Despite the resources being available in the environment, it required the tutors' initiative to access them and think of what they could produce from the resources collected. The tutors' creativity in transforming the resources to make teaching materials would increase availability of the resources. Similarly maintenance of the resources would improve availability, by making sure that they still have correct information and are in good working condition.

Challenges. Storage for the TALULAR items was not a challenge since the tutors had offices with storerooms where the items were stored. The challenges here were that there was need to change the mindset of the tutors to use the environment as their most readily available resource for effective teaching and learning. There was need for creative thinking on how the resource could be transformed to come up with the desired teaching materials. The development of such materials with locally available resources could be possible if there were in-house peer support workshops or resource persons to assist with hands-on practical applications for the tutors. However, another mindset needs to be changed here. Peer support was rated lowest in all the colleges; implying peer support hasn't proved to be helpful. But Beggs (2000) looked at this friendly helping hand of support as helpful and makes the experience of using technology easier.

Higher-Order Technologies

Training. In the higher-order technologies category comprised of overhead projectors, videos, and computers. The need for training to use these technologies featured high in the responses from all the colleges. The lack of training was one of the factors which made many tutors not to use these technologies, which have specific operations that need hands-on experience to ably use them. Although formal training is preferable, some tutors will somehow find ways to learn if they are motivated, for example the use of peer support, although it was rated just as "important" in the important factors that influence use of technologies.

Availability. In almost all the colleges, availability was a problem. For example, accessories for overhead projectors, such as transparencies and felt pens were either not available at all or were insufficient for any significant use of the overhead projectors. Such lack meant that tutors were unable to use these technologies. Availability was also hampered by the lack of good maintenance for mainly overhead projectors and videos in all the colleges, except for Montfort Teachers College whose technologies were all in good working condition. Blantyre Teachers College also had problems with computer maintenance

The need for availability of technologies expressed by participants agreed with the emphasis Brace and Roberts (1996) made that "networked computers, audiovisual equipment must be readily available" (p. 326).

Challenges. For the tutors to comfortably operate and use the technologies, they need training. The teacher training colleges did not have well-trained technicians to maintain the equipment when problems were identified. Such technicians would also be able to train tutors to use the technologies, but in the absence of technicians, little or no training could take place.

The other challenge that the colleges faced was the placement of these technologies. The rooms used for keeping these technologies were not cool enough to maintain the normal life span of the equipment, especially computers. Air conditioned rooms or rooms with electric fans are needed in order to minimize maintenance problems caused by keeping computers in overheated places.

Another challenge was that even when computers were available, they were not used much. This was because the tutors who were originally trained to teach others were not competent and confident enough to teach their fellow tutors.

Computer Use at Domasi College of Education:
A Snapshot Study

This snapshot study is intended to provide a salient example of how computers came to Domasi College of Education (DCE) and their potential for transforming teacher education. DCE represents a special case of the emergence of higher-order technology. Thus, studying it closely can inform policy makers and practitioners regarding new ways to approach teacher education in Malawi.

Domasi College of Education is located about sixteen kilometers north of Zomba town on the Zomba - Lilongwe road. Originally, it was a primary teacher training college from 1987 to 1993. In 1994 training of primary teachers ceased at the college, and the college began training secondary school teachers at diploma level. In January 2004 the college implemented a Bachelor of Education in primary specialization to train primary teacher educators for the teacher training colleges in Malawi. Domasi Primary Demonstration School is located on the campus. Originally located there when DCE was training primary teachers, the demonstration school can now serve as a site for various field experiences for the Bachelor of Education students. Similarly, there is a demonstration secondary school, where the conventional diploma students preparing to teach in secondary schools will do their teaching practice. Malawi Institute of Education (MIE) is located near Domasi College of Education. MIE, a curriculum center that works hand-in-hand with DCE on many issues, is charged with delivering in-service to teachers throughout the country.

The snapshot study begins with how computers came to Domasi College of Education. An inventory of computers at the college is also provided. Results from the survey data, views of the students, and those extracted from the transcripts of interviews are then discussed, followed by a vision for the college.

Emergence of Computer Use

Because Domasi College was in partnership with Brandon University of Canada, Brandon University donated ten Macintosh computers to Domasi in 1997. These were allocated in the principal's office and the computer room for use by the academic and support staff. When the Macintosh computers stopped working, the college lobbied for donations from USAID, which donated four personal computers (PCs). Another computer from the University Partnerships for Institutional Capacity (UPIC) project was located to the staff computer lab, resulting in five computers. At the time of this study, these computers were networked and connected to the Internet. Another donation of twenty computers came from School Net in August 2003 after the college responded to the School Net's advertisement about computers that were ready to be donated to educational institutions. Because of the Secondary School Teacher Education Project (SSTEP) run by Canadian International Development Agency (CIDA), the college benefited from those eight computers that also could be accessed by members of staff. Additionally, four computers from the UPIC project, which had been housed at MIE for an earlier portion of the project, were allocated to each of the offices of the DCE faculty who were in the doctoral portion of the UPIC project. Another donation of six computers came from the National Bank of Malawi for the library; unfortunately only two were currently working. The rest had no programs installed, and had no CD ROM drives. According to the librarian, loading of the operating system and programs could not be done. The availability of the computers from these sources eased the backlog of work to be typed at the typing (computer) pool. The confidentiality of examinations was also improved by having more computers because lecturers were now typing their own examinations. See table 4.37 for location and working condition of computers at Domasi College at the time of this study.

Computer Use

The data from the survey revealed that lecturers used the computers in various ways for administrative and instructional support. Over half (26 of 37) of the participants used the computers for examinations, handouts, email, and research. Very few used the computers only for typing examinations (8 of 37), handouts (1 of 37), and email (2 of 37). Despite many lecturers being able to use the computers in a variety of ways, very little has been

Table 4.37: The Inventory of Computers at Domasi College of Education

	Number of Computers	Number of Computers Working
Staff Computer Lab	5	5
Students Computer Lab	20	14
SSTEP Computer Lab	8	8
SSTEP Office	6	6
UPIC Office	4	4
Faculty of Science (Dean & Secretary)	2	2
Faculty of Education (Dean & Secretary)	2	2
Faculty of Humanities (Dean & Secretary)	2	2
Library	6	2
Accounts Office	3	3
Typing Pool	1	1
Deputy Principal's Office	1	1
Principal & Secretary's Office	2	2

done that engages the students in work on the computers. Thirty-five of the 37 participants indicated that they did not give students computer-based assignments. Only two lecturers gave assignments requiring the ability to retrieve notes from folders, word processing, and data analysis using average and standard deviation. Lecturers do not as yet use computers as tools in the teaching of their content areas.

User Competence

Competence in computer work enhances use of the computers. Responses to their perceived competence in use of computers showed that over half (26 of 37) of the participants at DCE reported average or above average competence, while (11 of 37) of the participants reported little competence. Such data were an indication that all the lecturers had some range of competence in computer use. Responses on how participants acquired their computer skills showed that eleven of the 37 participants learned through friends. Beggs (2000) looked at this friendly helping hand of support as helpful and reported that it makes the experience of using technology easier. In addition, apart from acquiring the skills through attending workshops, and classes, twelve of the 37 participants used all forms of support -- workshops, classes and friends. Mr. Jamie (pseudonym), acting principal at the time of this study, talked of the need for constant training to enhance competence in computer use. As a staff member who had been at the college a long time, he had seen and taken part in the decision making and introduction and advancement of computer technology at the college. This need for on-going staff development in technology was evident in the participants' responses pertaining to their last computer training. Less than half of the participants (12 of 37) had their last computer training between 2000 and 2002, while 25 of the 37 participants had their last training in 2003 and 2004. This recent training was complemented by the diversification of the use of the computers.

