

**EVALUATION OF TEACHERS' USE OF INFORMATION AND
COMMUNICATION TECHNOLOGY IN TEACHING AT BASIC
EDUCATION LEVEL IN SOUTH SOUTH NIGERIA**

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DELTA STATE UNIVERSITY, ABRAKA**

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**A THESIS WRITTEN IN THE DEPARTMENT OF GUIDANCE AND
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UNIVERSITY, ABRKA.**

**DEPARTMENT OF GUIDANCE AND COUNSELLING
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JUNE, 2016

CERTIFICATION

We the undersigned hereby certify that this thesis was carried out by Chiekem ENWEFA in the Department of Guidance and Counselling, Faculty of Education, Delta State University, Abraka.

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DECLARATION

I hereby declare that this research work was carried out by me, Enwefa Chiekem, in the Department of Guidance and Counselling, Faculty of Education, Delta State University, Abraka.

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DEDICATION

This research work is dedicated to my late brothers and parents, Emeke, Paul, Emmanuel, Ossai, Mr. Iwegbue J. Enwefa and Mrs .Orji. M. Enwefa.

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ABSTRACT

The integration of information and communication technology into educational practice continues to be lauded as having the potential to dramatically transform the teaching and learning process. This study evaluated teachers use of Information and communication technology in teaching at basic education level in South South Nigeria (Delta, Edo and Rivers States). Eight research questions and seven null hypotheses were formulated to guide the study. In the study, the researcher reviewed related literature. The ex – post facto research design was used in the study .The targeted population of this study cut across three states out of the six states in South South Nigeria which consisted of 21,617 teachers, made up of 11,754 in Delta State, 5,663 in Edo State and 4,200 in Rivers State. The researcher employed stratified and multi-stage sampling techniques to sample 1,014 respondents from the three states in South South Nigeria (Delta, Edo and Rivers States). The instrument used for data collection was a questionnaire titled “Evaluation of Teachers Use of Information and Communication Technology in Teaching at Basic Education Level in South South Nigeria”. The instrument was validated through expert judgment and factor analysis for content and construct validities respectively .The reliability of the instrument was established by the use of Cronbach Alpha method and a reliability index of 0.88 was obtained. The researcher visited the respondents and administered the instrument to them in their various schools with the aid of three trained research assistants. The research questions were answered by the use of mean and standard deviation with a mean of 3.00 and above taken as the criterion level of high extent. While a mean below 3.00 was taken as low extent and t – test statistic was used to test the stated null hypotheses at 0.05 level of significance. It was found in the study, that two null hypotheses were accepted while five null hypotheses were rejected. The findings provided information that significant difference existed between urban and rural teachers, graduate and non – graduate teachers; pre- service and in - service teachers, male and female teachers and young and old teachers’ on the extent of ICT use in teaching at basic education level in South South Nigeria. The study confirmed that no significant difference was found between less experienced and experienced teachers; teachers in single sex and mixed schools on the extent of ICT use in teaching at basic education level in South South Nigeria. Recommendations were made such as ICT skills standards for teaching should be set up for urban, rural ,graduate ,non-graduate,pre-service ,in-service, male, female, young, old, experienced, less experienced teachers and teachers in single sex and mixed schools that offer strategies for planning, training needs and staff development programme; Government and other stakeholders (Parents Teachers Association, Old Students’ should provide more computers, laptops, computer aided instruction (CAI) software, computer laboratory equipment to schools to enhanced teachers lesson delivery at basic education level in South South Nigeria and teachers training institutions should train teachers on ICT skills and competencies required for classroom teaching at basic education level in South South Nigeria.

CHAPTER ONE

INTRODUCTION

Background to the Study

Evaluation enables teachers to ascertain the extent to which learning experiences are developed, organized and implemented and are actually producing or meeting the desired objectives. Evaluation includes any activities involving information – gathering and analysis from the simplest to the most sophisticated operations. Evaluation according to Kpolovie (2002) is the passing of decision or judgment on a person's trait in accordance with a test which validly and reliably measures the presence of that trait. Evaluation allows for systematic improvement in learning (a relatively permanent change in the learner's behaviour). Behaviour means the totality of a person's activities in response to a given situation. Evaluation can be seen as the whole process of describing, obtaining and providing useful information for judging decision alternatives.

Changes in educational technologies are rotational phenomena. Variation in technological resources leads to discovery of new teaching aids. In the 21st century, the education systems are increasingly obliged to use new information and communication technologies (ICT) in providing knowledge for learners/students and exercising abilities and skills. Teaching based on the grounds of information and communication technologies has a positive evaluation. ICT helps teachers in achieving educational goals and develops learners' information and communication abilities which are necessary for professional activity in the future.

The need to operate in accordance with global orders and standard makes ICT an indispensable standard for the 21st century teaching and learning in Nigeria. It has already

been stressed that the modern world is an information society, driven by a complex set of digital devices and telecommunication networks and having the World Wide Web as an all- encompassing platform. The urban, rural, graduates, non-graduates, experienced, less experienced, pre-service, in-service training teachers, male, female, young and old teachers as well as teachers in single sex and mixed schools as leaders, and moulder, do dictate the pace of learning and direction of change, evaluate learning and give verdicts about learners' ability.

The society is dynamic and education being a micro unit of society has to change in line with social changes. One of such major transformations that have taken place globally is the introduction of information and communication technology (ICT) into every facet of human endeavor and for education not to be caught off guard, urban, rural, graduates, non-graduates, experienced, less experienced, pre-service, in-service training teachers, male, female, young and old teachers as well as teachers in single sex and mixed schools have to integrate ICT into all aspects of the school curriculum from planning to evaluation.

Technology involves the generation of knowledge and process to develop systems that solve problems and extend human capabilities. In other words, technology can change or alter people, access, gather, analyze, present, transmit and stimulate information. The impact of technology is one of the most critical issues in education and the use of Information and Communication Technology (ICT) creates a powerful learning environment that transforms the learning and teaching process in which students deal with knowledge in an active, self - directed and constructive way (Volman & Van Eck, 2001). ICT is seen as an important instrument to support new ways of teaching and

learning which should be used to develop student's skills for cooperation, communication, problem solving and lifelong learning.

