

**THE USE OF COMPUTER AS AN INSTRUCTIONAL TECHNOLOGY :
INTERNET AS AN INSTRUMENT IN THE TEACHING AND LEARNING
PROCESS IN TERTIARY INSTITUTIONS (NORTH WEST PROVINCE OF
R.S.A.)**

BY

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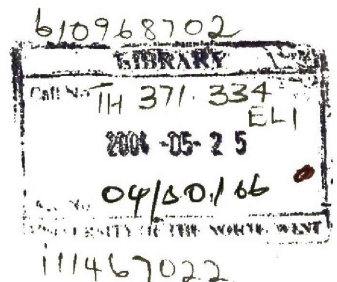
**SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
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DECLARATION

I **MOHUMI DOROTH ELISHA (NEE MAHOKO)** DECLARE THAT THE DISSERTATION FOR THE DEGREE OF MASTER OF EDUCATION IN EDUCATIONAL TECHNOLOGY AT THE UNIVERSITY OF NORTH WEST HEREBY SUBMITTED, HAS NOT PREVIOUSLY BEEN SUBMITTED BY ME FOR A DEGREE AT THIS OR ANY OTHER UNIVERSITY, THAT IT IS MY OWN WORK DESIGN AND EXECUTION AND THAT ALL MATERIALS CONTAINED HEREIN HAVE BEEN DULY ACKNOWLEDGED.

BY :

DATE:

CERTIFICATION OF ACCEPTANCE FOR EXAMINATION

This dissertation ***The use of computer as an instructional technology: internet as an instrument in the teaching and learning process in tertiary institutions (North West Province of R.S.A.)*** by ***Mohumi Dorothy Ouma Elisha***, Student Number ***10336370*** of the ***Department of Teaching and Curriculum*** in the ***Faculty of Education*** is hereby recommended for acceptance for Examination.

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alright,)

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DEDICATION

This study is dedicated to my late father **Mr. Mahoko Mahoko** who was called to rest on 4th November 1994 at 06h00 at Tshepong Hospital in Klerksdorp. He used to say, "**Ke leng o tsena sekwele Shanky? O hetsa leng, hetsa monna, o tlogele to tshameka, (When are going to finish with your studies? You are taking too long, You like playing too much, get finish) Rre (Dad) I'm through with my studies and facing the world boldy and still hope to make it one good day in my life. You are always on my mind Kubu!**

ABSTRACT

The use of computer as an instructional technology : Internet as an instrument in the teaching and learning process in tertiary institutions in the North West Province of R.S.A. was surveyed to identify and reveal problems encountered by lecturers and students with regard to the use of computer as an instructional technology in the teaching and learning process.

The main focus of the study was on the following areas, firstly, to find out whether tertiary institutions such as UNW, TNW, Technikon RSA, Mafikeng College and Vaal Triangle Technikon have enough computers with internet connections. Secondly, to find out whether the sampled institutions UNW and Vaal Triangle Technikon have enough computers to adequately provide students with computer skills. Thirdly, whether all the lecturers are computer literate. Fourthly, to find out whether there are adequate resources to assist students without prior computer knowledge in order to cope with the information technology age. Lastly, whether students are prepared to accept changes brought by computer technology.

The investigation involved two tertiary institutions, that is, Vaal Triangle Technikon in Klerksdorp area and UNW in the Mafikeng district. Questionnaires were used for data collection in this study.

Data were collected and analyzed. The study found out that there were not enough resources to cater for students to cope with information on technology as it is upgraded on frequent basis. And that most of the students agreed that they are prepared to accept changes brought by the computers as it would prepare them to face working environment.

Conclusions drawn from the study revealed that there is a serious problem lecturers and students face regarding shortage of computers (See Table 11 & 12). And that most of the lecturers have computer experience but are not provided with enough computers to provide students with computer skills.

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CHAPTER 1

1. INTRODUCTION

1.1. Background of the study

The focus of this study is based on the use of Internet as a source of information for teaching and learning purpose in tertiary institutions.

The internet could be employed in schools, colleges and higher institutions of learning, for instructional purposes. In order to investigate the influence of the computer in tertiary institutions, it is useful to distinguish its educational purposes from other purposes such as administration. Computers play an important role in tertiary education by providing students with typing and other computer skills.

Computers could play a key role in the transformation of the educational landscape in South African colleges and universities. This could lead to the most exciting and challenging period in the history of higher education.

Easley : (2000:1) observed:

As ever increasing numbers of students trumpet the advantages of the electronic classroom and the internet for teaching and learning, more and more institutions, from colleges and universities are finding themselves in the position of needing to obtain new

computer enhanced facilities or upgrades existing ones.

The existence of information technology in South Africa brought meaningful changes to learners by enabling them to use Internet in tertiary institutions. It also provided teaching staff with teaching and learning approaches which improved the quality of delivery in the teaching and learning situation.

Nash and Ball (1983: 17) argued that a computer could improve learning if the program design had been made carefully in order to make learning easier. That enables both the instructor and the student to concentrate on the most important aspects of the teaching and learning process.

Computers are able to sort out information quickly and reliably, and perform arithmetical calculations and display results in a form which could be easy to read. Students are then able to access information that is vital for assignments and other course related tasks.

1.2 Statement of the problem

The researcher investigated the use of computers as an instructional technology, especially the use of Internet as a tool in the teaching and learning process in tertiary institutions, with reference to the University of North West (UNW) and Vaal Triangle Technikon.

The new South Africa has inherited legacies of inequalities and disparities from the past. Previously disadvantaged groups found themselves short of skills, resources and experience; limited access to resources, education and training, technology and development.

The researcher has observed that the major factors which contributed to the governments' inability to reach its objectives of tertiary institutions to use instructional technology in the teaching and learning process, was that most of tertiary institutions with computers were not connected to Internet.

The competition is growing from the local market, national and spreading internationally. Tertiary Institutions in Mafikeng and Klerksdorp districts are faced with a very serious challenge to compete for students with both local and international institutions of higher learning. This competition was very rife because other national institutions like University of Potchefstroom and other international Institutions such as Twente University in Netherlands are a step ahead with technology. These Universities had students all over the world.

1.2.1 Research Questions

This study focused on the following key questions in determining the use of Internet in teaching and learning process in tertiary institutions.

1. Do tertiary institutions such as UNW, TNW, Technikon RSA and Mafikeng College have computers with Internet connections?
2. Do these institutions have enough computers to adequately provide learners with computers skills?
3. Are all lecturers computer literate?
4. Are there adequate resources that are user friendly to assist the students without prior computer knowledge to cope with the information or technology age?
5. Are students prepared to accept change brought by computer technology?

1.3. Purpose of the study

According to Reinking (1998:1) as quoted by Karchmer (2000), little investigation has been done in tertiary institutions with regard to the use of Internet in the teaching and learning process. Therefore the study is important because it investigated whether institutions had computers with internet connections and whether lecturers were skilled in computer literacy, and finally whether students were prepared to accept changes brought by computer technology in tertiary institutions.

One could realize that there is still considerable room for experimentation in teaching technology to students so that all students could benefit from the use of the internet. Opportunities should be seized to use new techniques to reduce the dependence on traditional method of 'chalk and talk' (Atkinson, 1998:103).

Based on this information, the purpose of the study was to investigate the use of Internet as an instrument in the teaching and learning process in the University of North West and Vaal Triangle Technikon.

The study also sought information on the following questions:

1. Does Internet as an instrument used in the teaching and learning process stimulate student's interest?
2. Is the student's computer knowledge enhanced when lecturers use internet during the teaching and learning process?

1.4. Assumptions

The study was guided by the assumptions that :

Access to computer technology by learners facilitates teaching and learning process with speed, accuracy and access due to availability of information.

Those lecturers exposed to and had access to computer technology were adequately prepared to exert themselves in the work place.