Infrastructural Issues

Domasi College of Education now has four computer labs: one for members of staff with five computers, another one for students with twenty computers but only fourteen were working, and the third one at the Secondary School Teacher Education Project (SSTEP) office operated by Canadian International Development Agency (CIDA) with eight

computers also used by members of staff. The fourth computer lab, which has just been constructed with assistance from the Japanese International Cooperation Agency (JICA), was for students. This lab can accommodate twenty computers, but there are no computers as yet in the facility. Other computers are in the administration section, deans' offices, and the offices of faculty who were doctoral students in the UPIC project. Because computers are expensive equipment, there was need for good security. At Domasi College of Education additional steel doors protect the students' computer lab, the SSTEP computer lab, and the UPIC faculty office.

In addition to the security of the computers, maintenance is also an important consideration. However, the college at the time of the study did not have a computer technician who was charged with taking care and maintaining the computers when they developed problems. In interviews with Mr. Jamie and Mr. Phiri, both observed that the college was paying a large amount of money for maintenance to keep the computers running. As Dean of Sciences, Mr. Phiri was responsible for overseeing the installation of computers in the offices and computer labs. He was also responsible for seeing that computers were used responsibly by lecturers and for reporting problems with computers so that the administration could decide to hire a computer technician to rectify the problems. Mr. Jamie further remarked that "every time we send computers [for maintenance] they come back much worse than they were because the repairers are taking away some parts from those computers." Such lack of control over maintenance done off-premises makes it difficult to fix a computer and as a result it is discarded and a new one bought. Lack of appropriate maintenance also affected availability and accessibility. According to Mr. Phiri, of the twenty computers in the students' lab, "only fourteen are working." With classes of over forty students, the number of computers and the room cannot accommodate the whole group. In the library there are no computers for students to use. There are two computers working, and they are used only by the library staff.

Accessibility to e-mail and Internet services had been primarily in the Dean of Sciences office, the deputy, and the principal's offices. The installation of an Internet service in the staff computer room by the UPIC project resulted in many members of staff acquiring e-mail addresses and surfing information from the Internet, Mr. Jamie applauded this

addition: "Now lecturers have realized that they can get more information on the Internet rather than waiting for a book, which is not there or is out of print."

However, due to over excitement and also lack of adequate training, there had been a substantial misuse of the Internet service by some lecturers and support staff according to Mr. Phiri, the lab assistant, who remarked that: "Honestly speaking the Internet is being misused; some go there to look for information which is not profitable at all." Computers being delicate and sensitive to heat, they need relatively cool rooms to sustain their life span. The staff computer lab and the UPIC office have air conditioners that cooled the rooms, creating an enabling environment for the computers to function normally.

More accessibility to the Internet was provided when a satellite Internet system, called VSAT, was installed and launched in October 2005. The installation was a joint effort between CIDA and Domasi College of Education, while the satellite connectivity was funded by JICA, which has been dealing with "Strengthening of Mathematics and Science in Secondary Education" through "In-service Training in Malawi" which is abbreviated to (SMASSE INSET MALAWI). The satellite system enabled the computers in the staff computer lab and offices to be connected to the Internet.

Vision for Domasi College

Domasi has laid a foundation in use of computer technology by moving from computers being in the secretaries' and principals' offices to faculty offices, where computers are used primarily for writing personal work, teaching notes, and examinations. However, for this advancement to continue, Domasi College will need to address a set of challenges. On-going training of lecturers on computer use will continue to be essential, and more especially the skills that would enable lecturers to use the computers in the teaching of their content areas. Currently, computer technology is not being used to facilitate classroom instruction and student learning. The training will help improve the lecturers' competence levels as technology develops and more new ideas and information emerge.

As Domasi develops in infrastructure, it should drive the college to solicit more computers for the students' lab, which would allow more students to learn computer skills and be able to work on the computer at their own free time for the improvement of their skills. With two fully equipped student labs available and faculty who know how to develop

content-learning materials for student use in the lab, the use of computers at Domasi College can go beyond learning just basic computer skills.

As the number of computers increases and faculty development of content materials for computer use increases, the college will need a full time computer technician for constant maintenance to keep the computers running as well as for on-going training of staff and students. Similarly, students in the Bachelor of Education for Primary Education program are now undergoing computer training so they will be able to diffuse use of computers in other teacher training colleges when they graduate. Given that Domasi College has taken a significant step forward in using computers, there is a need for linking closely with the other teacher training colleges to assist them in their development.

The importance of the role of the library in promoting computer use to improve instruction and to enhance student learning will be an important factor as Domasi College increases its computer capabilities. The vision for the library was raised by Mr. Jim, when he commented on the future use of computers: "We need to have a number of packages [in the library] like simulation games which the students can be using on their own even outside the classroom … to reinforce the ideas that students are learning in class." A wide variety of instructional material in CD format housed in the library would be accessible to both lecturers and students. Such programs would both reinforce and extend learning. The CD format is also quicker than lengthy Internet searches and downloads. Furthermore, faculty could make these CDs and commercial ones could be purchased to provide additional instructional assistance. On the other hand, having Internet capability in the library is important because print media, such as books and journals, become outdated quickly. The Internet provides a way for both faculty and students to access not only the most current information but also access resources from libraries and museums across the world.

However, as Domasi College increases its infrastructure for computer use, it also recognizes the impact that frequent power interruptions have on raising computer use to the next level. Without a consistent power source, it is difficult for office personnel, staff, and students to depend on having computers to facilitate their work and their learning. With the installation of a power generator, Domasi College will be able to ensure that the computers will be available for use during local power failures.

CHAPTER 5

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of this study was to provide a description of the instructional technologies that were in the primary teacher training colleges in Malawi, their frequency of use, and reasons that tutors gave for not using some of the technologies. Additionally, the study gathered data on tutors' perceptions of their competence levels in using the instructional technologies, their attitudes towards use of these technologies, and factors that tutors valued as important in influencing their use of technologies. A survey was administered at each college by the researcher with 80 of the 95 tutors completing surveys. Because Domasi College of Education (DCE) represented an unusual case of a college at the forefront of the implementation of computers in its programs, a study was conducted as a way of providing a "snapshot" of the implementation of computers at that college. Data from a survey, interviews, and observations were used to develop the snapshot study, which has provided insights that could facilitate the implementation of computer use at the other primary teacher training colleges.