Technology integration is meant to be cross-curricular rather than become a separate course or topic itself. Technology should be used as a tool to support the educational objectives such as skills for searching and assessing information, cooperation, communication and problem solving which are important for the preparation of children for the knowledge society. In fact, innovative use of ICT can facilitate student- centered learning and every classroom teacher should use learning technologies to enhance their student learning in every subject, because it can engage the thinking, decision making, problem solving and reasoning behaviours of students, which are cognitive behaviours that children need to learn in an information age (Grabe & Grabe, 2007).

Despite successful efforts to acquire computer hardware and to raise the student computer ratio 5:1 World Almanac, (2002) and Dooling ,(2000) indicated that there has been less success in identifying which computer skills should be taught in school and how computers can be used for teaching and learning. Thus, current attention has turned to what is actually happening in the classroom with computer technology. In fact, urban, rural, graduates, non-graduates, experienced, less experienced, pre-service, in-service training teachers, male, female, young and old teachers as well as teachers in single sex and mixed schools play an important role in the teaching/learning paradigm shift. They must understand the potential role of technology in education. They should also become effective agents to be able to make use of technology in the classroom.

Africans have witnessed the development and use of ICT in different sectors of the economy over the last decade including education. The change from teacher-centered education system to learner-centered education the world over in the past years contributes to the use of ICT in education. Education reform practices should focus on equal access and quality of education which should highlight the importance of change in the education sector through the use of ICT and equipping new generations with enhanced skills to operate in the 21st century.

The use of ICT in Nigeria and African countries generally, is increasing and dramatically growing. However, while there is a great deal of knowledge about how ICT are being used in developed countries, there is not much information on how ICT are being introduced into schools in developing countries (Beuks-Amiss & Chiware, 2006). Viewing at the developing countries according to these authors, there is generally limited access time per month using ICT by both the teachers and students, and even less time spent with reliable internet access. It should be noted that availability of ICT vis-à-vis access in terms of ratio of teachers and students differs significantly. Despite all these, the new and emerging technologies challenges the traditional process of teaching and learning, and the way education is managed. Rapid communication plus increased access to ICT in the home, at work and in educational establishment, could mean that learning becomes a truly lifelong activity - an activity in which the pace of technological change forces and constant evaluation of teaching process itself.

It has been found that teachers can use ICT to promote students' intellectual qualities through higher - order thinking, problem solving, improved communication skills and deep understanding of the learning tool and the concept to be taught (Sutton,

2006). Teachers can use ICT in Basic Education to promote a supportive, interactive teaching and the learning environment, create broader learning communities, and provide learning tools for students, including those with special needs (Trinidad, Aldridge & Fraser, 2001; Hawkins, 2002). Computer - generated graphics have been used to illustrate relationship of all kinds, especially dynamic processes that cannot be illustrated by individual pictures (Franke, 1985). Teachers in Basic Education could use ICT to improve the creation of a new and more effective curriculum. It is no more contestable that ICT used by teachers in Basic Education could contribute to the teaching and learning, and achievement in many subjects. Some areas of the curriculum have been the focus of considerable ICT development. Apart from the initiatives to support literacy and numeracy, evidences of positive impact have been reported in mathematics, modern foreign languages, sciences, history, geography, physical education and creative arts.

The use of ICT in education, according to Liverpool (2002), includes ICT as an object, ICT as an assisting tool, ICT as a medium of teaching and learning and ICT as a tool for organization and management in schools. ICT as an object refers to learning about ICT. It is mostly organized in specific courses. What is learned depends on the type of education and level of the students. ICT can be used as a tool to support teaching, both in content and methodology. It can be used while making assignments, collecting data, documentation, conducting research and communicating.

ICT serves as a medium through which teachers can teach and learners can learn. It can be in form of drills, simulations, practice, exercise and educational networks. ICT can be used in handling school records like timetable, attendance, fee collection,

examination results and general communication which is commonly referred to as database management.

With the use of ICT, the following can also be achieved: increased supply of trained teachers through ICT-enhanced and distance training of teachers, integration of ICT training into curriculum, improvement of efficiency and effectiveness of education ministries and related bodies through strategic application of technologies, ICT-enabled skill development, teachers are empowered at the local level through the use of ICT and networks that link teachers to their colleagues, increased availability of quality educational materials/resources through ICT, local content distribution and use of ICT to provide schooling and training, including vocational training outside the schools. Teachers' use of ICT in Basic Education: enhance learning, broadcasting access to literacy education, creating local content, professional development, cultivating literacy conducive for learning.

The current issues in the use of ICT by the classroom teachers include the use of computers, Internet, telephone, digital camera, data projector, and so on. As the world continues to revolve around technology, teachers need to continue incorporating these new technologies into their teaching.

ICT implementation has affected the functioning of schools at multiple levels: new configuration of learning spaces and timetable have been created; innovative teaching methods have been incorporated; autonomous and active learning processes using technology have been adopted; teachers' traditional roles have been expanded to include personal and group tutoring and guidance functions; and new ICT-based curricular solutions have been generated (Venezky & Davis, 2002).

Nigeria, like many other countries around the world, has over the years sought to improve its education system by introducing reforms and making plans based on education needs of the country, hence the development of Universal Basic Education (UBE). The broad aim is to give a solid foundation for life-long learning through the inculcation of appropriate learning-to-learn, self-awareness, citizenship and life skills (Federal Government of Nigeria (FGN), 2003). With this focus, it can be concluded that beyond increasing access to education, ensuring quality is a key goal of basic education in Nigeria. This is in support of the Dakar Framework for Action (2000) in Education for All (EFA) that quality is at the heart of education – a fundamental determinant of enrolment, retention and achievement.

Quality improvement has two important dimensions: increase in the amount of subjects covered by existing curriculum, and through better pedagogy (changes in the learning process). The later includes developing new types of learning; ability to gather and manipulate information, problem solving, higher order thinking, critical and creative thinking and other necessary skills to interact in knowledge based economics. The need for the changes in the learning process paved way for ICT use in the teaching and learning processes where students are expected to play more active roles than before (Alabi, 2004), especially if basic education should target the four pillars of learning – learning to learn, learning to be, learning to live together and learning to impact (Delors, 1996).