1.5. *Rationale for the study*

The South African experience has given sufficient evidence of the results of Internet as used in the teaching and learning process, like providing free lesson plans, on how to teach mathematics. Therefore it is important that the results of Internet be put to test in relation to its social reality (Rogers, 1962:20 as quoted by Cookson 2000). The extent of the use of Internet in the University of California in Los Angeles grew fast since its inception in 1969 because the first host-to-host message was sent from the University of California in Los Angeles to the Stanford Research Institute where the computer composed the initial ARPANET network. Since then, the Internet seeds have germinated. As a result, more networks developed, personal computers too entered the scene including people with different interests, for example, educational, commercial, political and scientific interests. This expanded the initial limited population of Internet users (Mioduser, 2001:1)

The ability of Internet to be exploited as an instructional resource is important in a sense that it could be used as a way to further the teaching-learning process. This can be done either formally or informally because right now it is used

by many companies around the world to help educate their employees or rather provide them with an important opportunity to improve their productivity, capability and job performance in a format that could be combined with schedules. Jack, (2000: 1) as quoted by (Goodman) stated that Internet could further provide students with the opportunities to increase their knowledge so that in future they could improve their job standing and market ability in the working situation while not taking too much time away from work. As a result, graduates could be able to provide training to other employees at a relatively low cost if Internet is introduced within an enterprise.

Text books or prescribed books may not have enough information to provide students with enough knowledge of their study material. This could however not necessarily mean that lecturers perceived Internet as a replacement of traditional texts, but instead view it as an additional resource for students to use. It is also important to note that Internet could benefit learners by engaging them to comment on the course material.

1.6. *Delimitation of the study*

The researcher concentrated on tertiary institutions with computers, in particular, University of North West and Vaal Triangle Technikon which are situated in Mafikeng and Klerksdorp districts of the North West Province.

1.7. Definition of terms

1.7.1 Computer :

It is a device that automatically performs calculations and sorts, files, edits, or otherwise processes information. The term is applied specifically to electronic digital computers, whose operation is based on the processing of discrete quantities of information (digital or characters), in contrast to analog computers, whose operation is based on continuous variable quantities such as lengths, weights or voltages. (Encyclopaedia American International Edition 1949: 185). In this study the term computer is defined as a tool used to process information with great speed, accuracy and reliability.

1.7.2 Instrument:

The term Instrument is defined as a tool used to gather knowledge about the world. Everything we know about our surroundings comes through our senses, such as hearing, sight and smell. For most purposes, our senses do a good job of telling us what is going on around us. But we need help from scientific instruments to know such things as what is going on in space or inside an atom. (Encyclopaedia American International Edition.1949:200). In this study the term Instrument is defined as a tool or view that scientists use to produce new predictions or new techniques for controlling

events, but not capable of literal truth or falsification of the information

1.7.3 Teaching and Learning process:

The teaching and learning process refers to instruction given in a formal or informal environment. Formal instruction is always given in school, whereby students come regularly to school and given tests to measure their progress. Informal instruction involves a learning process which takes place while people go about their daily lives. In this study, the term is used to define how students learn and the management of the teaching session which promotes learning. It is an active and interdisciplinary process, aimed at producing an observable change in student's behaviour or attitudes, and ultimately resulting in an improved outcome for the students (The World Encyclopedia 1996:11)

1.7.4 Instructional technology:

Babcock (1993:107) refers to this term a broad-based program designed to improve the students' skills competence and provide leadership in improving the teaching and learning process through the coordinated use of human resources, instructional materials and technology. In this study, this term is used as courseware for use in computer-assisted instruction in education; applications of appropriate evaluation

on criteria, to select suitable materials to be used in communication theory and learning principles, in order to design educational products, and to administer distance learning via- telecommunication, and interactive distance learning for education training.

1.7.5 Tertiary Institution:

These are educational institutions which offer an extensive range of nationally and internationally recognized qualifications and degree courses. (Encyclopedia American International Edition. 1981:226) In this study, it is used to refer to any tertiary institution of higher learning such as University or Technikon.

1.7.6.Distinction between primary, secondary and tertiary institution

A primary school is regarded as a place of formal learning for education to take place. It usually consists of the first 3 grades of elementary school but sometimes involves kindergarten. The secondary school involves students who are usually 11-18 years receiving formal education which is used as an inclusive designation to provide them with liable compulsory attendance or a place where instruction is given.

A tertiary institution is an environment whereby students for higher level of education are offered international qualifications (The World Book Encyclopedia, 1996:88)

1.7.7 Classroom:

Classroom refers to a room which is used to conduct lectures in a formal set up. It is further defined as an environment which encompasses both physical characteristics and the social climate of a learning setting and structuring a supportive environment (Babcock1993:60)

1.8. Organization of the report:

The research study is organized using the following chapter headings and subsections:-

Chapter I - Introduction

Chapter 2 - Review of Related Literature

- Theoretical Background and supporting literature

Chapter 3 - Research Methodology

- Types of Research Methodology

Chapter 4 - Data Analysis

Chapter 5 - Summary, Discussion, Recommendations and
Conclusions Informal education

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

Computers play an important role in our lives and because of this aspect we are confronted not only with the results of their use throughout the industries, banking, advertising, newspapers communication industries but with the realistic possibility of purchasing them for our offices, homes and other enterprises.

Since Internet was introduced in South Africa in 1998, it brought meaningful changes to lecturers to enrich the wealth of electronic text, which is Internet (Mioduser 2001:3). In the third Millennium, it is likely that computer programming could become a measure of ones literacy. Computer literacy will be integrated into all levels of the school curriculum, starting with the elementary grades. This could help in understanding the knowledge of computer and of programming competence (Mioduser 2001:7)

Computers enable business to deliver information speedily to the people and at a lower cost. Forester (1985:128) highlighted the fact that in the past it took days to take information for a loan application in London, mail it to Boston for review, and then mail it back .

Forester, (1985:128) continued to comment that computer technology can benefit the users because of its efficient communication network.

Computers are also used to store data, retrieve and manipulate medical record-keeping, and report writing. They offer accurate data which can be collected, stored, handled, managed effectively, displayed appropriately in a text and then communicated properly to become information.

Computers make these functions possible and thereby bring substantial improvements in the effectiveness of clinical practice, although success in the field has been limited to date.

2.1. Significance of technology:

2.1.1. Technology and Society.

Computers are exploring the world of technology in a sense that they are designed to help various activities as providing medical practitioners with information of a particular disease or illness. For example, Meindle, (1985:361 as quoted by Forester 1985) observed :

Medical data are remarkably soft in character. They are described, collected and interpreted with a degree of variability and in accuracy that falls disturbingly short of typical engineering standards. In order to provide data to a physician, a patient must first perceive himself as ill. The patient – physician dialogue entails two medical history, a description of current illness, and statements in response to examination. The second type is directly obtained data, which do not pass through the patients' intellectual and emotional filters. These data included some aspect of the physical examination and diagnostic test that do not require patient responses for their measured values. Electrocardiograms, ex-rays, emotional and language barriers. Electrocardiogram, ex-rays haematology laboratory tests and similar directly obtained data are more objective.

Technology is dominating today's society in a sense that it can either replace human effort and skills or it can complement it. For instance, the domestic washing machine and the robot are examples of these replacements. Musical instruments and conventional machine tools are examples of the complementary function. Whilst the car replaces the need to walk or ride, the driver should be there to steer a route safely. Again, technology can also complement human information processing skills such

as problem solving and decision-making. This could help in allowing human beings to be able to develop and apply new knowledge and skills to use technology effectively.

Instructional technology has brought societal changes to adults who are computer illiterate by making them to cope with laws forcing them to use computer for tasks like banking, and voting Dede, (1985:249 as quoted by Forester 1985).

The role played by computers is important in a sense that it decreases one's workload, it offers new services, and expresses a need for greater efficiency. This simply means that if there is too much workload, the computer is there to control large number of documents. The computer has contributed to a more rapid and systematic flow of information in the work environment.

Due to major social and economic changes taking place in the world, technology was introduced in order to help in the communication process. It brought relief to the world by becoming the fastest mode of communication.

The capability of computer technology is illustrated in handling much of the paperwork of modern life such as fax returns, mortgage calculations and other financial transactions. It can be involved in entertainment such as offering an array of games,

music and art far more sophisticated in terms of speed and capability than video material based only on television (Toong & Gupta, 1985:169-170 as quoted by Forester 1985).

