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TO INVESTIGATE POSTGRADUATE STUDENTS' USE OF COMPUTER -BASED TECHNOLOGY (CBT) AND THE EFFECTIVENESS OF THEIR RESEARCH PROCESS

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Ketwords: Postgraduate, Students, Computer, Technology, Research, Effectiveness.

ABSTRACT

This study was designed to investigate Postgraduate students' use of Computer -Based Technology (CBT) and the effectiveness of their research process. The objectives that were used for the study were to investigate the effect of availability of CBT resources, to investigate the effect of Accessibility of CBT resource, to find out the Postgraduate student basic skills and the frequent use of CBT resources on the effectiveness of the research process. The sample size was 320postgraduate students selected from three Faculties in the University of Buea. The questionnaire and interview guidewere used to obtain information from correspondents and data were analyzed using Pearson product moment correlation (PPMC) alsoStatistical Package for social studies (SPSS) The following results were obtained; postgraduate that make more use of CBT resources has a higher positive effect on such students than on students who make less used of CBT resources, also the availability, CBT skills and the frequent usage ofCBT resources has a positive effect on postgraduate students on their research process while accessibility has a negative effect on postgraduate students use of CBT resources on their research process.

1.0.INTRODUCTION

In today's technologically driven society, information has taken on a new importance as a commodity (Diem, 1997). The endless, rapid flood of information and disinformation is causing a great deal of confusion and frustration; those who are ill- equipped to handle the information overload run the risk of falling behind those who have embraced the latest computer technologies (Titus, 1994) More and more pressure is being placed on schools to ensure mastery of technological skills essential to survival in this new society. "The Internet, for example, is entering classrooms at a rate faster than books, newspapers, magazines, movies, overhead projectors, television or even telephones" (Leo, 2000: 425).

The pressure to computerize has had important implications for social studies educators. In addition, AAU (2009) holds that technology will offer universities tremendous new possibilities in research and teaching, and open wider access to information. It adds that, universities have been at the forefront of technology's development as well as integrating and adopting these technologies into their work especially teaching, research and learning, will be of greater help to them. Lastly, that as universities develop and expand the use of computer technology in their activities, this will strengthen their capacity to enhance and respond to new challenges.

1.1 Background of the Study

Computers-based technologies are effective tools for facilitating social studies research. They can provide quicker and easier access to more extensive and current information for students (Boldt, Gustafson & Johnson, 1995). With computer-based technology tools such as computers, laptops, desktops, internet connection, wireless connection, wife connection, and internet key, postgraduate students can learn to manage information (Warburg 1991). However, there appears to be a misconception that ICTs generally refers to 'computers and computing related activities'. This is fortunately not the case, although computers and their application play a significant role in modern information management, other technologies and/or systems also comprise of the phenomenon that is commonly regarded as ICTs. Pelgrumand Law (2003) state that near the end of the 1980s, the term 'computers' was replaced by 'IT'

(information technology) signifying a shift of focus from computing technology to the capacity to store and retrieve information.

Computers are generally more engaging and interesting to use than textbooks as information is presented in a variety of forms such as graphs, pictures, text, and through a variety of modalities such as auditory, visual (Mitchell-Powell, 1995). Individuals are enabled to develop further their own unique strengths by being able to access information through their preferred learning style and through opportunities to represent their learning in a variety of ways (Wade, 1995). Determining more of the direction for their learning creates feelings of independence and empowerment, promotes creativity, and increases students' active involvement in their learning, thereby making their learning more personally relevant (Peck &Dorricott, 1994).

1.2. Statement of the Problem

Research literature has portrayed student's determination to integrate computer-based technology into educational and non-educational domains around the world since computers were invented (Mohnsen 2007) In this regard most universities in developed and developing countries are integrating and using Computer Based-Technologies as an essential instructional tool including research. Recent empirical findings by Mbiybeh (2003) ,Willinsky, et al (2005) and Mambah(2005) show that Cameroon state universities are using Computer-Based-Technology for research and other instructional activities for the acquisition of updated information and it seems to save time and resources and increase efficiency of research process. The use of computer technology in the contemporary era seemsto pose an additional advantage in terms of information sourcing, independent skills acquiring, efficiency and productivity.According to International Telecommunication Union (ITU) (2009), 70% of European population had access to the Internet, 48.3% in Americas, and only 8.8% in Africa. Again, Sweden had a percentage of 90.8, Finland 84.1% and Iceland 93.5%, while Cameroon had 3.3%, access to computer technology resource Despite the advantages of computer based technology for postgraduate students study and research process, the majority percentage of the postgraduate students in the University of Buea seems not to have access to computer-based technologyresources for their academic activities and their research process, and it resultsto the ineffectiveness of postgraduate students use of CBT

resources for their research process.This situation prompted this study as can be seen in the aim and the significance of the study in the following paragraphs.

1.3. Research Question

To what extent does postgraduate students' use of computer-based technology affect the effectiveness of research process in the University of Buea?

1.3.1. Specific Research Questions

2. To what extent do CBT skillsaffect the effectiveness of postgraduate students'research process in the University of Buea?
3. How does the availability of CBT resources affect the effectiveness of postgraduate students' research process in the University of Buea?
4. Howaccessibility of CBT resources doesaffectthe effectiveness of postgraduate students' research process in the University of Buea?
5. To what extent does frequency in usage of CBT resources affect the effectiveness of postgraduate student's research process in the University of Buea?

2.0.REVIEW OF LITERATURE

Conceptual Review

The conceptual reviews reveal the main variables in the study, explaining detail inside of the respective variables, supporting with the opinion of other authors related to the study.