Discussion of the Findings

"The issue of quality education remains crucial in the Malawi education system" (Commonwealth Education Fund, 2003, p. 5). Malawi is still struggling in its education system to improve the quality of education. One of the contributing factors is the lack of educational resources. The use of instructional technologies has proved important because the technologies facilitate the teaching and learning process. In a survey, to find factors that facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms, Baylor and Ritchie (2002) found that teachers valued the use of technologies in class and that it had a positive impact on students' content acquisition and class performance. In addition, as the tutors use these technologies in their teaching, they are at the same time acting as role models to their student teachers, who will in turn emulate the

101

practice and use instructional technologies in their own classes. However, despite instructional technologies having an impact on the teaching and learning process, data in this study have revealed that tutors in the teacher training colleges (T.T.Cs) use more of the chalkboard and local resources in their teaching than any other instructional technologies. On the other hand, although the use of local resources was rated high, the tutors indicated that "the local resources require too much time to produce." This is sending a strong signal that even the local resources were not used as much as would be expected. This finding clearly shows that tutors are dependent on chalk and talk in their instruction while student teachers listen. Baylor and Ritchie (2002) called such instruction a traditional method focusing on imparting skills and knowledge rather than "… [preparing] our students for a life that will be drastically different … [a life that will] need students to become creative problem-solvers, able to analyze a wealth of information to draw valid conclusions" (p. 400) when a variety of instructional technologies are used.

The inventory of technologies at the teacher training colleges showed that the availability of adequate supplies of technologies was uneven, while the most basic technologies like chalkboards were typically available. Shortages and/or no supplies were found with flip charts, videos, overhead projectors, and computers.

Question 1 of the study centered on how often tutors used instructional technologies in their teaching. Results of the analysis showed that there was more use of the chalkboard than flip charts, overhead projectors, videos and computers. Furthermore, some of the tutors did not use the local resources to develop instructional aids. Tutors reported that it took too much time to make such learning materials. Another deterrent to making teaching and learning materials using locally available resources (TALULAR) was that tutors generally lacked the necessary skills.

Question 2 focused on reasons for not using the technologies. Several reasons were given for the varied frequency in use of the technologies. Lack of training was featured in almost all the technologies except for chalkboards. Some respondents also indicated the need for training even for the production and use of the local resources. In many colleges, lack of things like sockets, bulbs for overhead projectors, felt pens, and transparencies affected the use of overhead projectors and videos. Unavailability of certain resources affected the use of the technologies mainly the flip charts and videos.

Question 3 focused on the competence levels of the participants. The competence levels were high in the use of the chalkboards, preparation and use of charts, and use of local resources. It should be noted that despite the unavailability of the flip charts, which resulted in the frequency of use being low, the tutors still had the competence to prepare and use them. On the other hand, competence levels were low in the use of the video, overhead projectors, and computers. The lack of the competencies was attributed to lack of training, infrastructure, unavailability and inaccessibility. It is anticipated that if these essentials were put in place, the tutors would be much more likely to use technology.

Question 4 dealt with the tutors' attitudes towards use of instructional technologies. The analysis showed that they agreed on the importance of using the technologies. Despite the teaching materials helping to elaborate difficult concepts, the tutors agreed that producing them requires too much time, which to some extent threatens the availability of these self-produced teaching materials. On the other hand, the tutors were eager to learn how to use the higher-order technologies. This was evidenced by their disagreement with the statements "learning about computers is difficult," and "videos are difficult to use in the classroom." This finding clearly shows that they need the training to be able to use the technologies.

Question 5 focused on factors that were considered important to influence the tutors' use of instructional technologies. Participants rated almost all the items on training, availability, accessibility, administrative support, workshops and seminars, and personal interest as very important. Peer support was also rated "important." This finding is an indication that several aspects play an important role to enable tutors to use the technologies. For example, tutors have to be trained how to use the technologies, the technologies have to be available to be used, and there needs to be a personal willingness to use them.

Lessons from Domasi College

From almost all the teacher training colleges, peer support, as one of the factors that can influence use of instructional technologies, was rated low. This finding was not evident in Domasi College of Education with regard to the emergence of use of computers. According to the survey conducted at Domasi College eleven of the 37 participants learned

their computer skills solely from their friends, an indication that peer support played an important role in sharing higher-order technology skills. Lack of training featured high as one of the reasons for not using instructional technologies in all the teacher training colleges. Domasi College of Education, which conducts regular computer training sessions for its lecturers, would be a model to learn from. However, in the teacher training colleges, the one or two tutors who were initially trained lacked the confidence to train their fellow tutors. For those who took up the initiative and made up a training program, some got a negative response due to the frustrations that members experienced.

Although there were a few computers available in the teacher training colleges that were not being used by tutors, the situation at Domasi College when computer use emerged was different. The administration actively sought computers for the college, and as the number increased and the accessibility to faculty increased, the desire to learn about computer use seemed to increase among faculty. Faculty learned from their peers, and as their skills improved, they wanted better access to computers and to Internet connectivity.

Domasi College revealed that a proactive administrative staff was important in helping establish computer use among faculty. Having a critical mass of computers also seemed to be a factor in developing faculty interest in learning and using computers. Neither of these factors was prevalent at the teacher training colleges.

Implications for Teacher Education

Results of the study have shown that there is minimal use of the instructional technologies by tutors in the teacher training colleges despite the promise that instructional technologies have for enhancing teaching and learning. The assumption is that instructional technologies can improve student learning in teacher training colleges. However, except for the very basic technologies of the chalkboard, teacher training colleges are not using instructional technologies to improve instruction. Therefore, it is essential that efforts are made to upgrade the instructional technology capacity of the teacher training colleges. Responses from the tutors have also shown that the tutors are eager to learn and use these technologies. This is evidenced by their responses where they disagreed with statements like: "learning about computers is very difficult," and videos are difficult to use in class.'

They also realized how important it was to use these technologies where they strongly agreed to statements like, "Teaching materials help elaborate difficult concepts." Despite the tutors' realization of the importance of learning and using the technologies in their instruction, maximum use has not been realized.

Use of instructional technologies is effective when the tutor is able to capture the students' attention in the lesson, motivate the students to want to learn more, and to help students remember what they have learned, and to use the knowledge they have gained. To realize these goals, the existence of two main factors, availability of the resources and training of the tutors, are essential. The two factors have an interactive effect on each other and on the use of instructional technologies (see Figure 5.1).

Availability

Availability, referring to having the technologies at hand, has an impact on the use of the instructional technologies and is important because the technologies to be used they must be available. In the study some technologies were not used just because they were not available. On the other hand, the use of the technologies can have an impact on the availability of resources because the government may provide resources depending on how effectively the already existing technologies are being used. Thus, low use could result in a decision not to develop instructional technologies. Conversely, the more tutors use the technologies the more new knowledge is discovered and the stronger the argument to increase support.

For use of instructional technologies to be realized, government should commit itself and make sure that technologies like computers, videos, overhead projectors, and flipcharts are made available in the colleges for tutors to use. The availability of these technologies would enable the tutors to use them in their instruction, and this would be possible through the introduction of the end of year award for those who thrived to use instructional technologies. Hope (1997) asserts that, "Recognizing and rewarding teachers will enhance technology's integration in the teaching and learning process" (p. 5). As a concept, availability is comprised of a set of sub-factors.