The Universal Basic Education (UBE) is designed to lay solid foundations for scientific and technological development in Nigeria. In order to achieve these objectives, there is need for adequate Information and Communication Technology (ICT) facilities,

which enhance the quality of the UBE (Johnson, 2007). The quality of ICT personnel and facilities enhance qualitatively the implementation of the UBE. There is a positive relationship between educational resources and students' academic performance. This is in agreement with Nwangwu (1997) and Olutola, (2000) who believe that teaching materials and facilities for teaching and learning activities could promote school attendance and create a good school environment which affects positively the students' academic achievement.

Studies by Kandiri (2012); GOK (2010) and Drent & Meeslissen (2008) have further established the roles of ICT in achieving qualitative education at all levels of the school system. ICT is seen as key tool in acquiring, processing and disseminating knowledge. It offers increasing possibilities for codification of knowledge about teaching activities through being able to deliver learning cognitive activities anywhere, anytime (Larsen & Vincent-Lancrin, 2005) . Yusuf (2005) noted that ICT has impacted on the quality of teaching; learning and research in traditional and distance education institutions through provision of dynamic, interactive and engaging content and providing real opportunities for individualize instruction. It has the potential to accelerate, enrich and deepen skills, motivate and engage students in learning; help to relate school experiences to work practices, contribute to radical changes in the schools and provide opportunities for connection between the school and the real world.

ICT can, therefore, make the school more efficient and productive thereby engendering a variety of tools to enhance and facilitate professional activities (Kirschner & Woperies, 2003). Haddad and Jurich (2002) summed it up thus:

The traditional model of learning emphasizes mastery of facts and concepts. ICT diversifies the system of representation through the use of various stimuli (images, sounds and movement) and address the needs diverse type of learning (visual, psychomotor and affective). (p.33)

In the National Policy on Education, among the innovations planned to take place is the introduction of information and communication technologies (ICTs) into the school system, which is now gaining grounds even in the globe. Information and Communication Technology could not be regarded as the only solution to education problems, but in the world today they are essential tools for teaching and learning. For a teacher to be versed while using these tools there is need for visions, potentialities, and opportunities in application, training and time to experiment. Thus ICT should be regarded as a tool for teachers but not to be substituted for the teacher. Education systems in the globe are being pressurized to apply the information and communication technologies to teach students the expected needed knowledge and skills in this country.

Information and Communication Technology (ICT) is regarded as a phenomenon that is fast revolutionizing the world and making the world to become a global village (Abidoeye & Ayelaagbe, 2001). It is essential for the teachers to take the issue of ICT with all seriousness so as to take education systems to enviable levels. Gone are those days when traditional classroom was gaining grounds, teachers in this country are expected to be ICT compliant so as to move with knowledge explosion and technologically minded classroom interaction. ICT in the classroom came as a result of the search for better classroom and better teachers that will open their minds to positive changes.

In developing countries like Nigeria, most of the technological facilities are concentrated in urban areas. This, therefore, indicates that teachers' attitude towards ICT

use would depend on the geographical location (rural and urban). Introducing technology into urban and rural schools would also largely depend upon the availability and accessibility of ICT resources. Schools are increasingly being equipped with computers for teaching, learning and administrative purpose, connectivity is improving and students are enthusiastic about using computer for learning. Qualification of teachers' are often seen as a catalyst in the introduction and effective use of technology in schools .Unfortunately in many African countries ,the lack of qualified teachers and low levels of teachers' ICT knowledge and skills have been identified as major impediment to effective introduction of technology into schools. Ayersman (1996) indicated in his research that teachers who are professionally qualified demonstrate a sound understanding of Information and Communication Technology (ICT) operations and concepts, use productivity tool to enhance professional tasks such as correspondence, assessment, classroom materials, presentations and so on.

In terms of ICT and teachers development, the National Policy on Teacher Education, Federal Government of Nigeria (FGN, 2007) developed a vision to produce quality, highly skilled, knowledgeable and creative teachers based on explicit performance standards through pre-service and in-service programme to raise a generation of students who can compete globally. The goal is to ensure that teachers are trained and recruited to teach world-class standards and continue to develop their competence over their entire career. Gender differences and the use of ICT have been reported in several studies .It has been observed that female teachers have low levels of computer use due to their limited technology access, skill and interest.

Research results in some developed nations revealed narrowing gaps across age groups among teachers in ICT related behaviours. It was observed in Norway's situation that the share of teachers who stated that they have good command of ICT use in teaching and learning was negatively correlated with age. It was also obtained that Taiwan's younger teachers were more literate on ICT use than their older teachers'.

ICT integration in single and mixed schools is needed in order to accomplish many objectives and improve the quality of lesson in all subject areas. Filling the single sex and mixed schools teachers with the necessary ICT facilities neither improves the quality of instruction nor creates more effective learning environments. However the crops of teachers in mixed schools lack the professional capabilities to harness technology in teaching and learning (Babalola, Ibitoye & Efunbajo, 2002). The field of education has been affected by information and communication technology (ICT), which has undoubtedly affected teaching-learning. In a rapidly changing world, basic education is essential for an individual to be able to access and apply information.

The need for ICT in Nigeria, particularly South South Ngeria Secondary Schools cannot be overemphasized in this technology-driven age. Everyone requires ICT competence to survive and government is finding it necessary to train and re-train urban and rural teachers, graduate and non-graduate teachers, experienced and less experienced teachers, pre-service and in-service teachers, male and female teachers, single sex and mixed school teachers and young and old teachers, to increase their knowledge of computers and other ICT facilities.

Therefore, research is needed to evaluate teachers' use of Information and Communication Technology (ICT) in teaching at Basic Education Level in South South Nigeria.

Statement of the Problem

In both academic literature and policy documents on ICT in education, strong arguments are put forward for ICT to be used by teachers in schools in order to realize new goals of Basic Education which are seen to be important for the 21st century. These goals are developing lifelong skills; the ability to engage in collaborative knowledge creation and problem solving with peers and experts around the world. These two bodies of literature anticipated that significant changes in the teaching and learning process have to take place in UBE in order to achieve this new curriculum.