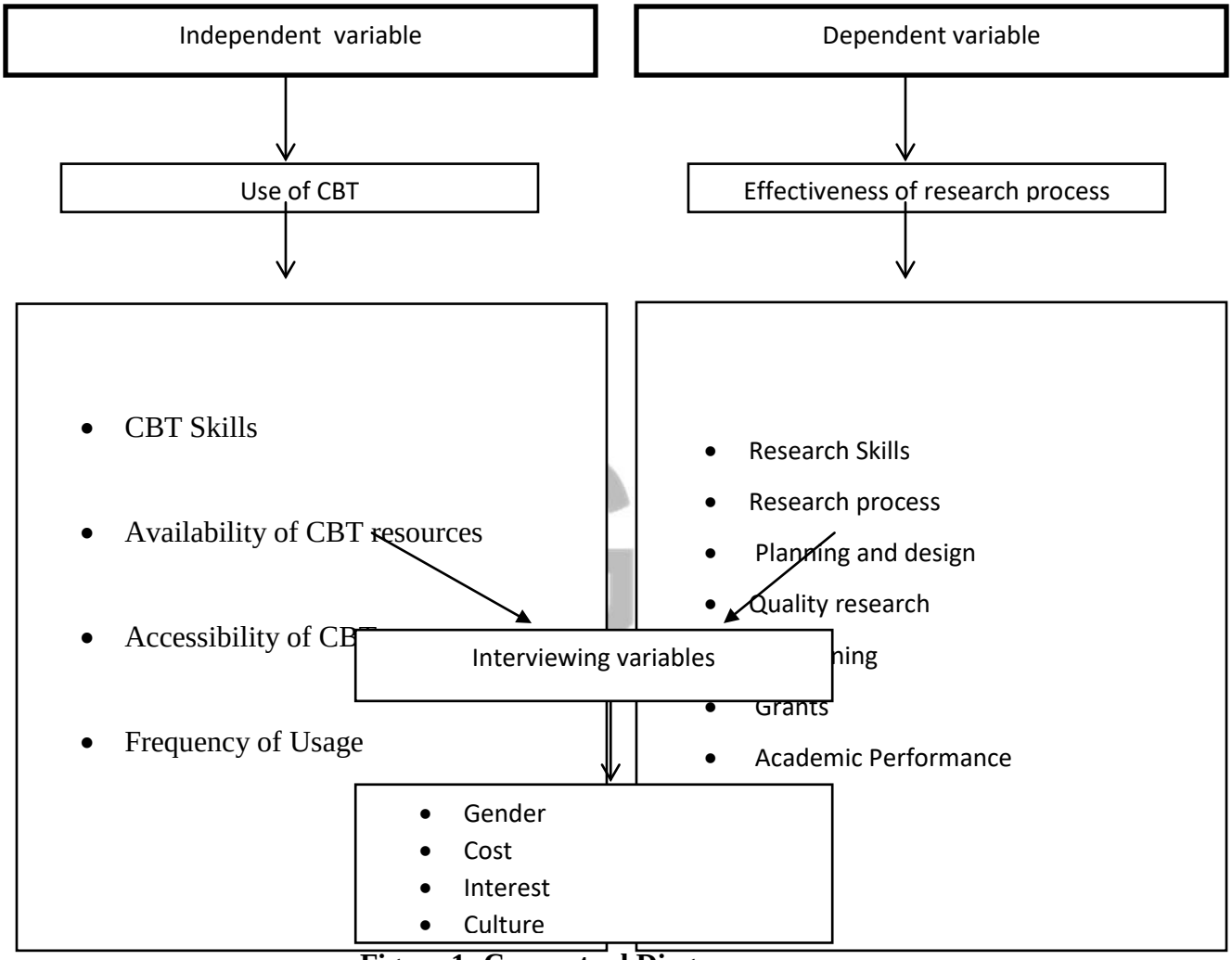

Figure 1: Conceptual Diagram

Computer Based Technology Skills

This study intended to provide guidance as to what CBT skills of postgraduate students should know and be able to do independently at various level of their research process (basic, intermediate, proficient skills) with specific types of software applications to enable them to access, manage, integrate, evaluate, create and communicate information. These skills should not

be taught in isolation but should be applied when meeting learning outcomes in the content areas. Postgraduate Students are expected to use technology in an ethical manner including following their school systems ethical use policies. Ethical use of technology is further explained in Standard. Postgraduate students require basics, intermediate and proficient computer skills in order to successfully completely write an effective research process.

The basic foundational computer literacy skills refers to the general knowledge require of every user of computer technology in order to properly operate the technological resources. The basic CBT skills needed by postgraduate students when using computer-based technology for their research processare log on, off computer, open, and close an application, type letters and figureswhile intermediate computer skills are more advanced and complicated than the basic skills. Some of the intermediate computer skills are to save and retrieve a document, locate and retrieve a file, create folder to organize the folder, use multiple ways to accomplish the same task and many more lastly proficient computer skills regarding as the highest level of the computer skills. According to experience and investigation, postgraduate students in the University of Buea dominantly have basic foundational computer literacy skills in order to successfully operate the computer technology resources to accomplish their task.

In order to be successful in academic programs and careers, it is essential that university undergraduate students and postgraduate students possess improved computer skills

(Furst&Boger, 1996). There are many factors producing wide variations in the computer skill levels of University students, such as the courses they completed at high school and University their academic major, their work experience, and their personal interest in computers and computing (Smith &FurstBowe, 1993). There is little agreement on what skill level was necessary for success in introductory and advanced coursework or on the types of computer skills necessary to obtain and maintain employment after graduation (Furst-Bowe &Boger, 1996). Researches suggest that factors such as gender, age, experience, and interest in computers might affect students' attitudes toward computers and their computer skills as well (Morahan-Martin, 1992). Many faculties expect students to know how they should use a word processor to create and format papers, make use of software for classroom presentations and speeches, use spreadsheet software to prepare charts and graphs, navigate the internet for research, and have the ability to learn and participate in online classrooms using various software (Lahore, 2008). On the other hand, many students do not have the knowledge, memory, learning, intelligence, or

expertise to assess what they do and do not know and what they need to learn to succeed in a particular course. Because they essentially "don't know what they don't know," they are unable to recognize their exact level of competence (Kennedy, Lawton &Plumlee, 2002).

Technology is human innovation in action and computer literacy is the basic condition for technology learning environment (International Technology Education Association, 1996; Li, 2008). The term "computer literacy "is often used as a basis of making decisions regarding a student's ability to perform specific tasks on a personal computer (Lahore, 2008). Computer literacy is important,because it transforms the computer's capability into proficient and productive activities (Simonson, Maurer, Montag-Torardi& Whitaker, 1987). It consists of the experience and ability to operate computers, including knowing the structures of computer software and hardware, having the skills to operate computer software, and applying computer usage to social issues (Foreman, 1998; Lin, 2003; cited in Li, 2008)

Availability of Computer Based Technology Resources

Milken Exchange on Education Technology (1999) defines computer-based technology as computer-based tools used by people to work with the information and communication processing needs of an organization. It encompasses the computer hardware and software, the network that convert information (text), images, sound, motion and so on into common digital form. CBT utilization is, the presentation and distribution of instructional content through web environment (e-teaching) or systems offering an integrated range of tools (stand-alone computer instruction, CD ROM amongst others) to support learning and communication (Yusuf, 2005).