In addition to that, it brought changes into our lives, by involving cognitive skills which we value most and are being altered by each innovation and information management technology. For example, several years ago, brains were used to access knowledge, through oral tradition; but now computers retrieve almost everything for use in a few seconds. (Dede1985:248 as quoted by Forester 1985) observes:

In general, the intellectual skills most important to possess will become increasingly centred on an analysis, synthesis and evaluation, as tremendous amounts of data become easily accessible through technology, and as options in the presentation of that information multiply, being able to select the best option from the menu of choices, analyse the data's implications, synthesize it with knowledge, and evaluate the outcome will be crucial to successful intellectual endeavour. For example, (a writer expert in using word processor exercises. A set of skills completely different from one using a typewriter). Those portions of education stress fluency in lower – order cognitive skills will thus gradually be de-emphasized in favour of building proficiency in higher-order abilities.

Other activities regarding the exploration of computer technology could provide a great assistance in the banking institution. For instance, banking institutions were criticized for providing poor services to retailers when they were most wanted, more especially on Saturdays, Sundays and in the evenings, and also providing service to their private account customers by limiting opening hours and their willingness to pay interest on current accounts (Forester, 1985:354).

Computer technology also help banking institutions by reducing high rate of fraud on credit cards and check guarantee cards by introducing direct electronic funds transfer from the point of sale in the shop (or pub, restaurant, railway station, travel agent, or wherever a purchase is made). This helps in reducing the amount of paperwork and the number of staff needed to provide quality service. (Forester, 1985:355)

2.1.2. Technology and Economy

When computer technology was introduced, there were serious threats and fears that could lead to higher unemployment in the U.S.A. Fortunately it did not lead to that situation but instead created and promoted employment. (Jenk 1985:380 as quoted by Forester 1985) observes:

Already there is evidence that some firms that have introduced microelectronic production technology have experienced difficulties as a results of a shortage of engineers, technicians programmers. What is needed is the right training, and the government therefore makes available a wide range of training schemes and courses.

The overall indication is that people should make use of microelectronic technology, whereby they should be prepared to adapt as some industries and the corporate world have done. Secure employment will come from embracing new technology, not from pretending that it does not exist. Wilkinson, (1985:360) as quoted by Forester (1985) further argued that the computer is not only used in government offices, banking institutions and other organizations but it is also used for shop floor worker. As a result, the shop floor is being redesigned in order to suit today's use of technology. This leads to the realization that computer technology can improve the economy of the country by making people to build a high-wage, high-productivity economy, which would lead to more competitiveness, sell more goods and also employ more people (Forester, 1985:380)

Forester (1985:380) continued to state that computer is also used in factory floors where it introduced new payment systems, patterns of shift working, styles of supervision, control, the

structure and distribution of skills. These factors led to a situation whereby factory floors in Britain had to be redesigned to suit the latest equipment and machinery. For example, the introduction of microelectronics which allows the movement of production of machinery to be predetermined by programming or setting of the new controls in order to eliminate the need for manual intervention, which led to a point of providing an opportunity to remove the skilled and semi-skilled machine operator from his/her central position in the production process Wilkinson (1985:440 as quoted by Forester 1985) comments:

The new control devices are held to confer several economic advantages. For instance, predetermining the job can make the process easier, the machinery itself can be in more constant use; this has the desired effect of increasing utilization rates, major concern for engineers, particularly when production machinery is expensive and pay-back period is critical. Second, the program, often in the form of a paper or magnetic tape, can be filled and recalled wherever needed, thus, the programming effort for every small batches or "one-offs" may be worth the effort. Third, manning levels may be reduced on some machinery, contribute to higher productivity. Finally, higher accuracy and predictability of production is sometimes held to improve product quality and reduce the scrap rate. At least some of these economic advantages were cited as justification for introduction of the new technology in all the case firms.

2.1.3. The growth and impact of technology in education at Tertiary Institutions.

Reedt, (1999:1) stated that during the time he was employed few people were using internet, but after his departure the number increased dramatically. More people were using e-mail than actual post mail in the U.S. and this phenomenon cannot be reversed. It will continue to be used by the entire country to communicate effectively.

One realizes that this exciting, magnetic device possesses three dimensions: technological, economic and political which according to Reedt, (1999:4) makes multimedia transmission possible. Reedt (1999:6) furtheron alluded that internet can be used to empower students who are the future employees.

Wright as quoted by Forester (1985:120) conducted a survey in educational technology and found out that the utilization of technology has been linked with the popular modular curriculum, which showed that respondents preferred to use the modular approach as a means of organizing the classroom, the content and a means of student management.

This method would benefit students as they work in pairs in order to confront the reality of the modern workplace by building upon group problem-solving abilities. Lecturers would, then share their knowledge with others at equally skilled levels in order to facilitate the teaching and learning process.

This process has been amazing because electronic communication and news-media have become common place and indispensable. Thus, the number of computers have increased at an alarming rate and are regarded as powerful because of not only being able to store, retrieve, communicate and broadcast a large quantity of information at the fastest rate, but can also re-arrange, and select it. Halton (1985:16) as quoted by Forester (1985) says.

Until recently, these activities were the sole province of the human brain. While creative, judicious, moral and aesthetic choices are still best to let to people, all the tedious and mechanical mental process can now be relegated to the accurate, fast and tireless machines. Halton,(1985:23) as quoted by Forester(1985).

The use of computer increased dramatically from the year 1960 computer could only be afforded by large organizations, government departments and groups within such organizations. Presently, the availability of computers in stores means that people can be able to purchase for personal use. As a result,

these computers play important roles in the lives of majority of people by offering significant computing capability and range of daily activities in both office and home. The world has come to the realization that computers are important tools used to increase productivity in the office, which is the most labour intense sector in the United States. Halton, 1985:20 as quoted by Forester (1985) comments:

Since its inception, the development of computer technology has been accompanied by attempts to assimilate it into education, in pursuit of teaching and learning goals. (Mioduser, 2001:1)

The extent to which the use of the personal computer is growing at an alarming rate in a sense it invades offices. As a result, managers are no longer prepared to use corporate computer centres that need months to do a job. For example, it could take the manager to wait for a week even more for one page letter to be typed. This led them to take matters into their own hands and bought their own machines. Forester, (1985:323) observes:

The results already are astonishing. Even those Managers who type only the "hunt peck" method are now using the desktop computer to do everything from analysing data to sending their mail electronically and tapping into large corporate databases.

This statement brought what one could call a "computer shock" as people are now experiencing problems, due to the high rate of computers being bought almost at a high rate everywhere. This makes it impossible to desktop units to work together or link up with large corporate information systems.

In the ideal learning environment, technology facilitates the teaching and learning process but does not replace teaching. In such an environment, students and lecturers must work together to learn and evaluate the effectiveness of scholarly work. This is a departure from the traditional model in which an "all knowing" lecturer impart knowledge to passive students. All these factors facilitate the use of technology in the teaching and learning to prepare students for the changing workforce.

One can realize that the corporate user is not only hit by personal computer shock, it also affects some equipment makers because they are seeing their office markets rapidly drying up as the desktop computer replaces specialized word processor, office automation system; and data processing terminals. It is also forcing manufacturers to come up with new products and introduce new marketing strategies to take the personal computer into consideration. Wohl, (1985:96) as

quoted by Forester (1985) drew an illustration of how the above could be applicable by stating that:

The personal computer has been accepted as the workstation (in the office), as a result, the personal computer will permanently alter how office automation will work”.

2.3. The Significance of technology in tertiary institutions

Despite the fact that lecturers are encouraged to use technology in the teaching and learning process, one important aspect which has to be considered is the changing classroom environment brought about by the increasing use of technology. Such changes affect both lecturers and students, due to the fact that students are regarded as pro-active learners. They are actively seeking ways to analyze, question, interpret and understand their ever changing environment. Lecturers are also involved in helping learners to acquire higher-levels skills that allow them to move readily, analyze, make decision and solve “real-world” problems. Newby et al, (2000:4) as quoted by Duhaney (2001) alluded to the fact that learners become more actively involved in the classroom activities while lecturers help to guide and facilitate the teaching and learning process.