The Ministry of Education in its Draft Policy for ICT in Education, acknowledged that the integration of ICT in education has the potential to enhance human capacity, dynamize the teaching- learning environment and providing equity and access, create an environment that encourages creativity, critical thinking and decision making. To ensure that these expectations are achieved, the researcher found that the modern world is an information society driven by a complex set of digital devices and telecommunication networks and having the World Wide Web as an all encompassing platform. Because of the relevance of this to education, the Ministry of Education has keyed into the training of teachers by organizing workshops, conferences, seminars and symposia on the use of ICT in teaching at basic education level in south south Nigeria. The extent to which this is effectively being used is yet to be assessed. Therefore, one may ask whether teachers in South South Nigeria are using ICT or not in teaching at basic education level. The

problem of the study put in question form is: What is the extent of urban and rural teachers, graduates and non-graduate teachers, experienced and less experienced teachers, pre-service and in-service teachers, male and female teachers, teachers in single sex and mixed schools ,young and old teachers on ICT use in teaching at basic education level in South South Nigeria?

Research Questions

The following research questions were raised to guide the study:

1. What is the extent on which teachers use ICT in teaching at basic education level in South South Nigeria?
2. What is the extent on which urban and rural teachers' use of ICT in teaching at basic education level in South South Nigeria?
3. What is the extent on which graduate and non - graduate teachers' use ICT in teaching at basic education level in South South Nigeria?
4. What is the extent on which less experienced and experienced teachers' use ICT in teaching at basic education level in South South Nigeria?
5. What is the extent on which pre-service and in-service teachers' use ICT in teaching at basic education level in South South Nigeria?
6. What is the extent on which male and female teachers' use ICT in teaching at basic education in South South Nigeria?
7. What is the extent on which teachers' in single sex and mixed schools use ICT in teaching at basic education level in South South Nigeria?
8. What is the extent on which young and old teachers' use ICT in teaching at basic education level in South South Nigeria?

Hypotheses

The following hypotheses were formulated to guide the study:

1. There is no significant difference between urban and rural teachers' on the extent of ICT use in teaching at basic education level in South South Nigeria.
2. There is no significant difference between graduate and non - graduate teachers' on the extent of ICT use in teaching at basic education level in South South Nigeria.
3. There is no significant difference between less experienced and experienced teachers' on the extent of ICT use in teaching at basic education level in South South Nigeria.
4. There is no significant difference between pre service and in-service teachers' on the extent of ICT use in teaching at basic education level in South South Nigeria.
5. There is no significant difference between male and female teachers' on the extent of ICT use in teaching at basic education in South South Nigeria.
6. There is no significant difference between single sex and mixed school teachers on the extent of ICT use in teaching at basic education level in South South Nigeria.
7. There is no significant difference between young and old teachers' on the extent of ICT use in teaching at basic education level in South South Nigeria.

Purpose of the Study

The main purpose of this study is to evaluate teachers' use of ICT in teaching at Basic Education Level in South South Nigeria. Specifically, the study would:

- i. examine the extent on which urban and rural teachers use ICT in teaching at basic education level.
- ii. identify the extent on which graduate and non-graduate teachers use ICT in teaching at basic education level.
- iii. find out the extent on which experienced and less-experienced teachers use ICT in teaching at basic education level.
- iv. determine the extent on which pre-service and in-service teachers use ICT in teaching at basic education level.
- v. examine the extent on which male and female teachers use ICT in teaching at basic education level.
- vi. identify the extent on which single sex and mixed school teachers use ICT in teaching at basic education level; and
- vii. find out the extent on which young and old teachers use ICT in teaching at basic education level.

Significance of the Study

The study would be of significant benefit to registered and licensed teachers by Teachers Registration Council of Nigeria (TRCN); non-registered teachers, students, kids in nursery and primary schools; non-teaching staff, Ministry of education, Government and Researchers.

The study would be of significant benefits to registered and licensed teachers by TRCN based on ICT knowledge and skills expected of teachers by professional standards, which would meet the standard of the world bodies such as International

Forum of Teaching Regulatory Authorities and other relevant international agencies, for those wishing to teach in foreign countries.

The study would be of benefit to non-registered teachers by providing them regular access to up-to-date e-teaching materials and enable them to exchange their e-teaching experiences with colleagues through access to online journals, joining discussion forums, downloading lesson ideas and plans, exploiting teaching resources, and record keeping.

The study would be of benefit to students because it would accelerate and deepen student's basic skills in any schools subjects, especially reading, mathematics and sciences as well as encourage self-discovery by learners. The study would also be of significant benefit to children in nursery and primary schools because it would help to provide information and skills that would give a head start and upgrade the universally accepted importance of learning computer-based instruction in UBE in Nigeria.

The study would be of significant benefit to the non-teaching staff in the educational sector because it would contribute to the generation of skills that would prepare them for improvement on their jobs. The study would be of significant benefit to Ministry of Education if curricula and learning contents can be redesigned to integrate ICT into learning processes in addition to traditional paper-based learning materials; e.g interactive encyclopedia can be provided in classes to enable students to deepen and visualize their understanding of certain topics by searching for more information immediately after teachers have introduced some fundamental concepts.

The result of the study would be of significant benefit to the government by serving as a guide in planning and implementation of school curriculum in line with the

global trends. The study would also be of significant benefit to the researchers by adding to the pool of information that already exists in this area. Researchers can therefore fall back on information gathered here by replicating this study in other settings.

Scope and Delimitation of the Study

The study evaluated teachers' use of information and communication technology in teaching at basic education level. The focus was on teachers' location (urban and rural), qualification (graduate and non-graduate), experience (experienced and less experienced), training (pre-service and in-service training), gender (male and female), age (young and old) and type of school (single sex and mixed schools).

The study is delimited to teachers in the three states in South South Nigeria, (Delta, Edo and Rivers) of the federation and three local government areas from each of the states were drawn.

Limitation of the Study

The study is limited to 1014 teachers in nine local government areas in the three states out of the six states in South South Nigeria. Delta State (Oshimili South, Ughelli North and Warri South); Edo State (Oredo, Ovia North East and Etsako West) and in Rivers State (Ahoada West, Okirika and Port Harcourt).

Operational Definition of Terms

ICT: This stand for information and communication technology and is defined, for the purpose of this primer, as a "diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information". These technologies (radio and television), computer, power point and telephone.

e-learning: This encompasses learning at all levels, both formal and non-formal, that uses an information net-work – the Internet, an intranet (LAN) or extranet (WAN) – whether wholly or in part, for course delivery, interaction and/or, facilitation.