Sourcing. This factor represents the purchasing or soliciting accessories like felt pens, transparences, and bulbs, which would ease the problem of unavailability. As a more

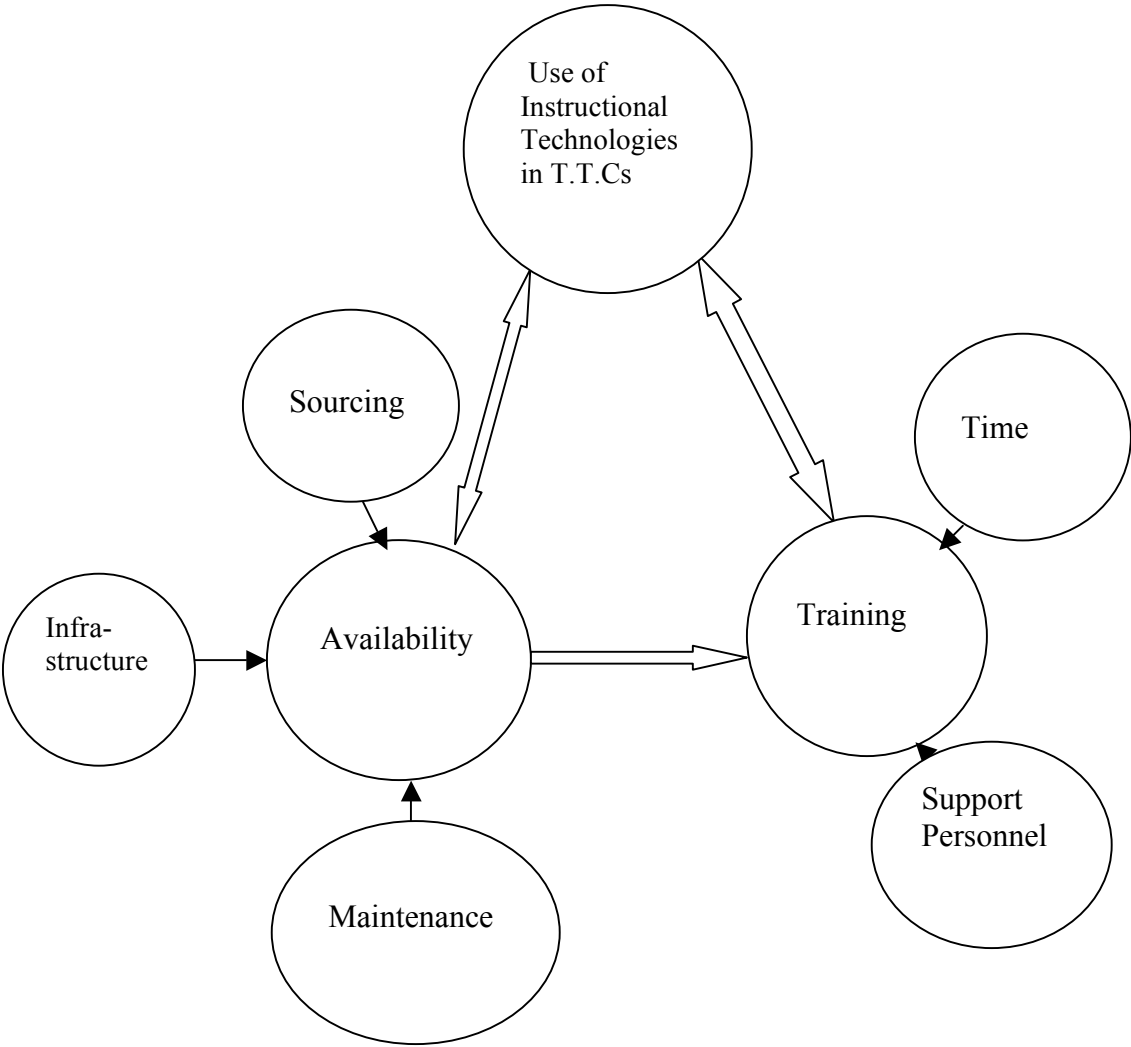**A Model of Features for Effective Use of Instructional Technologies**

Figure 5.1

advanced example, the teacher training colleges and Domasi College of Education need additional computers for their use. This activity would require an instructional technology expert so as to easily identify what type of machines, software and hardware, sizes of the accessories required.

Infrastructure. These are facilities that accommodate the available resources. In the classrooms, for example, accessories like sockets should be available and functioning. The higher order technologies i.e. overhead projectors, videos and computers being delicate, expensive and sensitive to heat need to be placed in cool rooms. Air conditioners have to be bought and fixed to help sustain the life span of the technologies. Domasi College, for example, which had air conditioners for the staff computer lab and the UPIC office, seriously needed one for the students' computer lab. For the basic technologies, i.e. chalkboards and flip charts, no air conditioners are needed and the classroom walls are ideal. The creative technologies i.e. the local resources, need adequate storeroom space to keep the TALULAR items. At the T.T.Cs audiovisual centers are available where technologies like overhead projectors and videos are kept. The tutors and administrators should take the initiative to have these centers revived and function the way they were designed to operate. Security of the technologies is also very important. Similar to Domasi College, where computer labs are secured by additional steel doors, the teacher training colleges' rooms, where computers and audio-visual equipment are stored, should also be properly secured. On the other hand, computer use at Domasi College has been hampered by intermittent power failures, thus demonstrating the need for a power generator. Teacher training colleges face the same challenge and will also need to install power generators.

Maintenance. Keeping the technologies running is very important because it ensures continuity in their use. Tutors will stop planning for their use if the technology is not reliable. Accessories like bulbs, start up discs, operating systems, antivirus CDs need to be readily available. In the study, technologies like overhead projectors, and videos were not used because of lack of maintenance. This has a bearing on the availability. The members of staff and the administrators should endeavor to draw up regulations to govern the proper use of the technologies. In all the T.T.Cs repainting of the chalkboards was a concern. This requires the commitment of the administrators to make sure that the chalkboards are

constantly painted. A technology technician who is highly experienced is a necessity. Government should commit to establishing a full-time position of a technician in its institutions. Because these technologies are delicate and expensive, there is need for constant supervision and maintenance. In their budgetary allocations, a certain amount of money needs to be allocated for the maintenance of the technologies. In addition, funding for Internet connectivity, providing money for maintenance, buying new computers or accessories, and keeping them up to date and operable are all essential.

Training

Training, the second key factor in promoting effective use of instructional technologies, includes consideration of the required knowledge of and skills on how the technologies should be operated and used by the tutors. The availability factor has an impact on training because, when the technologies are available, training on how to use them can easily be done and is more credible to the tutors.

Training has a two-way impact on the use of the instructional technologies because it is through training that the tutors know how to use the technologies. When the effective use is not up to the expected standard, if tutors still have problems in using the technologies, more training has to be done to iron out the problems faced by the tutors. Moreover, the more proficient tutors become in using technology, the more they will see new possibilities for the use of technology, thus creating a need for even more training.

Time is an important consideration in training, that is when should the training take place and for how long. Brace and Roberts (1996) remarked that, "Faculty requires hands-on experience [through] workshops and orientations that are offered at convenient times" (p. 327). Consideration should also be put on the support personnel i.e. who is to do the training. A competent technician who knows the operations and functions of the technologies should be   engaged to do the training. It is important that advanced training be done by individuals who understand how to use the technology in instruction.

Training needs to be constant to keep up-to-date with new developments in the technologies. Domasi College of Education which is developing steadily in use of computers should serve as a model for the teacher training colleges. The B.Ed program, for example, which is training prospective tutors for the teacher training colleges, can be an important

108

vehicle in promoting computer use and developing computer skills among the primary teacher educators so that they can also serve as models when they join the teacher training colleges.