Newby et al, (2002: 4) as quoted by Duhaney (2001) further comment that the role played by computer technology in tertiary institutions is important in the sense that it has improved student learning. This fact depends on whether lecturers are ready to integrate it (computer technology) in their lesson plans. Dils (2000:7) comments:

In the future, lecturers may be able to integrate into a lecture or discussion virtual reality excursions for students using computerized information provided by digital icons, indexes, symbols. And that teachers attitude about computers and related technologies can positively influence their students' attitudes towards technology

2.4 Integrating technology in teaching.

Technology is important in the teaching and learning process because it requires interaction between students and lecturers. This means that students are forced to become involved with the internet from the outset of the course since it involves the ability to create more interactive course materials. This can help maintaining students' interests in the course. As a result, lecturers should be prepared to spend a lot of time helping students to understand not only the content of the course but also the mechanics and procedures of the electric classrooms better. (Easley 2000 : 4)

There is an increasing concern regarding the extent to which prospective lecturers are being prepared to integrate technology in order to support the teaching and learning process in the classroom. As a result, a number of tertiary institutions are successfully preparing lecturers who are incompetent in using technology and guided by sound principles governing the teaching and learning practice (Hall, 2001:1) observed.

For tertiary institutions to keep abreast of Technological developments'. Technikon Principals must understand where technology is leading society, how it will affect their institutions and how to lead lecturers in its use in classroom. To do this, Technikon Principals must make sure that computers are put in classrooms, that computer-related technology incorporated into lesson plans, that lecturers learn how to use computers and the Internet, that students have access to computers and that technology is kept up to date.

2.4.1. Problems encountered by Lecturers

One of the problems encountered by inexperienced lecturers in learning how to use computers and the Internet is the time factor. It has not been easy to make changes to the traditional techniques to incorporate technology into classrooms (National

Centre for Education Statistics 2000:2 as quoted by Jones 2000).

There are a number of factors that make inexperienced lecturers not use computers. These include lack of training and also the classroom environment.

Blackmore et al, (1992:1) as quoted by Duhaney (2000) carried a survey and observed that over the years studies showed that 50% of teacher education graduates were "not prepared at all, or poorly prepared", while 20% stated that they were inadequately prepared, or well prepared, to use technology for instruction.

The above survey done by Blackmore et al (1992:7) as quoted by Duhaney (2000) shows that there are problems faced by tertiary institutions in providing lectures with computer skills.

Lecturers can improve their competence in computer skills by participating in online discussion groups, forums, e-mail lists, bulletin board, message boards and chat-rooms. For example, using the 21st Century Teacher Network (www.21st.org) which enables lecturers to exchange technologies' ideas with other lecturers around the world. This factor improves a number of

inexperienced lecturers by getting support from their peers online. Mayer, 2001:2 as quoted by Jones (2001).

However, Chin (2001:4) as quoted by Jones (2001) explained that inexperienced lecturers are getting more funding, higher program standards, online support and a strong support system to help them improve their reading in using technology and the Internet into their classrooms.

Chin further argued that many lecturers have some basic computer skills, but most of them are not yet trained in multimedia activities. He said that every lecturer should make a greater commitment to be provided with technology training which could be applied in the teaching and learning process.

The above statement expresses the need to provide lecturers with computer skills for teaching and learning process in tertiary institutions. The researcher's interest in providing effective guidance/programs prompted and motivated her to undertake this study.

Even in tertiary institutions where technology is available, Internet connections often go unused because lecturers lack the skills and knowledge necessary to integrate them into their daily classroom activities. Lecturers often express their frustration about lack of available training. This makes it difficult

to take full advantage of the wide range of educational technology. (Duhaney, 2001:1).

There is a need to discuss the extent to which lecture-education programs are helping lecturers to integrate technology in the teaching and learning process. This can be done by considering lecturer preparation, standards, some of the challenges encountered in integrating technology.

Mehlinger, (1996:5) as quoted by Devon (1996), regarding the standard set by International Society for Technology in Education (ISTE) stated that there should be only nationally adopted guidelines concerning what type of technology should be in teacher education. This could help educators in redesigning courses, as well as the integration and use of technology in the teaching and learning process.

2.4.2. Preparing Lecturers to use technology

Most of the lecturers did not receive any formal training regarding computer skills. As a result, they are facing several challenges in trying to embrace technology. For example, learning new software and developing lesson plans that incorporate new technology (Jones 2001:1)

Hall (2001:2) argued that those lecturers not involved in the use of technology in the classroom are doing so because of insufficient training, perceptions regarding lack of control of specific initiatives, including lecturer's own attitude towards technology and individual projects. In addition to this, is lack of access to equipment and insufficient staff development. This statement leads to the realization that these inexperienced lecturers feel that they need more help in technology training in order to incorporate it in their classrooms.

In order to prepare lecturers to use technology in the classroom, they should be capable of integrating it in classroom activities. The appropriate model of technology for teaching and learning should also be included. This should also be included in courses for different disciplines. To make this a success lecturers should work with college teachers to help them adopt best practices in the effective integration of school teaching curriculum.

Lecturers should integrate technology in the teaching and learning process, although one realizes that some educational institutions are not in favour of preparing lecturers to integrate information technology in the teaching and learning process, but others are greatly supportive this idea. Beck and Wynn. 1998:1 as quoted by (Duhaney 2001) comment:

Schools, colleges and departments of education may be placed along continuum in their integration of technology. Whereas there are those who are seeking to maximize the integration of technology in their comfort levels, working with these tools. Many lecturers who have integrated technology to support teaching and learning process have only used it for activities which they control (e.g. drill, practice and tutorials). Other lecturers, however, have used technology for instruction in ways which are more student-centred, for example, (collaborative) learning activities (office of technology assessment,

1995). Yet others may still be reluctant to integrate technology beyond the use of the traditional ones (e.g. overhead projectors, video tape recorders, 35 mm projectors) in their programs.

2.4.3. Training Lecturers and students in the use of Internet.

In order to equip students with computer skills, the first and most important point to be considered is to train lecturers through in-service training.

Computer centres should co-ordinate their activities with lecturers training centres, because it should be a collaborative venture between all concerned parties.

After training them, tertiary institutions can introduce the use of Internet in the teaching and learning process by preparing students for the challenge of lifelong learning, which is the key

to success in the continuously changing world of technology. This can be done by allowing students to have access to Internet.

Jon-Paul (2001:1) as quoted by Jones (2001), suggested that administrators should “best-practice” themselves with instructional strategies in order to integrate technology into the teaching and learning process in tertiary institutions. For example, using an up-to-date school web-site as a vehicle for communication, or using power point, presentations at faculty meetings, an online professional development and opportunities are indicators that administrators are using technology effectively.

Needham (2001:2) as quoted by Jones (2001), observed that in United State, school systems are provided with free access to the Internet and their e-mail. Lecturers are encouraged to use their laptops to surf the Internet, create lessons, power point presentations and derive their students’ grades. This will increase the lecturers’ comfort level with technology.

Principals at tertiary institutions are trying to make technology a priority in their Institutions by adopting programs and creating work environment where lectures will be equipped with computer skills. For example, University of Potchefstroom holds weekly workshops in which lecturers get lessons on

specific aspects of technology. Classes are scheduled to take place at a particular date and time, for example in a period of 1hr 45 minutes, students interact with each other and with their lecturers in a normal way by receiving lectures, asking questions and receiving answers or having discussions with the whole class.

The above information can be supported by stating that lecturers should be given enough in-service training in order to provide students with computer skills. Computer centres should coordinate their activities with lecturers training centres, as lecturers training is a major issues that concerns the National Program. Gillingham and Topper (2001:2) as quoted by Duhaney (2001) argued that lecturers should be involved in teacher training programs in order to employ technology appropriately in the teaching and learning process by using the following methods:-

- a. An instructor equipped with technology skills should teach a course on technology within a teacher preparation program.
- b. This technology infusion method would help in placing aspects of technology within each course in a teacher-preparation program. As a result, it could also help them to concentrate on pedagogical content knowledge and content specific application.
- c. Another method is the one of students performance approach which involved students
- d. The last point is case-based approach which

provides instance of teaching theory for analysis and examination and allows prospective teachers to study and effect on the efforts of existing teachers who have incorporated technology into their classroom practice. (Gillingham 2001:4 as quoted by Duhaney 2001).