Postgraduate students cannot use CBT resources without availability of the CBT resources. Solner and Thousand (1996) described that, in the past, technology was in the hand of "few alerts," the lone computer lab teacher, or the specialists who knew how to program the "mysterious" augmentative communication device used by students with communication limitation. The limitation of technological resources in the Africa and Cameroon in particular has cause the set back of technological development in our continent.According to AAU (2009) remarks that, there is a substantial technological difference between African universities and those elsewhere due to their differences in technological resources in terms of availability, access, and affordability and capacity. It further adds that this gap can and must be bridged because if time is wasted, it will openly more widely. Chilenga (2008) notes that most of the ICT research in Africa come from South Africa, followed by Nigeria and Botswana, but

even if all research done in Africa is added up, it is only 9% of the research done in Africa by African institutions. This means that about 91% is done by aliens and or is not done at all. Availability of CBT resources has a grate influence to play on the parts of the country and the users in particular.

In addition, Jonassen (1996) concurs that when computer technology tools such as smart phones, desktops, laptops, connected to internet, and network search engines are utilized to complete projects requiring students to use information to solve problems, there is greater potential to promote cognitive development. These tools have the power to stimulate the development of intellectual skills such as inquiry, reasoning, problem solving and decision making abilities; critical and creative thinking; and, learning how to learn (Rose &Ferlund 1997). For example, not only have computer based-technology has been found to be more fun, interesting and challenging for students, they can also be effective for integrating information from a variety of library sources, stimulating higher level thinking, visualizing complex historical relationships and developing a deeper understanding of concepts (Ehman, Glenn, Johnson & White 1992).

The University of Buea has established a University Strategic Plan that runs from 2007-2015, and in this plan, ICTs have been one of the focal points. It has longed for 100% bandwidth internet connectivity in the entire institutions by 2008 that students could access the internet form their phones and laptops. The University of Buea also has made available the IT Center and Library in connection with America Conner having computer technology resources available to students both at the undergraduate and postgraduate level use for their academic purposed. The availability of CBT resources influence postgraduate students use of the compute technology in the university of Buea.

Accessibility of Computer Based TechnologyResources

The 1990s was the decade of computer communications and information access, particularly with the popularity and accessibility of internet-based services such as electronic mail and the World Wide Web (WWW). At the same time, the CD-ROM became the standard for distributing packaged software (replacing the floppy disk). As a result, educators

became more focused on the use of the technology to improve student learning as a rationale for investment. Any discussion about the use of computer systems in schools is built upon an understanding of the link between schools, learning and computer technology. When the potential use of computers in schools was first mooted, the predominant conception was that students would be 'taught' by computers (Mevarech& Light, 1992). In a sense it was considered that the computer would 'take over' the teacher's job in much the same way as a robot computer may take over a welder's job. Collis (1989) refers to this as "a rather grim image" where "a small child sits alone with a computer".

However, the use of information and communication technologies in the educative process has been divided into two broad categories: Computer Technology for Education and Computer Technology in Education. Technology foreducation refers to the development of information technology specifically for teaching/learning purposes, while the Computer Technology in education involves the adoption of general components of information technologies in the teaching learning process.According to the empirical study of Mbah (2010) its observed that students of the university of Buea are of the view that computer technology resources have a positive impact on their study habits and also to their research efficiency, on the basis of computer availability and internet connectivity. According to Mbah (2010) 44% of students in the University of Buea have computers at home and only 20% of these computers have regular internet connections, for frequent usage. 64% have internet access off campus, particularly at cyber Cafes. It was also found out that more than half (58%) of students prefer to use the University of Buea IT Center and America corner to access the interne.

Experiences have proven that in the past decades, 1990's and 2000, has been face with massive limited connectivity internet problem and access to computer resources. This gives room for the paper and pen and pencil traditional research findings compared to computer based technology research procedure now. Accessibly of disposable computers for students usage, laptops, internet cable, internet key. Frequency of usage will increase when the CBT resource are accessible so that the postgraduate students or computer users can easily has access to the resources and see how to accomplish their task in time.

Frequency of Usage of Computer Based Technology

The availability, accessibility and CBT Skills of both hardware and software of computer-based technology resource by postgraduate students in the University of Buea for their research process will improve the use of computer-based technology for research, it for delivering information by using voice, visuals, and video. The use of technology at large scale is changing the pattern of life that includes working, learning, communicating with each other, and other daily activities. In all types of education, the gadgets of technology had long-lasting impacts on the process of teaching and learning and in the research world. This dual-way process can be speeded and supported by using information technology for both faculty and students. The easy access to new dimensions of technologies have placed the institutions and individuals on an advantaged place to follow rapid changes

Here the frequency of CBT usage among postgraduate students inthe University of Buea is on the intensity of using computer technology during the research process at their postgraduate level. As the postgraduate students used computer based technology daily it appeared to unravel the myth of difficulties that surrounds the use of computer Based Technology as an aid to teaching and learning and research process. The impact that computer based technology has on postgraduate students' research process tend to improve productivity and efficiency of academics.Leuven et al (2004).

The present study focus on the aims to examine how University of Buea postgraduate students use computer based technology for research, that is the intensity of using computer based technology for their academic course work, and thesis writing A faculty or university where computer –technology resources are available and accessible to student's usage will seems to have more frequency in the usage of computer technology for research than a faculty or university where resource are not at students disposals.Researchers focused on the idea that ensuring the full accessibility and utility of technological resources is a critical part of the design of the research system, and should be taken into account at the start of the research process.

Postgraduate students in the University of Buea have access to CBT resources for education that is the internet wireless band is accessible to all the students' population of the University of Buea for their learning process, while CBT resources in education is not adequately accessible to postgraduate students in the University of Buea.