Learner-centered knowledge: This means the teaching process that pay careful attention to the knowledge, skills, attitudes and beliefs that learners bring with them to the classroom.

Evaluation: This is the judgment on whether the extent of teachers’ use of ICT is high or low which depends on teachers’ ICT use.

Instruction: This is the act of giving detailed information on how to use ICT in the teaching and learning.

ICT Standard: An ICT standard is a combination of attributes describing a teacher’s professional performance involving the use of ICT.

Pre – Service Teachers: These are trainees’ teachers that are about to round up in teachers training programme.

In – Service Teachers: These are professional teachers who are already teaching, they are send on workshops, conferences, seminars and symposia.

More Experienced Teachers: Teachers who had served for ten (10) years and above.

Less Experience Teachers: Teachers who had served for below 0 – 9 years.

Young Teachers: This refers to teachers within the age brackets of 21 – 49 years.

Old Teachers: This also refers to teachers within the age brackets of 50 years and above.

Scaffolding: This implies to support students learning by asking questions or connecting new information to existing knowledge or providing encouragement for attempting something new or providing assistance to move understanding to the next level.

Cognitive: This means the nature of learning process or goals of the learning process.

Metacognitive: This refers to construction of the knowledge or strategic thinking or thinking about thinking or context of learning.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Theoretical and empirical literatures related to the study were reviewed. The literature were reviewed under the following sub-headings:

- Conceptual Model
- Concept of Evaluation
- Evaluation Model - Accreditation
- Concept of ICT
- Aims and Objectives of ICT in Education
- Uses of ICT
- Universal Basic Education (UBE) Programme
- Teachers use of ICT for Instruction in Universal Basic Education (UBE) based on Location
- Teachers use of ICT for instruction in Universal Basic Education (UBE) based on Qualification
- Teachers use of ICT for instruction in Universal Basic Education (UBE) based on Experience
- Teachers use of ICT for instruction in Universal Basic Education (UBE) based on Training
- Teachers use of ICT for instruction in Universal Basic Education (UBE) based on Gender.
- Teachers' use of ICT for instruction in Universal Basic Education (UBE) based on Age.

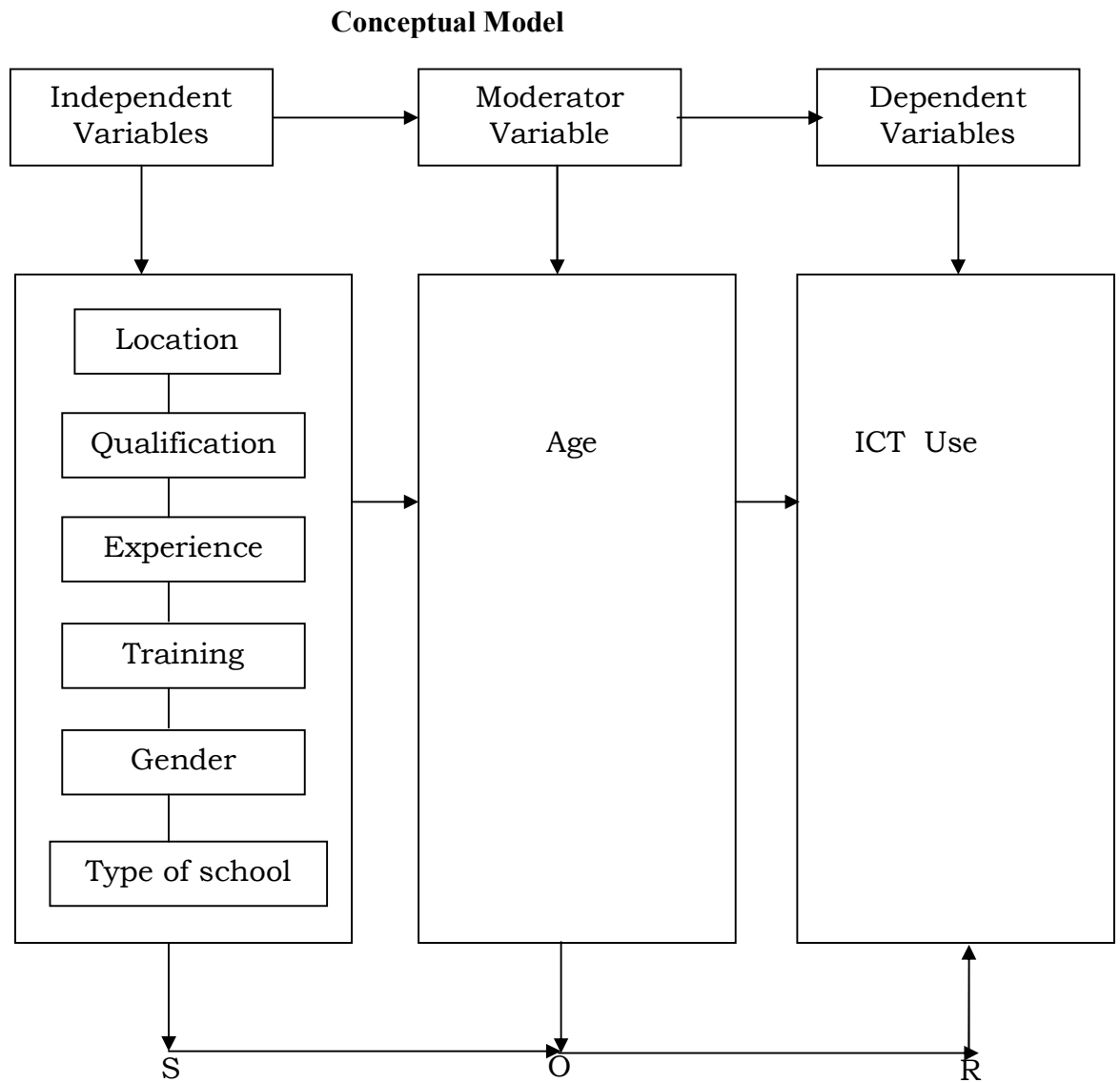
- Teachers' use of ICT for instruction in Universal Basic Education (UBE) based on Type of School.
- Benchmarks for ICT in Teacher Education.
- Empirical Studies on Teachers' use of ICT in Teaching.
- Appraisal of Reviewed Literature.