In addition to the modern technologies, local resources play an important role in the teaching and learning process. The assertion that "local resources require too much time to produce" implies creative and technical skills are lacking in the tutors. The administrators should take up the challenge to liaise with Malawi Institute of Education to organize training sessions on the use of TALULAR.

Recommendation to Develop a National Plan

Given that only the most basic techniques are available to the teacher training college tutors, it is clear that much must be done to improve the use of instructional technologies at the national level and within the teacher training institutions in Malawi. Realizing the promise that instructional technologies hold for increasing the quality of teacher education by enhancing the learning of the student teachers, there is need to develop a national plan. Such a plan would help to ensure that instructional technologies are used in teacher education.

Creating Guidelines for a National Plan

Guidelines for the development of a national plan are important to give direction on how instructional technologies can be used. These guidelines should be able to help tutors, administrators, as well as government on what needs to be put in place to create an enabling environment for technology use. Generic questions with elaborating sub-questions are presented below as key considerations that would help a task force create guidelines on how to upgrade the use of instructional technologies in the teacher training colleges.

- What is the vision for instructional technology in teacher education in Malawi?
  - ➢ How does instructional technology increase the quality of teacher education and affect the teaching and learning process?
  - ➢ What are the purposes of instructional technologies?
  - ➢ What are essential policies for implementing the vision?

- What technologies do teachers need to use for teacher education?
  - ➢ What technologies are in use now?
  - ➢ What other instructional technologies are needed for teacher education?
  - ➢ How many of each of the instructional technologies would be required in the teacher training colleges?
  - ➢ Where do we get these instructional technologies from?
  - ➢ How can these instructional technologies be acquired?
- What do the tutors and their students need to know about the use of instructional technologies in instruction?
  - ➢ How do tutors involve students in the use of instructional technologies?
  - ➢ How can students utilize instructional technologies in the classroom?
  - ➢ What precautionary measures should be considered when using the instructional technologies?
  - ➢ How do tutors and students store their instructional technologies for future use?
- How can teacher educators acquire the knowledge, skills and competences they need to effectively utilize instructional technology?
  - ➢ On what operations of the instructional technologies do tutors require knowledge, skills and competences? How are these determined on an on-going basis?
  - ➢ What methods are going to be used for the delivery of the knowledge, skills and competences?
  - ➢ Who will facilitate the delivery of the knowledge, skills and competencies?
  - ➢ Where will this facilitation of the knowledge, skills and competencies to the tutors be done?
  - ➢ How do we sustain this acquisition of knowledge, skills and competencies?
- What infrastructures do colleges need to sustain the use of instructional technologies?
  - ➢ What facilities are required to make up the infrastructure?
  - ➢ When will the infrastructure be required?
  - ➢ Who will provide the infrastructure?

- How do we sustain the functionality of the infrastructure?
- How much money will be required for the infrastructure?

- What resources need to be available and how can they be obtained in order for instructional technology to be put in place and sustained?
  - What resources are needed?
  - Who will supply these resources?
  - How will the resources be supplied?
  - Who will be responsible/accountable to these resources?
  - What mechanisms should be put in place for checks and balances on the resources?

- What type of evaluation plan is needed to monitor progress in the use of instructional technology in teacher training colleges?
  - What type of evaluation is going to be done?
  - Who will be involved in the evaluation?
  - When is evaluation to be done?
  - Who will compile the report for the results of the evaluation?
  - To whom will the report go?
  - How will the dissemination of the report be done?
  - How will the results of the report be used?

Since Domasi College of Education is now responsible for the training of tutors for the teacher training colleges, it is suggested that they, in collaboration with the Department of Teacher Education and Development (DTED), which is responsible for the teacher training colleges, convene meetings for a task force from various stakeholders to draw up the plan of action and a way forward.

Suggested Composition of the Task Force

The composition of the task force should be broad based and include all major stakeholders in teacher education.

- Representatives from the Ministry of Education (Basic and Higher Education). These members should take part because the issue is focusing on teacher training

colleges (TTCs) ,which are in Higher Education and also Basic Education because the TTCs are involved in training teachers for basic education.

- Another representative should come from the Planning Office of the Ministry of Education, since they will deal with proper planning procedures and budgeting for the activities.

- Domasi College of Education (B.Ed. Primary Department) should be involved because it is involved in training tutors for the teacher training colleges and advocating the use of instructional technologies.

- Teacher training colleges need representation because they are the first beneficiaries and implementers of the use of instructional technologies.

- Another representative should come from the Department of Teacher Education and Development (DTED) since they are responsible for the teacher training colleges and for the recruitment and training of prospective primary school teachers.

- Malawi Institute of Education (MIE) needs to be represented because it is an essential curriculum development center that can be involved in the creation training manuals on how instructional technology can be used

- Mzuzu University as a tertiary institution and also an advocate for the use instructional technology should also be represented.

Recommendations for Further Research

The findings of this research suggest other possible areas for investigation. The contradiction between "producing teaching materials requires too much time" and "teaching materials help elaborate difficult concepts" which both were either agreed or strongly agreed by tutors in the teacher training colleges needs further research. Despite teaching materials helping in the teaching process, the fear of them not being produced is there since their production requires too much time. Further research could concentrate on an in depth study, through class observations, on what teaching materials that are self produced by the tutors and used. This study could include unstructured interviews on the participants' experiences with use of self-produced teaching materials.

112

Another area for further research might focus on whether maintenance, which also affects availability, would influence the tutors' use of technologies. Lack of maintenance and unavailability of teaching materials contributed to the failure of tutors to use various technologies. If maintenance systems were improved, would technology use increase? Observations and records could document the amount of usage of the technologies after maintenance and supply are improved and comparisons made.

During the study, from the teacher training colleges and Domasi College of Education, there was no serious mention of computers being used for instructional purposes. Further research could be conducted through an intervention study to find out from the tutors through class observations and interviews on what it would require to increase the use of computers in their lesson presentations.

Institutions like Mzuzu University and Chancellor College have and use technology for instruction. A case study can be conducted to establish how the lecturers at these institutions use the technologies during instruction. The findings would act as lessons for tutors in the teacher training colleges and lecturers at Domasi College of Education on how they could incorporate technology in their instruction.

Looking at how Domasi College is steadily advancing in putting in place various infrastructure regarding instructional technology is a true testimony that it is opening up for easier connectivity with the outside world. A case study might be conducted after five years to establish what further developments have been occurred and how the developments are helping the lecturers improve their teaching styles that positively or negatively affect the students' learning.

With the opening up of use of computer technology to students at Domasi College, where students are exposed to working on the computers, a case study could be conducted after two or three years to find out how the students felt working with the computers and how helpful the computers were in their class work.

Vision

Using instructional technologies motivates students to learn and facilitates the learning of new concepts. Unless teachers themselves are taught with effective instructional

113

technologies, they will not see the importance of going beyond the chalkboard and lecture in their own teaching. My vision for the teacher training colleges would be that a variety of instructional technologies are available, used, and sustained in the primary teacher preparation programs. For instance, very little outlay of funds for each college could assure that felt pens, transparencies, and bulbs would be available so that overhead projectors could be used for instruction. I envision a renewed interest among tutors in producing and using teaching materials made with local resources. Peer sharing of materials and ideas as well as workshops organized by MIE or other agencies involved with teacher development could enhance the skills of tutors in making such teaching and learning aids.