The frequent use of computer-based technology will determine the efficiency or the quality of the research process, academic output more concentrations on using computer for research findings, and to which research processdo the research processes become less intensive in the usage of CBT

Postgraduate students of the University of Buea use a varieties of computer devices to carry out their research process such as smart phones, laptops, Desktop, and so on, and the research can be carry out in the following places, such as the, home, cyber café, school library, IT Centre, and in any place accessible with internet.

Theoretical Review

There are a number of theories attempting to address computer technology in instructional activities including research, which tend to associate the use of computer-based technology for research process findings. In addition, one might distinguish between descriptive theories and critical theories. Most theories use in computer technology aredescriptive theories. This study makes use of three main theories. Connectivism theory (Learning theory for digital age), Computer-Based Instruction Theory, and Use and Gratification Theory while the main theory that was use to explain the work was the connectivism theory, that is the learning theory for digital age.

3.0.METHODOLOGY

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Research Design

The design used by the researcher in this study is the survey design. According to Kelinger, (1974) a survey is a method, which enables researchers to select a small group from a large population in order to get some necessary data. The researcher used this method because it enable him to easily collect the administered questionnaire and data after carrying out investigations. The researcher considered this design appropriate because there will be a randomization of the population concerned for the study which will be generalize to the entire population of the study.

Area of Study

This study was conducted in the University of Buea, is situated in Buea the capital of South West Region of Cameroon, University of Buea is one of the two English-speakingstatesUniversity of the country, with its total population of eighteen thousand. In addition, is presently operating in nine establishments at the undergraduate level and seven out of the nine offering postgraduate programs.The University of Buea is operating postgraduate programs in both professional and non-professional programs. The programs are Master's of Education (MEd), Master's of sciences (MSc), Master's of Art (MA) and all operating inPhD.The University of Buea was chosen as the study site due to a number of factors. The first one is that the University of Buea has established a University Strategic Plan that runs from 2007-2015, and in this plan, ICTs have been one of the focal points. It has longed for100% bandwidth internet connectivity in the entire institutions by 2008. This gives the reason why University of Buea stand its grand as priority for research and quality education.

Population of the Study

The population of the study is all postgraduate students in the University of Buea with total population of 1969postgraduate students for 2014/2015 academic year source: (admission and record for school of postgraduate). This population is suitable for the study because the postgraduate students seems to engage with research studies and about 80% to 90% of their studies is dependent study, which gives the room to explore the internet or make use of CBT. Population here defines the limit within which the research findings are applicable. There are two types of populations, the target and the accessible population. The target population is made up of all the members of a specified group, which the investigation relates to. The accessible population is those in a group within the reach of the researcher. The target population is the three randomly selected faculties currently offering postgraduate programs at the University of Buea, that is, Faculty of Sciences, Education and Arts postgraduate students. These three Faculties are accessible for research to carry out this study, and the sample population will be determined from the accessible population

Table: Population of Postgraduate students

No.	Faculty	Population of postgraduate students
1	Education (Fed)	372

2	Social and Management Sciences(FSMS)	463
3	Health sciences (FHS)	205
4	Sciences (FS)	562
5	Agriculture and vertinary medicine	77
6	Engineering (COT)	61
7	Arts (FA)	229
	Total	**1969**

Source: School of Postgraduate UB.

Table 2: Target Population

No.	**Faculty**	**Target population of postgraduate students**
1	Sciences	262
2	Education	472
3	Arts	329
	Total	**163**

Source: School of Postgraduate

Sampling andSample Technique

William, (2003) says that a sample is a representative and manageable part of the accessible population that the researcher can handle. Sampling is therefore a search for typicality. The sample was made up 321 postgraduate students from the Faculty of Sciences, Faculty of education and Faculty of Arts

Table 3: Sample Population

No.	**Faculty**	**Sample Size**
1	Sciences (FS)	93
2	Education(Fed)	114
3	Arts (FA)	113
	Total	**362**

Source: School of Postgraduate

Sampling and Sample Technique

The purposive sampling technique was use to select the faculties use for the study, that is out of the seven faculties operating the postgraduate programme. Purposive sampling technique was use to select the faculty of Education, Arts and Sciences, these faculties where considered appropriate for the study. This was done in other to fine the relationship of using CBT resources in social studies research, in the faculty of Education and Faculty of Art and Scientific or Experimental research studies in the Faculty of Sciences. Simple random technique was use to select the participants for the study. The sample population of the study was320postgraduate students from the faculty of Education, Arts and Sciences according to Krejcie and Morgan (1960) a sample population gives the researcher ease access to the study population and reduces durability and resources. The simple random sampling technique was suitablefor this study since the faculty of education, faculty of sciences and the faculty of Arts is divided in respective proportion. The sample size of each of the faculty considers was determine proportionately, and the

4.0.FINDINGS

Demographic Data

This section represents descriptive information on the gender, faculty and level of study of the respondents.

Gender of Respondents:

The study considers the male postgraduate students as respondents and female postgraduate students in using CBT resources on the effectiveness of the research process.

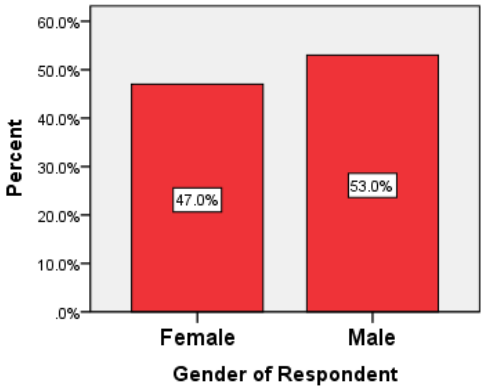

Figure 2: **Distribution by Gender of Students**

Both male and female students were represented in this study but male students 168 (53.0%) were more represented than the female 148 (47.0%). The difference of only 6% was however not significant χ^2=4.062, p= 0.131.

Faculty Range of Respondents:

The study also consider the proportion of postgraduate students from each of the respective faculties involved for the study. The usage of CBT resource could also be influence be the faculty in question.