Conceptual Model

The study was based on the Behaviorist Theory and social-cultural theories of learning. The Behaviourist theory sees human behavior as the product of stimulus variables and organism variables, while the social – cultural theories of learning claims that all human action is mediated by tools. The Behaviourist theory was postulated by Hull (1952) to explain the concept of structured learning programmes, skill learning and much of common sense experience along the S– O – R model. While social cultural theories of learning hinged on Vygotsky (1978) ;Wertsch (1991) which grounds that the cultural aspects of human action. ICT use was conceptualized in this study as the Response or Dependent Variable which is affected or determined by the interaction of teachers, location, qualification, experience, training, gender, age and type of school. The above conceptual framework adopted in this study is illustrated in the S – O – R model in figure 2.1 below:

Figure 2.1

Conceptual Model



Source: Hull (1952)

The conceptual model in figure 2.1 shows how independent variables influence dependent variable and how moderator variable influences both independent and dependent variables. On the independent variables: teachers' school location (urban and

rural), teachers' qualification (graduate and non - graduate) teachers experience (experienced and less experienced), teachers training (pre - service and in - service), teachers gender (male and female), teachers type of school (single sex and mixed) was focused on ICT use in teaching at basic education level. The moderator variable teacher age (young and old) interlinked with the benchmarks for ICT in teacher education in teaching. These benchmarks for ICT in teachers' education provided information on the extent of ICT use in teaching at basic education level in south south Nigeria, hence the influence of the moderator variable.

The dependent variable was influenced by both independent and moderator variables which in turn resulted to high or low extent of ICT use by teachers in teaching at basic education in south south Nigeria. Since the society is dynamic and education being a micro unit of the society, has to change in line with the social changes. This conceptual model is seated on accreditation model in evaluation. The accreditation model relies on experts' opinion to determine the quality of programme. The purpose is to provide professional judgment of the teachers' qualities on the extent of ICT use in teaching at basic education level in south south Nigeria.

Concept of Evaluation

The concepts of evaluation are understood in different ways. For this reason it is important to define them so that everyone would attach the same meaning to them or know what the differences are, thereby improving communication. Evaluation is a process that critically examines a programme. It involves collecting and analyzing information about a programme's activities, characteristics and outcomes. Its purpose is to make judgments about a programme, to improve its effectiveness, and/or to inform

programming decisions (Patton, 2001). Evaluation is often defined as an activity that judges worth. For example, evaluation is the determination of merit, worth, or significance (Scriven 2007). A course of action used to assess the value or worth of a programme, (Farell, Kratzmann, AlWilliam, Robinson, Saunders, Ticknor & White 2002). Evaluation is a set of research questions and methods geared to reviewing processes, activities and strategies for the purpose of improving them in order to achieve better results (Kahan & GoodStatt, 2005).

Policy evaluation is a family of research methods that are used to systematically investigate the effectiveness of policies, programmes, projects and other types of social intervention, with the aim of achieving improvement in the social, economic and everyday conditions of people's lives (Government Social Research Units, 2007).

Evaluation is an integral part of all aspects of the educational process and its major purpose is to improve instruction and student learning. Evaluation is the reflective link between the dream of what should be and the reality of what is. This reflective link or activity would contribute to the vision of schools which are self-renewing with mechanisms in place to support the on-going examination and renewal of educational practices. Evaluation procedures must contribute to that vision. (Minister's Advisory Committee on Evaluation and Monitoring, 1989).

Evaluation is the process of assessing the impact of project, programme or policy while it is in operation or after it has come to an end. It involves consideration of the economy efficiency and effectiveness of the project to determine whether the objectives would be achieved. This would have been identified at the project initiation stage. Evaluation brings to the fore the lessons to be learnt for the future which in turn, should

be fed into future decision-making. Evaluation does not seek to create blame for what did not go well. (Department of Health, 2002).

Evaluation is an integral part of education. It affects the way students study, their motivation, performance and their aspirations. At school levels, it enables inspectors and officials from the ministry to assess the quality of education offered in a specific school, region or throughout the country. At curriculum level, it gives us an idea of whether the curriculum set up is leading us to our educational goals/objectives at the end. For the teacher, it gives an idea of the importance of evaluation in education. It helps to come up with appropriate means of measuring and evaluating students. In the National Policy on Education, among the innovations planned to take place is the introduction of Information and Communication Technology (ICT) into the school systems, which is now gaining grounds even in the globe. Evaluation studies and reports showed that the multimedia rooms and computer labs are rarely used by teachers and administrators do not encourage or support teachers and students to use them to enhance their teaching and learning (Warschaver, 2003).

Evaluation Model – Accreditation

Accreditation had different meanings: The concept of accreditation normally refers to the process of assessing and officially recognizing whether certain programmes or certain individuals or certain teachers are able to perform inside the school system (Leonardo, 2006). Accreditation is a process that ensures quality, accountability and continuity of a programme in the school system. It is an assurance that minimum standards have been met and school is committed to have continuous qualitative improvement.

Accreditation is a system which determines whether an institution or a programme meets acceptable quality criteria that had the resources to meets its objectives. Generally, accreditation is a quality assurance process based on the application of predefined standards through evaluation. However, the accreditation of study programme (ICT use) involves investigating whether the programme provide an adequate framework for learning and achievement of the ICT objectives or benchmarks for ICT in teacher education.

Accreditation hinged on inputs, processes and outputs. It was on this basis that accreditation of programme (ICT use) in schools was advocated that the inputs, processes and outputs (I.P.O) model should be adopted for use in evaluation studies (Onwuakpa and Anyawu, 2012). Accreditation focused on inputs such as, ICT aims and objectives, benchmarks for ICT in teachers' education, manpower (quality and quantity) of teachers (staffing, sex, age, experience and other predisposition of teachers), students characteristics (sex, age, potential capabilities and socio-economic background e.t.c), learning environment (cultural setting, social needs, instructional goals and objectives and facilities in the schools).