The above mentioned methods are the best ways in which pre-service lecturers may be encouraged to use technology to support the teaching and learning process. They can be used either singly or in combination to help pre-service lecturers to become familiar or conversant with different technologies. This will put lecturers to be able to use them effectively in the teaching and learning process.

2.4.4. Availability of resources and its impact

According to Banaszewski (1997:1) a school can survive by using one computer in applying the following strategies:

- use technology to complete part of an established lesson
- holding students accountable course content through journals
- establish a scheduled time for pairs of students to use the classroom computer
- harness the skills and computer knowledge already in your class by encouraging peer tutoring.

With the increasing use of different technologies throughout the society, classroom teachers need to develop a level of proficiency in using these tools to support the teaching and learning activities. However, Grabe and Grabe (1998:2) as quoted by Duhaney (2001) observed the following as factors which led to the causes of poor preparation for lecturers in using technology:

- frequent situation in which colleges of education are less equipped than the elementary schools where their graduates will work.
- lack of interest and anxiety cause a large number of faculty members are unable make appropriate use of technology in their own classrooms.
- experiences with technology are focused in a single course that concentrates on learning to use technology rather than learning how to facilitate learning with technology.

2.4.5. Accessing information in training Lecturers

Internet is facilitating the teaching and learning process in tertiary institutions in a sense that it connects almost all the users like teachers, students to students, students to lecturers and also bringing the world of information inside the classroom by reshaping its setting. The role of educators and students' perception concerning what they know. This led to a point where Internet users are able to access information easily than ever. For example, one can access any document published online anywhere in the world; one can initiate or collaborate in discussions, search for policy archives and educational database, download information and access online libraries Ely (1996:59).comments:

Some of us feel that technology for better or for worse, is going to be out of modus operandi, our academic "tool box" of the coming millennium, an adaptation,

especially in today's elective environments found within our class that depending upon our asynchronous and intercultural view of academia, each of us is bound to be the recipient of some very massive changes in how we do our in our class-rooms.

2.5 Conclusion

From the above-mentioned points, one can realize that there is proof that the computer has led to great ongoing strides in technological advancement. This is observed by Atush in Japan (Sunday Times 24th February (2002:3):

Within just few days, Microsoft has made two important moves that could radically shape its future, and that of many of its competitors, moreover that the Software giant was forming an alliance with the world's biggest chip maker, Intel to set a new standard for the next generation of cellphones. Future strategy: The world's biggest software firm is pushing into mobile telephones and computer-games in a desperate attempt to keep competitors at bay. Equally threatening to Microsoft's current personal computer dominance, game consoles can be made even more like PCs with the additional of a hard-disk. (The Economist Sunday Times 24th February 2002:3).

It has been shown that lecturers can use a computer as a tool in the teaching and learning process by involving students in computer training at the beginning of the school year. These students can then be responsible for teaching their peers. This can be done by arranging time effectively, and also avoiding bottlenecks at the computer. As a result, it will make students to work at their convenient time. The strategy can empower lecturers to teach technology to prepare students for the job market where computers are part of the office tools.

CHAPTER 3

3.0. RESEARCH METHODOLOGY

3.1. Introduction

This chapter briefly outlines the research method used in conducting the study. It explains the rationale behind the type of method employed, how the research was conducted and what steps were taken to ensure the validity of the study.

Empirical investigation was conducted to determine the nature and scope of the use of computer as an instructional technology in tertiary institutions in Mafikeng and Klerksdrop districts.

3.2. Population:

Goddard and Melville (1996:29-30) defined the term population as a group that is the subject of research interest. It is often not possible to study the entire population. As a result, it is necessary to make general findings based on a study of only a subset of the population, which is called a population. For example, in this study, the researcher was interested in studying the use of computer as an instructional technology the

teaching and learning process in tertiary institutions in the Mafikeng and Klersdorp districts.

The survey population was drawn from the UNW in Mafikeng district and Vaal Triangle Technikon in Klersdorp district. The first step was to identify lecturers and students in the two institutions.

3.3. Sampling:

Sampling must be representative of the population of concern, otherwise no general observation about the population can be made from studying the sample

A sample can be much less accurate and more convenient because in this study, a total population of 2511 (two thousand five hundred and eleven) students doing computer, as a course and 350 lecturers (three hundred and fifty) both from UNW and Vaal Triangle Technikon were used. 150 (one hundred and fifty) students and 150 (one hundred and fifty) lecturers were randomly selected as a sample from both institutions. The random sampling method was drawn by writing down the names of lecturers and students on pieces of paper. These pieces of papers were put in a box. A student was then asked to pick up a name of a lecturer or a student, until 75 names in both groups i.e. one group for lectures, another group for

students were selected These two groups, were used as representatives of both lecturers and students at University of North West and Vaal Triangle Technikon.

3.4. Questionnaires

The researcher used this method because it is more convenient, fast, cheap and efficient in obtaining large amount of quantifiable data on relatively a large number of people

This method is defined as a self-report instrument whereby the respondent writes his/her answers in response to what is asked on a written document. Haralambos (1985:511) states that the questionnaire should be designed in such a way that respondents should understand it easily without encountering any problems.

He further argued that, a well designed questionnaire should meet the objectives of the enquiry by obtaining the most complete and accurate information possible to do so within reasonable limits of time and resources.

In addition to this Cohen and Manion (1989:107) argued that the most commonly used tool to collect data is the questionnaire because it is the best form of survey in carrying out an educational enquiry.

Questionnaires usually fall into the following categories:-

Firstly, they may be 'open ended' for example: Why do you think the use of computers as an instructional technology in the teaching and learning process is exceptionally good? This type of question allows the respondent to compose his/her own answer rather than choosing between number of given answers

Another type is known as a 'closed/fixed choices question, which requires a choice between a number of given answers, for example: how about the idea of becoming computer literate, indicate whether you would like this (i) very much, (ii) a lot (iii) not at all. When compared to the open ended type, fixed-choice questions provide responses which can be more easily classified and quantified. (Haralambos, 1992:505-511).

According to Schnetler (1989:44) the major criticism regarding the use of questionnaires that in most cases they are poorly designed, and that items should be dealt with meaningfully. Questionnaires should also be structured and administered effectively to qualified respondents.

In order to construct questionnaires properly Borg and Gall (1989:430) outlined the following rules:

- clarity : sameness in items should mean the same to all respondents.
- short items preferably
- negativity in items should be totally avoided
- items which have double-barreled requiring the subject to respond to two separate ideas with a single answer should also be avoided and
- biased questions should be avoided.

3.4.1. Questionnaire Items

The main aim of the questionnaire was to gather information about the use of computer as a tool in the teaching and learning process in tertiary institutions. This instrument has been used successfully in the sampled tertiary institutions i.e. Vaal Triangle Technikon and University of North West to determine the use of computer in the teaching and learning process.

3.4.1.1. Format of the questionnaire.

3.4.1.2. Introduction:

Questionnaire consists of a list of preset questions in which respondents are asked to fill in answers. They may be administered by an interviewer in which case they take the form

of structured interviews. The questionnaires were divided into the following Sections (See Appendix 1)

3.4.1.3. Section A

The purpose of these questions was to gather biological information about the respondents. The information is important to understand the background of the respondents (See Appendix 1).

3.4.1.4. Section B:

The main aim of this section was to determine the use of computer as a tool in the teaching and learning process in tertiary institutions. In this case, items were developed from the literature study and each respondent were asked to indicate, on four-point scale, how s/he saw the computer as a tool used in the teaching and learning process in tertiary institutions (See Appendix 1).

3.4.1.5. Section C:

The purpose of these open-ended questions was to determine the views of respondents on the use of computer as a tool used in the teaching and learning process in tertiary institutions regarding interviews.