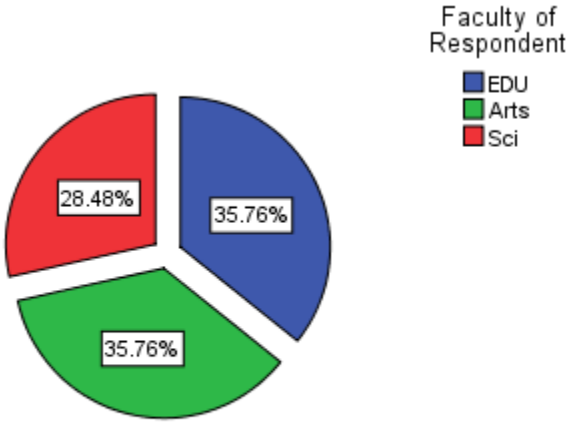

Figure 3: Distribution of Responded Per Faculty

Participants were distributed in the various faculties using the proportionate sampling technique giving rise to 113(35.76%) for both Faculty of Arts and Faculty of Education, and

90(28.48%)for Faculty of Science. Figure 3 below shows the distribution of the gender over the various faculties of respondents.

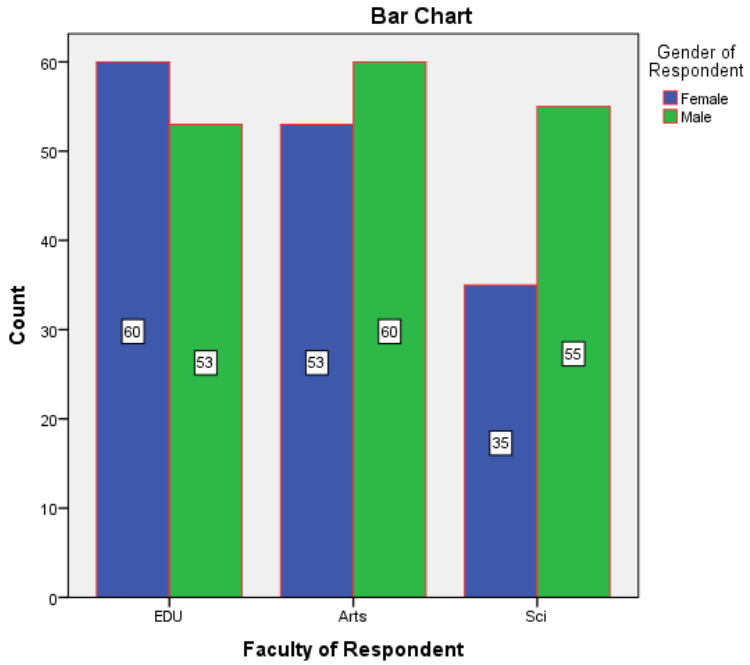

Figure 4: Sex Distribution over Faculty of Responded

The Figure shows that more females (60) responded to the questions than males (53) in the Faculty of Education while in the faculties of Arts and Science, the respondent were dominated by males (60) and (55) respectively.

Academic Level of Respondents:

The academic level of respondents refers to the level of education of the respondents, the study deals with postgraduate students as respondents of the study. The academic level of education has influence the proportion of respondents in level 600 who are greater than the level 700 students and also gives the same reasons of the frequent usage of CBT resources of level 700 students than level 600 students due to greater experiences or skills acquired.

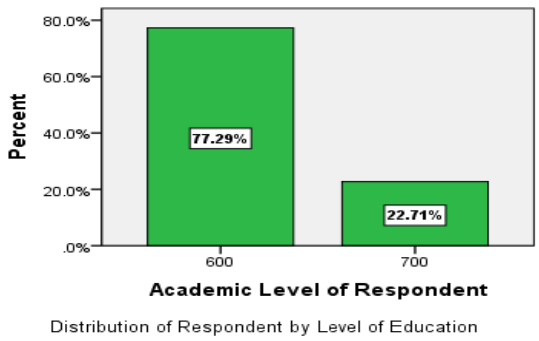

Figure v: Distribution of Respondent by Level of Education

The results revealed higherχ^2=7.818, p= 0.02 responds rate in level 600 (77.29%) 244 than level 700 (22.71%) 72. This is probably because of the fact that more students are being admitted in the master level than the PhD level.

Analysis of Data for Each Research Objective

Usage of CBT Resources improves Research Effectiveness

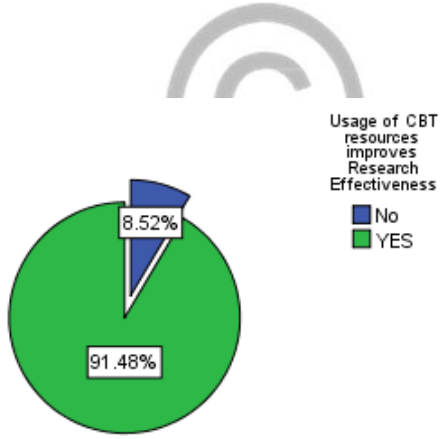

Figure 5: Response Rate for Usage of CBT Resources Improves Research Effectiveness

Table 4: Usage of CBT Resources Improves Research Effectiveness

NO.	ITEMS	SD	D	A	SA	N
1	Online information sourcing improves research effectiveness	3(0.9%)	4 (1.3%)	158(49.8%)	152(47.9%)	317 (100%)
2	Availability of IT resource Improves research effectiveness	5(1.6%)	12(3.8%)	153(48.3%)	147(46.4%)	317(100%)
3	Research effectiveness	4(1.3%)	17(5.4%)	165(52.1%)	131(41.3%)	317(100%)

	require basic CBT skills					
4	Research effectives depends on accessibility of IT	0(0%)	51(16.1%)	173(54.6%)	93(29.3%)	317(100%)
5	Research process effectiveness improves curriculum content	2(0.6%)	19(6.0%)	185(58.4%)	111(35.0%)	317(100%)
6	**MRS**	**14(0.8%)**	**103(6.5%)**	**834(52.6%)**	**634(40.0%)**	**1585(100%)**

χ^2-test; χ^2=10.823, df=3, p=0.011

The Multiple Response Set (MRS) shows that 1468(92.6%) of students agreed that usage of CBT resources improves research effectiveness significantly (χ^2-test; χ^2=10.823, df=3, p=0.011) higher than 117 (7.4%) who did not agree. The most expressed points were online information sourcing improves research effectiveness 308 (97.7%), and availability of IT resource improves research effectiveness 300 (94.7%).