Accreditation processes entails student – teacher classroom interactions, as found in class lessons, students learning activities, teachers activities in terms of lessons plans, lesson notes, table of specification and class test items. It also addresses the teaching process and the level of students supports. Accreditation explores outputs such as the learning outcomes, cognitive outcomes i.e. the abilities, skills, knowledge and competencies; affective outcomes such as attitude, interests and character towards the ICT use in teaching; psychomotor outcomes which involves the motor skills and creative

skills. However, the medium of delivery would be the focus when it varies from the norm.

Concept of ICT

The advent of information and communication technology (ICT) in education which is exacting an unprecedented impact in the learning process is a culmination of advancement in information technology (IT). The recognition of communicative abilities and facilities offered by the computer, notably the e-mail, led to the replacement of the term ‘Information Technology’ with that of Information and Communications Technology (ICT) over a decade ago. Pelgrum and Law (2003) affirm that the term ICT started replacing that of IT from the 1990s. Abbott (2001) observe that at the initial stage of ICT more people were adopting the term ICT, while people in higher education were using communication and information technology (C& IT) to refer to the same concept. It is interesting to note that most developed countries have embraced ICT in education as a means for ensuring the development of ICT capability of the people. This is with a view to achieving technological emancipation and to competing favorably in the international arena. The major way of developing the ICT capability of citizens is through the implementation of the three facets of ICT – based curriculum which comprise: learning about ICT, learning with ICT and learning through ICT. It is in this regard that Tanner (2003) presents ICT as discipline, resource and Key skill.

ICT as discipline refers to ICT as a subject in the curriculum. As an instructional resource, ICT encompasses a wide range of technologies including telephones, fax machines, televisions, video, audio recorders, CD players, CD-ROMs, personal organizers, programmable and remote-operated toys radios, computers (O’ Hara, 2004)

as well as any other technologies that can enhance the processes of finding, exploring, analyzing, documenting, exchanging and presenting instruction based information. ICT is also considered as skill in line with literacy and numeracy.

The enormous benefits of ICT have been well documented by various authorities and researchers such as Department for Education and Employment (DFEE, 1997); The Independent ICT (IICT) in school commission (1997); the National Grid for Learning (NGFL, 1997) and QCA (1999); Akudolu (2002), Sharp, Potteer, Allen, and Loveless (2002), the Scottish executive (2005) and the UNDP/APDIP (2006). This implies that ICT promotes learning, motivates and empowers the learner as well as facilitates the job of the teacher. The NGFL and DFEE (2001) add that ICT “has the potential to transform the way education is delivered and to provide new opportunities, enhancing scholarship and investigation. The compilation of research findings on the benefits of ICT as presented by the British Educational Communications and Technology agency (BECTA, 2004) is grouped under benefits for learners, teachers, parents and the society.

However, there is a global awareness of the centrality of the teacher’s role in the learning process, even in ICT – rich contexts. Teachers cannot be replaced by the best technology. Jone (2003:3) reiterated this and opines that “no matter what educational systems mandate and expect, in the end effective learning is very dependent on the will and competence of the teacher”. In recognition of this fact, country members of the European Union entered “the twenty-first century in the throes of a major programme of equipping schools and training teachers” (Abbott, 2001:33). Also the IICT in schools commission (1997:22) warns that “If we wish to ensure that our children and country

reap the benefits of ICT we must cherish our teachers and do everything we can to help them to take it on board”.

The declaration by the Federal Republic of Nigeria (FRN, 1999:9) at the on-set of the UBE programme that “current efforts to raise the level of federal education of teachers (as well as efforts to raise the level of their initial professional preparation) will be pursued, broadened and intensified”. The same document presents the “career long professional development of serving teachers” as a “crucial issue”. An indispensable element of teacher preparation for the present information age is the development of teachers’ competencies for instructional use of ICT in UBE programme. Bearing in mind the existing ICT- poor school environments in the country and the vastness of ICT capabilities.

Aims and Objectives of ICT in Education

The general aims and objectives of ICT in education can be grouped under the following headings:

- a. utilitarian objectives
- b. social objectives,
- c. cultural objectives,
- d. personal objectives.

(a) The utilitarian objectives of ICT in education:

One of the major objectives of ICT is to help the learners become competent and confident users of ICT who can be effective, creative and efficient in applying them in their daily lives. It aims is to support learners to become critical users of ICT who can evaluate the capabilities associated with its use. Its objective also is to prepare the learners to be flexible and have open mind for the society of tomorrow by adjusting to future changes in the technology.

(b) The social objectives of ICT in education:

Its objective is to provide the learners with the appropriate social skills necessary for collaborating and cooperating learning about ICT. It

empowers ICT learners who are deprived to use this technology outside the school system by ensuring sufficient access for those learners. For this, it will ensure equity between all learners by providing appropriate qualitative and quantitative opportunities.

Another objective of ICT is to facilitate a good communication between the learners by promoting great social understanding.

(c) The cultural objectives of ICT in education:

ICT objectives enable the learners to appreciate the goodness of our culture. It helps the learners become well-cultured citizens of the modern world through the discovery and appreciation of the cultural heritage of various countries in the world.

(d) The personal objectives of ICT in education:

ICT aims are to enable learners to improve on their appropriate personal skills that is important for independent learning. It helps to assist the learners to improve their potentials to their fullest through the acquisition of knowledge by concentrating on higher order cognitive tasks than on lower order tasks towards further learning. It assists the learner in identifying the special needs by linking themselves within the school and society by increasing their independence and developing their abilities and interests.

Uses of ICT

In education, ICT is considered part of a solution to addressing the changing learning needs of societies (Garrison & Anderson, in Allitwa 2006). ICT helps improve schools administration such as the registration of learners, the keeping and retrieving of

learner records, and enables electronic rather than manual handling of marks. Furthermore it enables teachers and learners to gain easy access to learning and teaching materials online without time constraints.

However, once a classroom/learning environment is supported by ICT, teachers would be able to present complex materials. The following are the importance of ICT as enumerated by National Teachers Institute (2004).