3.5. Covering Letter

Borg and Gall (1989:436) state that a covering letter is a tool used to introduce questionnaires to the respondents, with the aim of getting them to respond to the questionnaire. It provides direction to the respondents to be able to complete the questionnaires and further guarantees anonymity. However, the researcher did not include it, but indicated in (Appendix 1) that the information that is going to be provided by respondents is confidential and it will be used for this study only

3.5.1. Administrative Procedures

Permission was obtained from the lecturers for accessing information and to administer the questionnaire in all the computer classes. The researcher requested lecturers to help with the distribution of the questionnaires to the selected

respondents. Thereafter researcher collected all the questionnaires back, that is, she got 100% response from her participants.

Table 3.5.1.1. Distribution of the sample population

Institutions	No. of Lecturers	No. of Students
University of North West	75	75
Vaal Triangle Technikon	75	75
Total	150	150

Out of 10 tertiary institutions within the NWP only two were used for the investigations. These Institutions were University of North West and Vaal Triangle Technikon.

3.5.2. Data Collection Strategies:

There are different types of methods used for collecting data. The most frequently used method is by directly asking respondents to express their views on questions asked regarding a particular issue or topic. In this study, the emphasis was placed on a questionnaire, because it is commonly used as a tool for data collection.

3.5.2.1.Observation Method:

This method consists of:

- simple observation and
- participant observation

The simple observation method is one where the observer records events as they are taking place, at the same time observing the social behaviour of people interacting regarding a particular topic of research.

Haralambos (1985:502-506) states that the observation method takes part to some extent in the activities of those the researcher observes. Thus, he joins the group he wishes to study and observes their activities naturally as they are taking place on daily basis.

However, the researcher did not use this method but it is regarded as one of the methods used in similar research.

3.5.2.2. Questionnaire

This method consists of a list of preset questions to which respondents are asked to fill in answers to the questions asked.

It may be administered by an interview in which case it takes the form of structured interviews. This method is regarded as cheap, fast and efficient for obtaining a large amounts of quantifiable data on relatively large number of people. Haralambos (1985: 511) The researcher used this method as it was interesting to her because of its advantages.

3.5.2.3. Participant Observation

In this case, the observer cannot reveal the purpose of his/her presence by becoming a participant in all the activities performed. He/She enjoys confidence of the participants without disturbing them in anything whatsoever Melville and Goddard, (1996:96) This method is also one of the method used to conduct the research, but this method was not used in the study.

3.5.2.4. Interviews:

Interviews are one of the most commonly used methods to gather information. They consists of a set of questions whereby the researcher is asking the respondents to fill in answers. Interviews are classified as structured and unstructured. In a structured interview, the wording of the questions and order in which they are asked remains the same

in every case. The result is fairly formal questions and answer sessions. Whilst with unstructured interviews it is completely different because it involves conversation or discussion. In this case, the interviewer has preset questions phrased the way he/she likes, i.e. asking the respondents to develop his/her answers and probe responses which might be unclear. Such questions are often extended to the respondent who may be allowed to direct the interviewer into areas which interest him/her. Information that has been obtained from this type of interview is regarded as more reliable because the wording of the same questions are the same for all respondents (Haralambos 1985:505-511). This is also another method used to conduct research though the researcher did not use it.

3.6. Summary:

In this study the questionnaire was employed as a tool to collect data because of its advantages. With the help of the University of North West influential statistics were employed to verify the use of computer as a tool in the teaching and learning process in tertiary institutions.

CHAPTER 4

4.0. Data Presentation and analysis

4.1. Introduction

In this chapter the researcher reports on the findings of the empirical investigation conducted to investigate the use of computer in the teaching and learning process in tertiary institutions in the North West Province of the Republic of South Africa.

Based on data collected in the study of two sampled tertiary institutions in the North West Province, (see chapter 2), this study focused on the use of computer as an instructional technology. Particular attention was given to the use of internet as a tool in the teaching and learning process.

4.2. Results and analysis

Demographic characteristics of respondents

The sample in this study was drawn from two tertiary institutions in the North West Province (see table one) The Table below gives demographic details of 150 lecturers from both institutions involved in the study.

Table 2 : Age distribution of Lecturers (N = 150)

	Lecturers	Percentage
20 years and below	16	11%
21-30	49	33%
31-30	47	31%
41-50	30	20%
51 and above	8	5%
TOTAL	150	100

From Table 2 above, the analysis of the age respondents shows that 16 lecturers i.e. (11%) were either 21 or below the age of 20 years, 49 lecturers i.e. (33%) were 21 and 30 years of age, while 47 lecturers i.e. (31%) were lecturers between 31 and 40 years of age, 30 lecturers i.e. (20%) were between 41 and 50 years of age and only 8 lecturers i.e. (5%) were between 51 and above 51 years. This indicates that the majority of lecturers are fairly young professionals.

Table : 3 Gender distribution of Lectures

Gender distribution	Lecturers (150)	N Percentage
Male	86	57 %
Female	64	43 %
TOTAL	150	100%

Table 3 above illustrates that there are 86 male lectures in both institutions and 64 female lecturers in both institutions included in the study. This show that male lecturers are more in number than female ones.

Table 4 : Position held by Lecturers

RANK	NUMBER (150)	PERCENTAGE
Junior Lecturer	45	30%
Lecturer	60	40%
Senior Lecturer	38	25%
Head of Department	7	5%
TOTAL	150	100%

Table 4 above show that 60 i.e. (40%) of respondents were lecturers whilst 45 i.e. (30%) were Lectures and 38 were Senior Lecturers, lastly, only 7 i.e. 5% are Head of Departments in both Institutions. This clearly indicates that most of the lecturers were occupying middle positions in both institutions.

Table : 5 Teaching experience of respondents (Lecturers)

Teaching Experience	Frequency	Percentage
0-5 years	52	35 %
6-10	48	32 %
11-15	35	23 %
15-20	17	10 %
TOTAL	150	100 %

An analysis of the period of teaching experience of the respondents indicates that 52 i.e. (35 %) had five years or less of teaching experience. 48 i.e. (32%) had between six and ten years of teaching experience. 35 i.e. (23%) lecturers had between eleven and fifteen years, whilst only 15 i.e. (10%) were lecturers with fifteen and above. One can see that the majority of lecturers, that is, those who were above 6 to 20 years had enough lecturing experience.

Table 6: Computer literacy

Are you computer literate	Yes	148	99%
	No	2	1%
TOTAL		150	100%

Table 6 above, shows that out of a total number of 150, 148 i.e. (99%) of lecturers were computer literate whilst only 2 i.e. (1%) of the total number of 150 were computer illiterate. Even though the majority of lecturers were computer literate, they did not have certificates on computer literacy. Thus, they indicated that they only gained this experience without computer training.

Table 7: Computer illiteracy can lead to difficulty in finding job employment

1.	Computer illiteracy leads to difficulty in finding employment	Yes	140	93%
		No	10	7%
		TOTAL	150	100%
2.	Computer helps in retrieving information in few seconds	Yes	148	93%
		No	2	1%
		TOTAL	150	100%
3.	Do you have enough computers in your institution?	Yes	41	27%
		No	109	73%
		TOTAL	150	100%
4.	Does your institution have computers with Internet connection?	Yes	51	34%
		No	99	66%
		TOTAL	150	100%

Table 7: above shows the number of responses from lecturers

based on the use of computers in the teaching and learning process in tertiary institutions. These questions were designed to find out whether lecturers are using computers as an instructional tool in the teaching and learning process in tertiary institutions. The above information shows that lecturers did not have enough computers in tertiary institutions.

It further indicates that 140 i.e. (93%) agreed that computer illiteracy could lead to difficulty in finding job employment, only 10 i.e.(7%) did not agree. Out of 150 lecturers 148 i.e. (99%) agreed that computers could retrieve information in few seconds whilst 2 i.e. (1%) did not agree. Again, that out of a total number of 150 lecturers, 41 i.e. (27%) indicated that their tertiary institutions had enough computer and 109 i.e. (73%) did not have enough computers. Lastly, that out of 150 respondents (lecturers) i.e. (66%) indicated that their computers were not connected to Internet as a results they were encountering problems.