Objective One: To investigate CBT skills and its' effect on the effectiveness of research process in the University of Buea

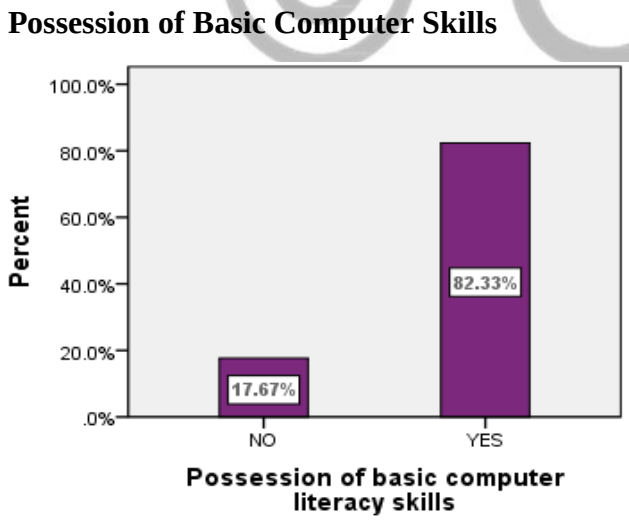

Figure 7: Possession of Basic Computer Literacy Skills

Most 261 (82.33%) of the respondents possessed basic computer literacy skills while just 56 (17.67%) lacked the basic computer skills (figure 6).

Table 5: Possession of Various Basic Computer Skills

NO.	ITEMS	SD	D	A	SA	N
1	Operation of Internet Without Difficulty	35 (11.0%)	62 (19.6%)	129(40.7%)	91(28.7%)	317 (100%)
2	Computer literate	16(5.0%)	48(15.1%)	177(55.8%)	76(24.0%)	317(100%)
3	Usage of different CBT software skills in research	12(3.8%)	71(22.4%)	163(51.4%)	71(22.4%)	317(100%)
4	Computer skills help to accomplish educational task	21(6.6%)	36(11.4%)	146(46.1%)	113(35.6%)	317(100%)
5	Knowledge on information sourcing in internet	13(4.1%)	35(11.0%)	180(56.8%)	89(28.1%)	317(100%)
6	Basic skills in data analysis	25(7.9%)	89(28.1%)	146(46.4%)	54(17.0%)	315(99.4%)
5	**MRS**	**97(05.1%)**	**341(17.9%)**	**941(49.5%)**	**494(26.0%)**	**1900(100%)**

χ^2-test; χ^2=30.669, df=3, p=0.000

The Multiple Response Set (MRS) showed that 1435 (75.5%) the respondents possess the various basic CBT skills (χ^2-test; χ^2=30.669, df=3, p=0.000) higher than 438 (24.5%) who do not. The most possessed CBT skills were knowledge on information sourcing in internet 269 (84.9%) and computer skills in accomplishing educational task259 (81.7%).

Tables 6: Association Between Basic Computer Skills and Effectiveness of Research Process

Basic Computer Skills		Effectiveness of Research Process		N	χ2-test
		No	Yes		
Possession of basic computer skills	No	11 (19.6%)	45 (80.4%)	56(17.7%)	χ2=10.804 p=0.001 Phi=0.185
	Yes	16 (6.1%)	245(93.9%)	261(82.3%)	
Operation of Internet Without Difficulty	SA	5(14.3%)	30(85.7%)	35(11.0%)	χ2=6.735 p=0.081 Cramer's V=0.146
	A	9(14.5%)	53(85.5%)	62(19.6%)	
	D	9(7.0%)	120(93.0%)	129(40.7%)	
	SD	4(4.4%)	87(95.6%)	91(28.7%)	
Computer literate	AS	2(12.5%)	14(87.5%)	16(5.0%)	χ2=6.723 P=0.081 Cramer's
	A	5(10.4%)	43(89.6%)	48(15.1%)	
	D	19(10.7%)	158(89.3%)	177(55.8%)	

	SD	1 (1.3%)	75(98.7%)	76(24.0%)	V=0.146
Usage of different CBT software skills in research	SA	0(0.0%)	12(100%)	12(3.8%)	$\chi 2$=5.621 P=0.132 Cramer's V=0.133
	A	10(14.1%)	61(85.9%)	71(22.4%)	
	D	14(8.6%)	149(91.4%)	163(51.4%)	
	SD	3(4.2%)	68(95.8%)	71(22.4%)	
Computer skills help to accomplish educational task	SA	0(0.0%)	8(100%)	8(2.5%)	$\chi 2$=10.405 P=0.015 Cramer's V=0.181
	A	6(20.0%)	24(80.0%)	30(9.5%)	
	D	16(10.7%)	133(89.3%)	149(47.0%)	
	SD	5(3.8%)	125(96.2%)	130(41.0%)	
Knowledge on information sourcing in internet	SA	2(15.4%)	11(84.6%)	13(4.1%)	$\chi 2$=0.939 p=0.816 Cramer's V=0.054
	A	3(8.6%)	31(91.4%)	35(11.0%)	
	D	14(7.8%)	166(92.2%)	180(56.7%)	
	SD	8(9.0%)	81(91.0%)	89(28.1%)	
Basic skills in data analysis	SA	6(24.0%)	19(76.0%)	25(7.9%)	$\chi 2$=9.725 p=0.045 Cramer's V=0.175
	A	8(9.0%)	81(91.0%)	89(28.1%)	
	D	8(5.4%)	139(94.6%)	147(46.7%)	
	SD	5(9.3%)	49(90.7%)	54(17.2%)	

5.0 DISCUSSION

Discussion of Findings

1. **Research Question One.To what extent do CBT skills affect the effectiveness of postgraduate students'research process in the University of Buea?**

The Multiple Response Set (MRS) showed that 1435 (75.5%) of the respondents possess the various basic CBT skills (χ^2-test; χ^2=30.669, df=3, p=0.000) higher than 438 (24.5%) who do not. The most possessed CBT skills were knowledge on information sourcing in internet 269 (84.9%) and computer skills in accomplishing educational task259 (81.7%).The results on table vii revealed thatthe possession of basic computer skills and effective research process are significantly positively related ($\chi 2$=10.804p=0.001) and the strength of the association represented by Phi=0.185 is very strong. The findings also suggested that using computer skills to help accomplish educational task and possession of basic skills in data analysis also enhances affective research process significantly ($\chi 2$=10.405 p=0.015 Cramer's V=0.181) and ($\chi 2$=9.725

p=0.045 Cramer's V=0.175) respectively with also good strength of association as indicated by the Cramer's V values.Though without significant associations; Operation of Internet without Difficulty (220, 69.4%), Computer Literate (253, 79.8%), Usage of different CBT software skills in research (234, 73.8%), and Knowledge on information sourcing in internet (259, 81.7%)also can improve the effectiveness of research process when used base on these high positive responses given to them.