The availability of instructional technologies at teacher training colleges can be attained by the government trying to achieve its objective to "maintain and improve the quality and relevance of education … by combining the right inputs of good … and adequate instructional materials … and the right outputs (of) motivated and well educated students," (Malawi Ministry of Education Science and Technology, 2001, p. viii). For their part, however, teacher training colleges can organize in-house induction courses to enhance the use of technologies and can develop a sense of responsibility and ownership for continual use of the technologies. Some colleges had working computers available to faculty who were not using them. Peer-led computer instruction not only would increase the use of the available computers but also would provide interest in seeking more computers.

Because Domasi College of Education has a bachelor's of education degree in primary teacher education specialization, the college will become the source of new tutors for the teacher training colleges. In that way Domasi College will have the opportunity to have a major effect on the use of instructional technologies through the way its faculty teaches and uses technology in their instruction. As these new teacher educators are taught, so shall they teach.

For Domasi College of Education, as I stand in front of the new computer lab looking through the windows with the newly installed satellite dish for the Internet in the background, I envision Domasi faculty advancing in the use of computer technology. Faculty will be searching for information on the Internet to complement or replace print media, which may or may not be available. Students will be able to type their assignments and, more importantly, will be able to search for additional information to that of the

114

classroom. Domasi College will be directly connected to the teacher training colleges throughout Malawi and will help them to develop their ICT programs. For example, as faculty increase their skills for using computers for instruction and as the number of computers increase at Domasi, especially in the library, I see students having access to learning materials on CD ROM. These CDs may be commercially produced, but many of them will have been developed by faculty so that students can access additional instruction and manipulate ideas in course content, for example in simulations.

Since Domasi is running a distance education program, I see these students being able to communicate with their faculty through wired zonal centers. In addition to the modules that they receive, through their wired centers, they will be able to get additional information through the Internet. With the introduction of the New Partnership for Africa's Development (NEPAD) E- Schools Initiative in the eastern and western boarders of Africa, I see Malawi (Domasi College of Education specifically), being one of the beneficiaries and leaders in advancing ICT in Malawi teacher training colleges. Connected to the broad band infrastructure, it will link these institutions of higher eeducation to the latest educational content through the Internet.

This vision calls for advanced training of Domasi College faculty and students. The signs of this advancement are already evident. Continuing change in the emerging e-learning environment will not only contribute to the improvement of the quality of education in Malawi but it will also place Malawi among the leaders in Africa for using technology in education. I am confident we can reach these goals if the key stakeholders in teacher education promote the use of instructional technology as an essential tool to enhance student learning.

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Appendix A
Map of Malawi Showing Locations of the Teacher Training Colleges

Karonga T.T.C.

Kasungu T.T.C.

Lilongwe T.T.C.

St. Joseph's T.T.C.

Blantyre T.T.C.

. Montfort T.T.C.
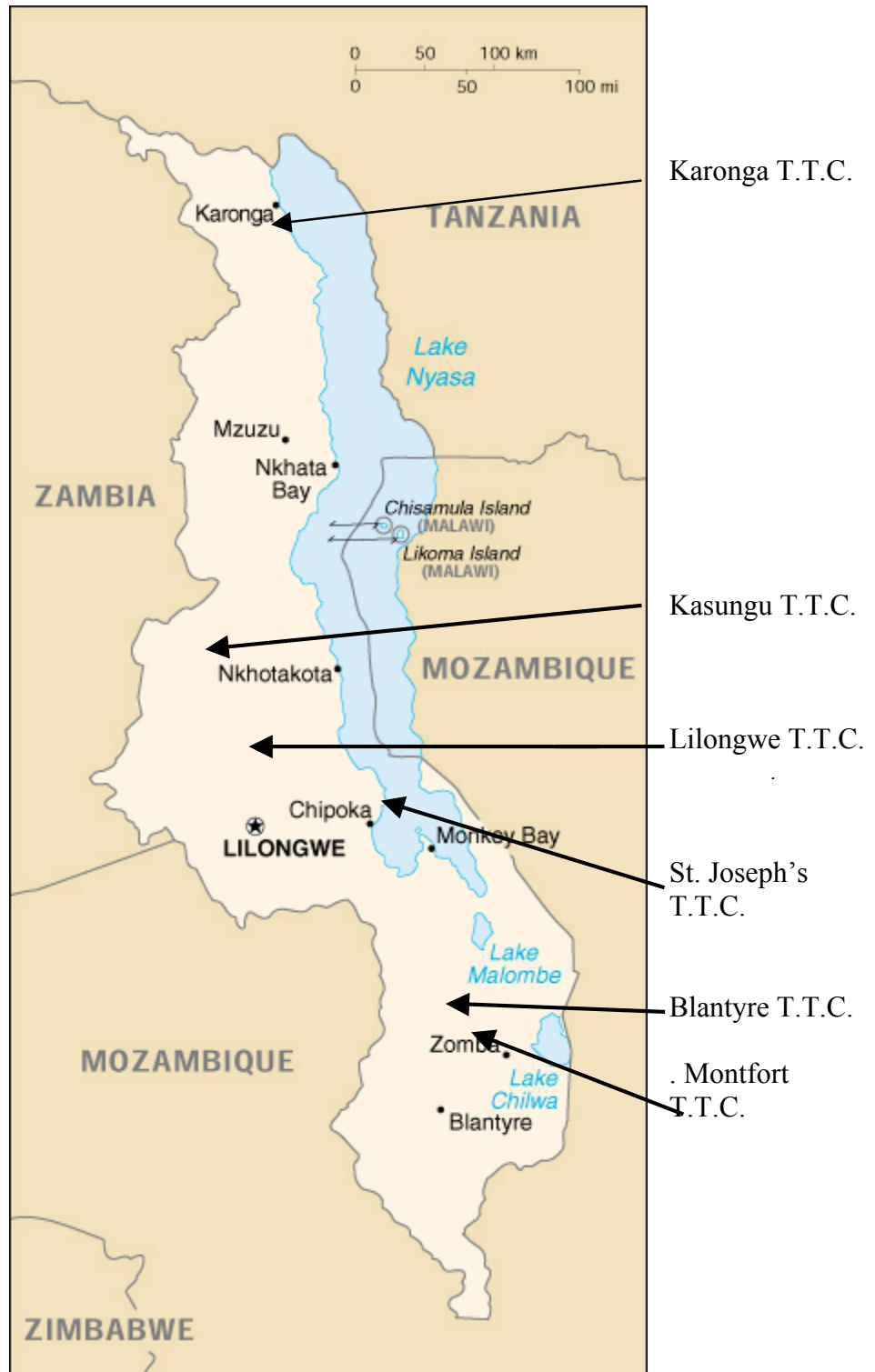
Appendix B
Letter to the Ministry of Education

<div align="right">
Kasungu Teachers Colleges,
P/Bag 23,
Kasungu.
October 28, 2003.
</div>

The Secretary for Education and Culture,
P/Bag 328,
Capital City,
<u>LILONGWE 3.</u>

cc: The Acting Director,
       Department of Teacher Education,
       P/Bag 215,
       Lilongwe

       The Education Methods Advisor,
       P/Bag 328,
       Capital City,
       Lilongwe 3.