Table 8: The importance of computer in working environment

PROBLEMS			KEY			
QUESTIONS	SA	A	NS	D	SD	TOTAL
Computer increases workload	34 23%	21 34 %	15 10%	27 18 %	53 35%	150 100%
Computer offers new services	86 57%	37 56 %	18 12%	3 2%	94 63%	150 100%
Computer leads to greater efficiency	93 62%	24 16 %	4 3%	6 4%	23 2%	150 100%

Looking at the importance of computers in the working environment, from the Table 8 above, one can see that out of 150, only 34 i.e. (23%) of the lecturers strongly agreed that computers increases workload; and that, only 21 i.e. (34%) agree with this statement.

Furthermore, out of 150 only 86 i.e. (56%) lecturers felt that the computer offered new services which means that it is being updated frequently, whilst 3 i.e. 2% did not agree. This shows

that it really works by offering new services to anybody who uses it on daily basis.

Still on the same question, 93 i.e. (62%) of the lecturers in both institutions strongly agreed that computers were really needed for greater efficiency. But only 4 i.e. (3%) did not strongly disagree with this statement.

Table 9: Need for installation of computers in tertiary institutions' Libraries

PROBLEMS		KEY				
	SA	A	NS	D	SD	Total
Computer should be installed in Libraries	90 57%	24 16 %	5 3%	30 20%	1 1%	150 100%
Lectures should guide learners when learning computer skills	96 64%	20 13 %	31 21%	1 1%	2 1%	150 100%

The above table shows that lecturers in both Institutions, that is, out of 150, 90 i.e. (59%) strongly agreed that computers should be installed in Libraries to help Library users to find library materials such as books and journals easily. This would help

them to save time, unlike using a strongly disagreed with this information.

Lastly, 96 i.e. (64%) of lecturers felt that students should be guided when learning computer skills. This would help them (students) to know and learn it easily so that they can be able to operate it without any guidance. On the other hand, only 1 i.e. (1%) of the lecturers disagreed with this statement, because they were saying that lecturers should avoid guiding them because they will not be able to learn on their own.

Table : 10 Interest shown in computer skills

Are you interested in learning about computer skills?	YES	113	75%
	NO	37	25%
	OTAL	150	100%

Table 10, above shows that out of 150, only 113 (i.e. 75%) were interested in computer skills whilst 37 (i.e. 25%) were not interested in acquiring such skills.

One can see that most of the lecturers were interested in doing computer literacy course and that only few of them were not interested.

Table 11: Availability of computers

Availability of computers	YES	58	37%
	NO	92	63%
	TOTAL	150	100%

Table 11 above shows that those two Institutions did not have enough computers because out of 150 students 58 (i.e. 37%) indicated that they have enough computers whilst 92 i.e. (63%) agreed that they did not have enough computers. The results show that there was already shortage of computers which affects the teaching and learning process.

Table12: Computers with internet connection

Male	YES	31	21%
Females	NO	119	79%
	TOTAL	150	100%

From the above table, out of 150, only 31 i.e. (21%) show that computers are connected to Internet in both Institutions; while 119 i.e. (79%) did not have computers with Internet connection. This indicates that most of the lecturers encountered problems in the teaching and learning process because their computers were not connected to internet.

Table 13 Age distribution of students (N=150)

	Students	Percentage
20 years and below	2	1%
21- 30	139	93%
31- 40	9	6%
41 and above	-	-
TOTAL	150	100

From Table 13 above, the analysis of age respondents show that 2 students i.e. (1%) were below age 16 and 139 i.e. (93%) of them were below 31 and 30 years of age, while 9 i.e. (6%) were above 31 and 40 years.

This indicates that the majority of students were below the age of 30 and 40 years in both institutions.

Table 14: Gender distribution of students

	Students	Percentage
Male	98	65%
Female	42	35%
TOTAL	150	100%

The table above, illustrates that there were 98 male students in both institutions and 42 female students covered in this study. It simply shows that male students were more than female students.

Table 15: Level of education: students

	Frequency	Percentage
First year	85	57%
Second year	46	31%
Third years	10	5%
Fourth year	9	6%
TOTAL	150	100%

Table 15 revealed that out of 150, 85 i.e. (57%) of students were registered as first years and 46 i.e. (31%) were second year students and 10 i.e. (5%) were third year students, lastly, 9 (i.e. 6%) were fourth year students. This means that the number was decreasing when students were moving to higher level of their studies in computer literacy because most of them were forced to use it at first year level, whilst from second to third and fourth year they had to choose whether they continue doing computer.

Table 16: Computer illiteracy can lead to difficulty in finding job employment

	Yes	114	76%
	No	36	24%
TOTAL		150	100%

Table 16, above indicates that out of 150 total number of students, only 114 (i.e.76%) agreed that computer illiteracy could

lead to difficulty in finding employment whilst 36 (i.e. 25%) did not agree. This indicates that, it is not easy to find employment without computer literacy.

One can see that most of the students in both Institutions could not be able to use Internet adequately because of its shortage. In other words, students could not be able to communicate with their lecturers by using computer in the teaching and learning process

Table 17: Interest shown in computer skills

Are you interested in learning computer skills?	YES	113	75%
	NO	37	25%
	TOTAL	150	100%

Table 17, above shows that most of the students, that is, out of 150 students 113 i.e. (75%) were interested in computer skills whilst 37 (25%) were not interested.

Table 18: Problems encountered by lecturers when using computer with internet

PROBLEMS		KEY				
QUESTIONS	A	A	NS	D	SD	Total
Time factor	75 50%	28 14%	33 22%	14 9,3%	0 0%	150 100%
Lack of Training	46 31%	17 11%	36 21%	22 15%	29 19,3 3%	150 100%
Preparation	75 50%	51 34%	17 11%	7 5%	0 0%	150 100%

The above table clearly shows problems encountered by students when using computer with Internet. For example, out of 150, 75 i.e. (50%) were having problems with time factor, thus, the time given for them to use computer is too short, whilst 14 i.e. (9.3%) agreed that they have enough time.

With lack of training, out 150 only 46 i.e. (31%) indicated that they did not get enough training while 11 i.e. (17%) felt that they are getting it. These figures clearly showed that students were not getting enough training for computer. When coming to preparation , 75 i.e. (50%) strongly agreed that they did not have

enough chance to prepare themselves whilst 7 i.e. (5) disagree with this statement.

4.4 Summary of Findings:

- 4.4.1. The study clearly indicates that in the two sampled tertiary institutions i.e. UNW in Mafikeng district and Vaal Triangle Technikon in Klerksdorp district, there was a serious shortage of computers with internet connections because most of the lecturers and students indicated that these institutions did not have enough computers (See Table 11)
- 4.4.2. It further revealed that these two institutions did not have enough computers to provide students with computer skills (See Table 11 and 12)
- 4.4.3. Another indication is that most of the lecturers were computer literate (See Appendix 6). If lecturers were provided with enough computers they could improve their computer skills.
- 4.4.4. Another finding from this study was the clear lack of resources to cater for students so that they can cope with information on technology as it was upgraded on daily basis.

4.4.5. Lastly, most of the students indicated that they were prepared to accept changes brought by computers as it would prepare them for the working environment on completion of their studies.

CHAPTER 5

5.1. Introduction

5.2 Discussion and findings

The purpose of this study was to investigate the use of computer as instructional technology especially the use of Internet as a tool instrument in the teaching and learning process in tertiary institutions in the North West Province of Republic of South Africa.

According to the findings as summarised in Chapter 4, it is indicated that there were indeed problems faced by lecturers in the sampled tertiary institutions with regard to the use of computer as an instrument in the teaching and learning process.

The study revealed that a shortage of computers with Internet connection was the main problem affecting the teaching and learning process.

According to the research conducted, lecturers offer computer courses to students on what they are experiencing about computer, thus, they are not well trained to be professionals on computer literacy. As a result, without being provided with computer training and computer literacy there is no way the teaching and learning process can be facilitated.