The results of table vi, vii, and viii together revealed that possession of basic computer skills significantly enhances research effectiveness process. Furthermore, looking at table vii, we can see that there many positive correlations between the factors of basic computer skills and those of effectiveness of research process. The results is also in line with the work of Becker (1994) and OTA (1988), cited in Bader and Moore (1999). There are many factors producing wide variations in the computer skill levels of University students, such as the courses they completed at high school and University their academic major, their work experience, and their personal interest in computers and computing

Further more according to OTA's findings, cited in (O'Neil, 1993b) students who have passed through training of CBT will have higher skills level than those who have not undergo training. Efficiency of findings or research result, and frequency of usage depends on the skills on CBT knowledge of usage level.(ATA, 2000). They will need specific skills in order to evaluate web sites and judge the reliability of the material. Students must cite their sources and, therefore, will need to be taught a proper format for their reference list or bibliography. Basic skills are one of the most necessary factors to determine the effective usage of the CBT. According to the respondents response it has proven that out of the 317 postgraduate students 264(81.7) of them posse basic skills that require them to operate the computer for two hours and above a day. The respondents has the following basic skills, Microsoft basic skill, Excel basic skill, Programming, Data Analyzing, information sourcing. The rest of the 50(18.3) lacks basic these basis skills, which makes it difficult for them to operate the interne.From the findings italso observed that the male postgraduate students tend to spent more time at the internet than the females. According to a survey research carried out in the University of Buea,students study also found out that the University of Buea students have average internet and computer skills because these skills are obtained mostly through self-development. Most of the students confirmed that the internet has increased the qualities of their studies together with handouts and books as

reliable sources to obtain information for academic work. The study reveal that Basic foundational literacy improves postgraduate students research process

6. **Research Question Two: How does the availability of CBT resources affect the effectiveness of postgraduate students' research process in the University of Buea?**

The data analysis in chapter four is inline with research hypothesis two that shows the availability of CBT resources and the effectiveness in the research process,Table ix showed that out of the 317 respondents 250 (79.1%) of the respondents agreed to the fact that faculty CBT resources are available while 64 (20.3%) disagreed. Majorityof the respondents164(53.16%) use smart phones and WIFI as CBT resources meanwhile135(42.72%) use computers and internet, and 12 (3.8%) use other means

The Multiple Response Set (MRS) shows that 663 (52.5%) of students who agreed to the availability of CBT resources is significantly (χ^2-test; χ^2=364.5, df=3, p=0.000) higher than 605 (47.5%) did not. The most expressed available CBT resources were the improvement of research effectiveness by postgraduate students 259 (81.7%) and provision of CBT resources by students229 (72.2%).

The results on tableiv revealed thatthe availability of CBT resources do not significantly affect the usage of CBT to improves effectiveness of research process. However, the findings suggested that available of CBT resources such as computers and internet 123 (42.6%), of postgraduate students use smart phones and wifi connection while 153 (52.9%) use computers and internet connection when used will improve the effectiveness of research process, also that these availability CBT resources for research are provided by the postgraduate students 229 (72.2%) and can improve the effectiveness of research process 212 (66.9%) when used. It further explained thatthe availability of CBT promotes quality research 259 (81.7%) and its usage can improve the effectiveness of research process. Putting the findings of table ii with that of table iii together, it can be resolved that the availability of CBT resources can improve the effectiveness of research process by University of Buea postgraduate students but the faculties and University do not provide sufficient CBT resources for research. Furthermore, looking at table iv, we can see that there are some positive correlations between the factors of availability of CBT resources and those of effectiveness of research process. Therefore, the null hypothesis that states that there is no effect of availability of CBT resources on the effectiveness of research process in the

University of Bueawas rejected and the alternative accepted. This was in line withBekele (2004: 110) says, “At AAU and most other African campuses, ICTs are available only to a few users for a limited time.” Technology pool compared to user population is far from satisfactory. That is the number of CBT resource in the University of Buea available to the postgraduate students are nothing compared to the number of postgraduate students. Secondly in this university, the acquisition and use of ICTs is a systematic process beginning with

Highest-level university authorities in addition the above statement prove that, availability play a vital role in the effectiveness of the users.(Bain & Ross, 1999), availability and skills to useCBT resource users would enhance student’s skills and quality in research process.In additionJonassen (1996) concurs that when computer technology tools available such as smart phones, desktops, laptops, connected to internet, and network search engines are utilized to complete projects requiring students to use information to solve problems, there is greater potential to promote cognitive development.The above finding reveals that availability has a significant effect on the effectiveness of postgraduate students’ research process.

Research Question three: Howaccessibility of CBT resources doesaffectthe effectiveness of postgraduate students’ research process in the University of Buea?

From figure xi, it is seen that most of the respondent 216(68.14%) pointed out that the CBT resources are not accessible to the students with only 101(31.86%) agreeing that these resources are accessible.The Multiple Response Set (MRS) shows that 919 (72.5%) of students who agreed to the availability of CBT resources is significantly (χ^2-test; χ^2=10.689, df=3, p=0.002) higher than 346(32.7.5%). The most expressed accessible CBT resources were access to online information on smart phone 278 (87.7%) and Easy CBT access out of University 245 (77.3%). The results on table 11 revealed that the accessibility of CBT resources do not significantly affect the usage of CBT to improve effectiveness of a research process except for the easy CBT access out of the University which shows a strong positive relationship with effectiveness of research process (χ2=10.632, P=0.014 Cramer’s V=0.183). The findings suggested that CBT resources in the University of Buea are not accessible for use in research as seen in the response rate of 216(68.1%) for not accessible compared to 101 (31.9%) for accessible. This work is in conformity with the empirical study of Mbah (2010) he pose that students of the university of Buea are of the view that computer technology resources have a positive impact on their study

habits and also to their research efficiency. The University of Buea has in its University strategic plan (2007-2015), articulated "a 100% improve Internet connectivity accessibility by increasing bandwidth by 2015. There is a greater need for computer-assisted instructions and computer-managed instructions. Hence, it is clear that the integration of ICTs into the university systems depends not only on access and on availability, but also on the extent to which staff and students embrace the technologies. According to the respondents, accessibility of CBT resources has a negative correlation with the effectiveness of research process in the University of Buea.