       The Principal,
       Blantyre Teachers College,
       P/Bag 502,
       Blantyre.

       The Principal,
       Domasi College of Education,
       P.O. Box 49,
       Domasi.

       The Principal,
       Karonga Teachers College,
       P.O. Box 122,
       Karonga.

       The Principal,
       Kasungu Teachers College,
       P/Bag 23,
       Kasungu.

The Principal,
Lilongwe Teachers College,
P.O. Box 40046,
Kanengo,
Lilongwe 4.

The Principal,
St. Joseph's Teachers College,
P.O. Box 11,
Dedza.

The Principal,
St. Montfort Teachers College,
P.O. Box 5452,
Limbe.

Dear Sir,

PERMISSION TO CONDUCT RESEARCH

I am Clemence Michael Kadzera, a doctoral student with Virginia Tech University in the United States on the forthcoming B.Ed program for Domasi College of Education. Currently I am working on my dissertation titled "Use of Instructional Technologies in Teacher Training Colleges in Malawi."

The purpose of the study is to provide a comprehensive description of the use of instructional technologies in teacher training colleges and an in-depth understanding of how technology is being used at Domasi College of Education and how it can be incorporated in the teacher training colleges.
This information would be helpful to policy makers and practitioners in teacher education on how they can enhance the use of instructional technologies in their institutions.

My writing this letter is to ask for permission to conduct a survey in the teacher training colleges and Domasi College of Education to collect data regarding use of instructional technologies in these institutions.

Your positive response will help me meet the administrators in these institutions to collect the data. I hope my request will meet your favorable consideration.

Yours faithfully,

Clemence M. Kadzera

Appendix C
Consent Form

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

INFORMED CONSENT FORM FOR PARTICIPANTS

Title: Use of Instructional Technologies in Teacher Training Colleges in Malawi

Investigators: Clemence Kadzera
                       Jerome A. Niles

The Purpose
The purpose of the project is to provide a description of the use of instructional technologies in teacher training colleges. This study is part of a requirement for a completion of a doctoral degree program at Virginia Polytechnic Institute and State University.

Procedures
If you choose to participate, we will ask you to fill a 41 item survey regarding use of instructional technologies.
Risks
 There are no anticipated risks to participants in this project

Benefits
The project will help in identifying strengths and weaknesses in the use of instructional technologies by tutors in teacher training colleges and what can be done to improve the situation

Anonymity and Confidentiality
The results in this study will be shared with the principals of the studied institutions and the Ministry of Education. Neither your name nor any personal identifiers will be associated with any information you supply

Compensation
There is no compensation for participating in this project

Freedom to Withdraw
Participants are free to withdraw from this study at any time without any penalty.

Approval of Research
This research project has been approved, as is required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Tech.

IRB Approval Date   **IRB Approval Expiration Date**

Participants Responsibility

I voluntarily agree to participate in this study. I will complete the interview.

Participant's Permission

I have read understand the Informed Consent Form for Participants and the conditions of this project. Any questions that I had about the project have been answered. I hereby acknowledge the above and give my voluntary consent for participation in this project.

If I participate, I may withdraw at any time without penalty.

Participant's Signature   **Date**

Witness Signature   **Date**

Researcher's Signature   **Date**

Should I have questions about this research project I may contact:
   a. Clemence Kadzera, Domasi College of Education, P.O. Box 49, Domasi. Email: ckadzera@vt.edu cell: 09251593
   b. Dr. Duncan Nyirenda, Malawi Institute of Education, P.O. Box 50, Domasi. Email:mie@malawi.net Tel.: 01536300
   c. Dr. Mary Alice Barksdale. Email: mab@vt.edu 01 540 231 3166
   d. Daisy Stewart 01 540 231 4991. Email: daisys@vt.edu
       Office of Research Compliance
       Research & Graduate Studies
       Virginia Tech
       Blacksburg, VA USA 24061

Appendix D

SURVEY QUESTIONS FOR TUTORS IN TEACHER TRAINING COLLEGES IN MALAWI

INSTRUCTIONS
- Attached is a questionnaire on use of instructional technologies in teaching and learning.
- Please take your time to respond to the questions.
- All responses will be treat with confidentiality.

Section 1: Demographics

The following are questions about you. Please tick what applies to you.
1. Please identify your gender **(tick one)**
       1. Male ------------   2. Female------------.
2. Tick the number that represents your age
    1. 20-25 years--------------   5. 41-45 years--------------
    2. 26-30 years--------------   6. 46-50 years--------------
    3. 31-35 years--------------   7. 51-55 years-------------
    4. 36-40 years--------------   8. 56 or more------------
3. My highest qualification is **(tick one)**
    1. Diploma in education------------   3. Master's------------
    2. Bachelors------------------------   4. Other (Please specify)
                                           ----
4. What teaching subject do you teach most of the time? **(Please tick one)**
    1. Mathematics-------------------   7. Agriculture---------------
    2. English------------------------   8. Creative Arts-------------
    3. Social Studies-----------------   9. Chichewa------------------
    4. Foundation Studies-----------   10. Music--------------------
    5. Physical Education-----------   11. Science/Health-----------
    6. Religious Education----------   12. Home Economics-------

Section 2: Frequency of use of technologies

The following items are dealing with how frequently you use the listed technologies. In a scale of **1=Never, 2=Seldom, 3=Occasionally, 4=All the time.** Circle the number that best describes your frequency of use in teaching.

Item	Never	Seldom	Occasionally	All the time
5. Chalk board	1	2	3	4
6. Flip charts	1	2	3	4
7. Overhead projectors	1	2	3	4
8. Videos	1	2	3	4
9. Computers	1	2	3	4
10. Local resources	1	2	3	4

Section 3: Reasons for not using / seldom use of technologies

What reasons do you have for not using or seldom use of the technologies in section 2? For the items you use all the time in section 2 above, indicate 'Not applicable' here. For the other items circle which ever numbers are appropriate to you. **1= Not applicable, 2 = lack of training, 3= lack of infrastructure (sockets), 4= not available,** and **5= not accessible.**

Item	Not Applicable	Lack of training	Lack of infrastructure – (sockets)	Not available	Not accessible
11. Chalkboard	1	2	3	4	5
12. Flip Charts	1	2	3	4	5
13. Overhead Projectors	1	2	3	4	5
14. Videos	1	2	3	4	5
15. Computers	1	2	3	4	5
16. Local Resources	1	2	3	4	5

Section 4: Competence Levels

Following are statements about your competence with technologies. Please indicate your competence level by circling the corresponding numbers using the following scale:
1=Little or no competence, 2=Average competence, 3=Above average competence, 4=Very competent.