The computer as an instructional technology has shown to be a good tool in the teaching and learning process in tertiary institutions though lecturers were experiencing problems due to shortage of computers.

Another factor is lack of time which lecturers are experiencing. If more time is not allocated to lectures, they cannot be able to promote the teaching and learning process for computer classes.

The results of the sampled institutions showed that if Lecturers could be supplied with enough computers with Internet connection. They could be given full training regarding computer literacy so that they should provide students with computer skills. This could have an impact on students' performance than might be the case with those who are unqualified.

5.2.1. Conclusion

One can say that the study clearly indicates that there are problems facing both lecturers and students regarding the use of computer in tertiary institutions. These problems ranged from internal to external factors which could be solved by buying enough computers which would be connected to Internet.

In order to achieve this, the following recommendations are suggested

5.2.2. Recommendations:

5.2.2.1. In order to meet the challenges indicated in the use of computer as an instructional technology in sampled institutions, the following points should be considered: -

- (i) **Lecturers should be computer literate in order to be able to equip students with computer skills.** This could help students be able to face the working environment.
- (ii) **Lecturers should also be given enough time to prepare themselves and be exposed to regular computer training** due to the fact that computers are upgraded on frequent basis.
- (iii) **If lecturers could be computer literate, this could build the confidence** to students as they will be able to access computers and internet in the teaching and learning process.

- (iv) **There should also be enough computers up graded with internet connection in tertiary institutions to promote the teaching and and learning process.** If this can be done it will encourage even those few lecturers and students who are not interested in learning computer skills (See table 10). Furthermore that the importance of computer in a working environment tends to create a greater efficiency (See Table 8) As a result, the HOD's and Vice Rectors of the institutions should look into this matter seriously. If not this will obviously affect the teaching and learning process which will later on lead to a point whereby students cannot find employment easily because without computer literacy, employment cannot be found easily

Since students are also involved in this research study, most of them indicated that they are interested in doing computer skills as this will help them to find employment easily. They are also prepared to accept changes brought by computer technology. (See Table 17).

- (iv) **The researcher further recommends that students too should be given enough time for**

training since computers were being upgraded on frequent basis and it is also dominating our lives. There should also be enough resources that are user friendly to assist students in order to cope with technology age.

5.2.2.2. **Suggestions for further research:**

In-depth study should be done of the following aspects that were treated at an elementary level in this study:

- Does internet as an instrument in the teaching and learning process stimulate student's interest?
- Is the student's computer knowledge enhanced when lecturers use Internet during the teaching and learning process?

5.3. Summary

As for the whole purpose of this study has been to investigate the use of computer as an instrument in the teaching and learning process, perhaps it is better to conclude that it stimulates students' interest. It can be used for teaching and learning purposes.

It is also important to note that Lecturers should be allocated enough time to help students better understand not only the contents of the course, but the mechanics and procedures of the electronic classrooms. In other words, creating the classroom of the future is possible using today's technology.

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APPENDIX 1

QUESTIONNAIRE FOR STUDENTS IN TERTIARY INSTITUTIONS

This questionnaire examines how students regard the use of educational technology in Tertiary Institutions. These questionnaires are quite demanding, but we would be grateful if you could take time to fill them in, individually without consultation.

Please be accurate so that a clear picture of the use of technology in tertiary institutions can be obtained.

The information is confidential and will be used for this study only.

Please make a cross (x) in the appropriate box.

1. Age

1.1	Below 16 years	1
1.2	17 - 20 years	2
1.3	21 - 24	3
1.4	25 - 28	4
1.5	29 - 32	5
1.6	33 and above	6

2. Gender

2.1	Male	1
2.2	Female	2

3. Level of education

3.1	First year	1
3.2	Second Year	2
3.3	Third Year	3
3.4	Fourth Year and above	4

4. Are you interested in learning about computer skills?

Yes	1
No	2

5. Does your Institution have enough computers?

Yes	1
No	2

6. Does computer literacy lead to difficulty in finding employment?

Yes	1
No	2

7. Are your computers connected to Internet?

Yes	1
No	2

8. Do all students benefit from Internet?

Yes	1
No	2

The following statements i.e. questions 9 - 12 are related to the use of computers in your school environment.

Put an (x) in the box with the number that best describe your opinion concerning the importance of computers in your school environment.

Key: 1.SA Strongly Agree 2. A. Agree 3. NS Not Sure 4. D. Disagree 5. SD Strongly Disagree

		SA	A	NS	D	SD
9.1	The existence of computer brought meaningful changes					

		SA	A	NS	D	SD
9.2	Computers enable students to use Internet					

		SA	A	NS	D	SD
9.3	Computers enable students to concentrate on the most important aspects of teaching process					

		SA	A	NS	D	SD
9.4	Computer provide students with the opportunities to increase their knowledge					

		SA	A	NS	D	SD
9.5	Computer improves the students' standing and marketability in the working situation					

APPENDIX 2

QUESTIONNAIRE FOR ACADEMIC STAFF IN TERTIARY INSTITUTIONS

This questionnaire examines how lecturers regard the use of educational technology in Tertiary Institutions. These questionnaires are quite demanding, but we would be grateful if you could take time to fill them in, individually without consultation.

Please be accurate so that a clear picture of the use of technology in Tertiary Institutions can be obtained.

The information is confidential and with the user for this study only.

Please make a cross (x) in the appropriate box.

1. Age

1.1	20 - 30 years	1
1.2	30 - 40 years	2
1.3	40 - 50 years	3
1.4	35 - 39 years	4
1.5	40 - 44 years	5
1.6	45 - 49 years	6
1.7	50 - 54 years	7
1.8	55 and above	8

2. Gender

2.1	Male	1	
2.2	Female	2	

3. Rank

3.1	Junior Lecturer	1	
3.2	Lecturer	2	
3.3	Senior Lecturer	3	
3.4	HOD	4	

4. Teaching experience

4.1	Below 4 years	1	
4.2	5 - 9 years	2	
4.3	10 - 14 years	3	
4.4	15 - 19 years	4	
4.5	20 years and above	5	

5. Are you computer literate?

Yes	
No	

6. Computer illiteracy can lead to difficulty in finding employment?

Yes	
No	

7. Computer helps in retrieving information in few seconds

Yes	
No	

8. Do you have enough computers in your institutions?

Yes	
No	

9. Does your institution have computers with Internet connection?

Yes	
No	

10. Put an (x) in the box with the number that best describe the problems encountered by lecturers when using computer and Internet.

		SA	A	N	SD	D
6.1	Time factor	1	2	3	4	5
6.2	Lack of training	1	2	3	4	5
6.3	Preparation	1	2	3	4	5

The following statements (i.e.) 7 - 10 are related to the use of computers in your work environment.

Put an (x) with the number that best describe your opinion concerning the importance of computers.

Key: 1. SA. Strongly Agree 2. A. Agree 3. NS Not Sure 4. D. Disagree

6. SD. Strongly Disagree

		SA	A	NS	D	SD
7.1	Computer increases workload	1	2	3	4	5
7.2	Computer offers new services	1	2	3	4	5
7.3	Computer is needed for greater efficiency	1	2	3	4	5
7.4	Computer should be installed in libraries	1	2	3	4	5
7.5	Lecturers should guide learners when learning computer skills.	1	2	3	4	5

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**REQUEST TO ADMINISTER A QUESTIONNAIRE CONCERNING A STUDY
ON THE USE OF COMPUTER AS AN INSTRUCTIONAL TECHNOLOGY :
INTERNET AS AN INSTRUMENT IN THE TEACHING AND LEARNING
PROCESS IN TERTIARY INSTITUTIONS (NORTH WEST PROVINCE OF
R.S.A.)**

I am humbly asking for your permission to conduct a study in your institution.

The purpose of the study is to investigate whether tertiary institutions have computers with internet connections and whether lecturers are skilled in computer literacy and finally whether students are prepared to accept changes brought by computer technology in tertiary institutions.

Your contribution is going to be treated as confidential issue and the study will involve collection of data.

I hope my request will meet your favourable consideration.

Yours faithfully

Ouma Elisha (Med Student)