Research Question Four. To what extent does frequency in usage of CBT resources affect the effectiveness of postgraduate student's research process in the University of Buea?

From the findings its revealed that most of the respondent 260 (82.02%) frequently use CBT resources in research with most of them spending 1-5 hrs/day on a computer for research purposes. Only 57(17.98%) of the respondents do not frequently use CBT resources for research.

The results on table 14 revealed that the frequent usage of the identified CBT resources do not significantly affect the usage of CBT to improve effectiveness of research process and also none of its parameters could show any significant relationship with majority of the respondent 188,(59.3%) spending just 1-5 hrs/day on computer for research.

However, the findings suggested that the postgraduate students 238 (75.1%) rely onsmart phone as CBT resources for research and it has also been shown from table 11 thatrecent and valuable information is obtained when using CBT (292, 92%) and most of the respondents 260(82%) agreed that frequent usage of CBT in research will improve the effectiveness of research process. This results clearly indicates that smart phones are not the best CBT instruments for research in the University of Buea and that the students need of CBT facilities than library for research as seen from 182(57.4%) of them disagreed to the fact that they use library more than IT Centre for research.

The result of tables xiv, xv, and xvi together revealed that there is lack of enough CBT resources for postgraduate students to use in research and as such, frequent use of the available resources do not prove to enhance the effectiveness of research process. However, majority of the postgraduate students agree that frequent use of CBT resource will improve on research effectiveness process and the use of available resources such as smart phones for online information showed a positive correlation with some parameters of effective research process. This is an indication that if the University could make available more CBT resources for postgraduate students' frequent use by postgraduate students, it will greatly enhance research effectiveness. With the present situation in the University of Buea, the null hypothesis that states that there is no effect of frequent use of CBT resources on the effectiveness of research process is accepted and the alternative rejected.This reveals the fact that the frequent use of CBT resources improves postgraduate students' research process. According to the present situation of respondents, postgraduate students has limited access to CBT resource in the University campus, rather make use of CBT resources out of the University campus and personal CBT resources ton improve of their research process.

5.2 Conclusion

From the results of the findings, it can be conclude that Availability, Accessibility, Skills and Frequent usage of CBT resources has an effect on the effectiveness of postgraduate student's research process in the University of Buea. From the findings its observed that University of Buea postgraduate students use the CBT resources for various purpose to accomplished their desired task.

The findings also reveals that level 700 students in the University of Buea tend to spend more time with CBT resources than the level 600 students, also the male postgraduate students spend more hours on the internet than the female postgraduate students.

According to research question one finding, the null hypotheses was rejected and the alternative accepted, to the fact that, availability of CBT resources has an effect to the effectiveness of the research process of postgraduate students in the University of Buea. This is seen from the viewpoint of the absent of CBT materials will hinder the effectiveness of the research process of postgraduate students in the University of Buea. Thus accepting the opinion of the respondents that availability has positive effects on the effectiveness of the research process by University of Buea postgraduate students.

According to research question two findings, accepting the null hypotheses, of the fact those postgraduate students from the University of Buea CBT basic skills has positive effects on the effectiveness of the research process in the University of Buea. Majority of the postgraduate students reveals to have diversities of basic such as programming, data analyzing, Microsoft hard and software, excel, typing and what have you that require postgraduate students to source the information relevant for the effectiveness of their research process.

According to research question three, the findings reveals that the null hypotheses was rejected while the alternative hypotheses was accepted to the fact that accessibility has a positive effect on the effectiveness of the research process by University of Buea postgraduate students. This is being observed from the reasons given by the postgraduate students to the fact that some of the CBT resources are available in their faculties and department, but not accessible. According to the interview guide, the respondents response to the fact that, the IT center, America Corner, and other wireless connected area on campus are very accessible for the effectiveness of their research process.

According to research question four, the finding reveal, that the null hypotheses was accepted, and the alternative rejected, to the fact that, frequent use of computer Based Technology does not have an effect on the effectiveness of the research process by University of Buea postgraduate students. The respondents agree to the fact that they use different CBT resources, which is further for pleasure and business purposes than for academics. The frequent use of CBT by postgraduate students does not necessarily means is use for research process.

Thus, conclusively CBT resources seem to improve the effectiveness of the research process.

5.3. Recommendations

From the findings and conclusion drawn, the researcher will recommend the following:

To Postgraduate Students

Postgraduate students in particular should know that CBT resources have both educational and non-educational usefulness in their daily activities. Thus they should give much time to educational than to non-educational activities such as in the research process to improve on their effectiveness of the research process. postgraduate students are also recommend to be formally trained a to acquired the necessary basic skills required for research process.

To Teachers and Parents

Teachers and Curriculum developers should understand the usefulness of CBT in the place of the classroom, CBT should be designed in the curriculum so as to instill in to the students the necessary skills and knowledge needed for them to accomplished given tasks in all dimension of life. CBT is recommended to be a core subject in the postgraduate students of the University of Buea curriculum as to prepared them for the emergence of 2035.

To the Government

The government should know that CBT resources play an important role on the effectiveness of the academic activities of postgraduate students. Thus, the government should not relent her efforts to furnish all the towns and schools with these CBT resources. Its also recommend that, the government should include Computer Technology as a core subject at the secondary level right up to the higher institutional level as competitive examination so as to let learners take it more serious than what they do now.

5.4. Suggestions for Further Research

This Research should also be carried outat any other state University in the country, to see if the findings will correlate with that of the University of Buea.

The researcher suggests that further research should be carried out in the various teaching training college in different regions so that we can compare their differences.

The researcher also suggest the influence of ICT on secondary school students academic performance.

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