Item	Little or no competence	Average competence	Above average competence	Very competent
17. Use the chalk board in my teaching	1	2	3	4
18. Operate an overhead projector in my teaching	1	2	3	4
19. Prepare flip charts for use in class	1	2	3	4
20. Use flip charts during lesson presentation	1	2	3	4
21. Produce teaching materials using local resources	1	2	3	4
22. Use computers to assist with class work	1	2	3	4
23. Use computers for personal work	1	2	3	4
24. Show a video during teaching	1	2	3	4

Section 5: Attitudes towards use of instructional technologies

Identify your opinion as to what extent you either agree or disagree with the following statements by **circling** the corresponding numbers: **1=strongly Disagree (SD), 2=Disagree (D), 3=Agree (A), 4=strongly Agree (SA).**

Item	SD	D	A	SA
25. Using the chalkboard is very important	1	2	3	4
26. Producing teaching materials requires too much time	1	2	3	4
27. Teaching materials help elaborate difficult concepts	1	2	3	4
28. Overhead projectors are easy to operate	1	2	3	4
29. Learning about computers is very difficult	1	2	3	4
30. The challenge of learning about computers is exciting	1	2	3	4
31. Videos are difficult to use in the classroom	1	2	3	4
32. Local resources are a good substitute for some commercial teaching materials.	1	2	3	4

Section 6: Important factors that influence use of technologies

How do you rate the importance of the following factors in influencing your use of instructional technologies?
Scale: **1=Not Important, 2=Somewhat Important, 3= Important, 4=Very Important.**
Please circle the appropriate number.

Item	Not Important	Somewhat Important	Important	Very Important
33. Training	1	2	3	4
34. Availability of resources	1	2	3	4
35. Administrative support	1	2	3	4
36. Peer support	1	2	3	4
37. Access to resources	1	2	3	4
38. Workshops and seminars	1	2	3	4
39. Personal interest in instructional technology	1	2	3	4
40. Personal interest in improvement in my teaching	1	2	3	4
41. Personal interest in enhancing students' learning	1	2	3	4

THANK YOU FOR YOUR TIME AND PARTICIPATION IN THE SURVEY

Appendix E

Inventory Sheet

**INSTRUCTIONAL TECHNOLOGIES AVAILABLE
IN TEACHER TRAINING COLLEGES.**

INSTRUCTIONAL TECHNOLOGY	NUMBER
1. Chalkboards	
2. Flip charts	
3. Over head projectors	
4. Videos	
5. Computers	

Appendix F
Survey Instrument

SURVEY ON USE OF COMPUTERS BY LECTURERS AT DOMASI COLLEGE OF EDUCATION

The following are questions about you and your use of computers. Please respond accordingly.

1. Please identify your gender
  1. Male ------------   2. Female ------------.
2. Tick the number that represents your age
  1. 30-35 years--------------   4. 46-50 years---------
  2. 36-40 years--------------   5. 51-55 years---------
  3. 41-45 years--------------   6. 56 or more----------
3. My highest qualification is
  1.Diploma in Education------------   3. Master's------------
  2.Bachelor's------------------------   4. Other (Please
                                              specify) --------------
4. In which faculty do you belong?
  1. Education   3. Science
  2. Humanities
5. What is your level of competence in computer use?
  1. No competence   3. Average competence
  2. Little competence   4. Above average
6. How was this competence in computer use learned?
  1. Workshop   3. Friend
  2. Class   4. All the above
7. What do you use the computers for?
  1. Examinations   4. Research
  2. Handouts   5. All above
  3. Email
8. When did you have your last computer training?
  1. 2000   4. 2003
  2. 2001   5. 2004
  3. 2002
9. Do you make any assignments that require your students to use the computer lab?
  1. Yes
  2. No
10. If yes, what are they?
  a.   c.
  b.   d. Not applicable

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EDUCATIONAL BACKGROUND
Virginia Polytechnic Institute and State University, Blacksburg, VA. USA.
Award: PhD, 2006
Curriculum and Instruction

University of Bristol – United Kingdom
Award: M.Ed, 1997
School Administration and Education Policy, School of Education

University of Malawi
Award: Diploma in Education, 1986
Chancellor College

Lilongwe Teacher Training College
Award: T2 Teaching Certificate, 1978

TEACHING EXPERIENCE
2003 – Present: Domasi College of Education
Chief Lecturer in Instructional Technology and Expressive Arts
1994 – 2001: Kasungu Teacher Training College
Lecturer in Expressive Arts

1987 -1993: Domasi Teacher Training College
Lecturer in Expressive Arts and Music

1986 – 1987: Our Lady of Wisdom Secondary School
Teacher in Art and Music

1978-1983: Mpapa Full Primary School
Primary school teacher.

RESPONSIBILITIES

Deputy Headmaster :	Mpapa F.P. School, Blantyre. 1981 – 1983
Sports Master:	Our Lady of Wisdom Secondary School 1986 – 1987
Hostel Warden:	Domasi Teachers' College, 1988 – 1993 Kasungu Teachers' College, 1997 - 2001
Head of Practical Arts Department:	Domasi Teachers' College, 1988 - 1993 Kasungu Teachers' College, 1995 – 2001
Judge:	National Aids Song Contest (Dowa, Ntchisi, and Kasungu) – 1995
Deputy Coordinator:	Kasungu Demonstration School and Kasungu Teachers' College – 2001
Judge:	Science Fair Displays – Kasungu, 2001

WORKSHOPS AND CONFERENCES ATTENDED

Orientation Seminar for District Inspectors of Schools and Home Economics Organizers (Resource Person): Chilema Ecumenical Centre – March, 1991

Use of Local Environment in Teaching: Blantyre. – July, 1991

Revision of One Year Teacher Education Curriculum: M.I.E. April, 1992

Participatory Methods,Techniques and Applications: Mzuzu University – July, 1999

The Teacher Educators Symposium: Kalikuti Hotel – September, 2000

Society for Information Technology and Teacher Education, 13th International Conference: Nashville, Tennessee. USA. – March, 2002

Society for Information Technology and Teacher Education, 14th International Conference: Albuquerque, New Mexico. USA. – March, 2003

Implementing New Concepts of Learner –Centered Learning in Teacher Education: Malawi Institute of Education, Domasi. 11 – 19, August 2004.

Stakeholders' Meeting for Initial Primary Teacher Education: Capital Hotel, 27 – 28 September, 2004,

Training Programme for Teaching and Learning Materials Developers. Class 1 & 4: Malawi Institute of Education, Domasi. 28th February – 5th March, 2005.

Finalization of standard 1 books: Malawi Institute of Education, Domasi. 16th – 18th November 2005.

PROFESSIONAL EXPERIENCES

Marker – MANEB Examinations:	Primary School Leaving Certificate Examinations (Science) – 1980 and 1982 Junior Certificate Examinations (Art) – 1987 Teacher Training Examinations (Foundation Studies 1989 – 2000
Moderator:	Foundation Studies – MIITEP Examinations for Cohort 1 - 1998; Cohort 4, 5, and 6 – 2000
Supervisor:	Planning, Supervising and Evaluating Student Teachers on Teaching Practice – 1987-2001
Curriculum Developer:	Wrote Creative Arts Modules for MASTEP Student Teachers, - 1990 Expert Judgment of Primary Creative Arts Teachers Guides for Standards 1-3 Co-authored the Primary Creative Arts Teachers Guide for Standard 6 – 1995 Preparation of guidelines for projects and Assignments for MIITEP Student Teachers, - 1998 Wrote Expressive Arts Teachers Guide and Pupils Book for Standard 4 under PCAR. Malawi Institute of Education, 14th – 24th March and 4th – 15th April, 2005.

Clemence Michael Kadzera is the fourth born in a family of seven children. He was born on June 1st 1956 in Thyolo District, Malawi. He is married to Maria and has three children: James, Chisomo, and Hope.