- It can be used to support conventional classroom works. The teacher can ask his pupils/students at primary, secondary schools and tertiary institutions to use ICT facilities in school works.
- The teacher can use ICT to design and develop learning materials. Such materials can be downloaded from the internet. Also, materials designed can be adopted to meet specific instructional objectives.
- Students can exchange – electronic materials like journals, books, newspapers, magazine etc. through ICT among themselves.
- Some libraries stock electronic versions of books, journals etc. Through ICT, teachers and students can have access, store, and analyze information in electronic form.
- ICT is also useful in research activities. This is because it gives access to a world of resources in electronic form.
- ICT is very useful in administration, recording students data, personal administration, purchasing and supplies and advertisement.
- ICT is use for on-line registration of Examinations.
- ICT is used for individualized and independent learning.

- ICT is used to make learning more vivid and engaging.

ICT is used to provide a two way channel of communication for exchange between teachers and students with their peers for feedback or for learning problems-solving advice, debate and support.

Through ICT, teaching would be simplified and learning experiences would be more effective. There has been considerable development in the provision of on-line resources for teaching across subject' areas, from a range of sources, commercial and public. More specifically, learning of modern foreign languages has benefited greatly from the increased availability of on-line resources as well as technologies such as digital video and photography, while animations and stimulations have enabled pupils/students to grasp more complex concepts in Mathematics and the sciences (National curriculum in Action – NCA 2007). These have been particularly effective in supporting, understanding of abstract or microscopic concepts and processes in science. In religious education, it could be observed that ICT is helping pupils/students to learn and enabling them to consolidate and deepen their knowledge understanding and skills.

According to National curriculum in Action, 2007, using ICT in teaching can help students to:

- Access, select and interpret information.
- Recognize patterns, relationships and behaviours.
- Review and modify their work to improve the quality.
- Communicate with others and present information.
- ICT can be used as a tool to support teaching both in content and methodology.

- ICT can be used in handling school records like time tabling, attendance, fee collection, examination results and general communication which is commonly referred to as database management.

Universal Basic Education (UBE) Programme

The Universal Basic Education (UBE) programme was launched on 30th September 1999, with the sole purpose of ensuring that illiteracy is reduced to its barest minimum among the adult population of Nigeria in the nearest future. In pursuance of this goal, the UBE programme aims at making education compulsory at the primary and junior secondary (classes 1-3) school levels. This is one of the cardinal programmes of the government, aimed at demonstrating its strong commitment to international policies geared towards the eradication of illiteracy in Africa. Through the UBE programme, the Nigeria Government demonstrates a strong commitment to the Jomtien Declaration (1990) on the promotion of Basic Education for all as well as the New Delhi Declaration (1991) requiring stringent efforts by the E-9 countries (nine countries of the world with the largest concentration of illiterate adults) to drastically reduce illiteracy within the shortest possible time frame. It is also a demonstration of commitment to the Durban Statement of Commitment (1998) and Organization of African Unity (OAU). Decade of Education for Africa (1997 – 2006) which requires African States to generalize access to quality basic education as a foundation stone for sustainable socio-economic development (Nigeria Federal Ministry of Education, 2000).

The specific objectives of the UBE programme, as outlined in the implementation guidelines of the Federal Ministry of Education (Nigeria Federal Ministry of Education, 2000), are as follows:

- Developing in the entire citizenry a strong consciousness for education and a strong commitment to vigorous promotion.
- The provision of free Universal Basic Education for every Nigerian child of school age.
- Reducing drastically the incidence of drop out from the formal school system through improve relevance, equality and efficiency.
- Catering for the learning needs of young-persons who for one reason or another had made to interrupt their schooling through appropriate forms of complementary approaches to the provision and promotion of basic education.
- Ensuring the acquisition of the appropriate levels of literacy education and ethical moral and civic values needed for laying a solid foundation for lifelong learning.

A Universal Basic Education Commission was established by an Act of the National Assembly as a way of ensuring the proper implementation of the objectives of the UBE programme. It is the responsibility of this commission to coordinate the activities of the programme throughout its first nine-year ‘gestation period’ from 2001 to 2009 and beyond (Nigeria Federal Ministry of Education, 2000). It is expected that the compulsory nature of the UBE programme would ensure that more pupils/students are enrolled in the primary and junior secondary schools which are the stages that lay the foundation for the educational attainment of children. The UBE guidelines also aim to correct the gender disparity in education by ensuring that all children of school age including girls are compelled to enroll in school. The UBE programme is intended to be universal, free and compulsory, thereby emphasizing that parents have an obligation to send their children to school. Furthermore, sanctions would be imposed on persons,

societies or institutions that prevent children adolescents and youth from benefiting from the programme (Nigerian Federal Ministry of Education, 2000). This harsh posture of the Federal Government in ensuring compliance with UBE programme by all citizens is very laudable. It gives hope of bridging the wide gender disparity in educational attainment of children in Nigeria in the near future.

The Universal Basic Education is designed to lay the solid foundation for scientific and technological development in Nigeria. In order to achieve these objectives; there is need for adequate information and communication technology facilities since this would enhance the quality of the UBE (Johnson, 2007). The quality of ICT personnel and facilities would also enhance qualitatively the implementation of the UBE. Nigerian Educational Research Council (1998), in agreement emphasized that for a good education programme like the UBE to guarantee quality output, it must be serviced regularly with appropriate trained and motivate teaching staff, adequately supplied with necessary facilities and equipment.

The roles that ICT plays in the education cannot be overemphasized. It can be used to realize certain objectives in developing our education system. No wonder, UNESCO (2006) summarized five key ways in which ICT can support literacy level of a country, namely:

- i. Enhancing learning
- ii Broadcasting access to literacy education
- iii. Creating local content
- iv. Professional development and
- v. Cultivating literacy conducive for learning.

With the use of ICT, the following can also be achieved, increase supply of trained teachers through ICT-enhance and distance training of teachers, integrate ICT training into curriculum, improve the efficiency and effectiveness of education, ministries and related bodies through strategic application of technologies and ICT-enabled skill development, empower teachers at local level through the use of ICT and network that link teachers to their colleagues, broaden availability of quality educational materials/resources through ICT, local content distribution, use of ICT to provide schooling and training, including vocational training outside the school (ICT for development 2004).

Using ICT to achieve universal basic education can be possible through so many educative programmes on radio, television, computer aided learning or instruction (CAL or CIA), CD-ROMS, internet facilities for learners and teachers. For instance, radio when used with printed materials can make literacy lesson more true to life and interesting; the combination of audio and visual stimuli is more effective than visual stimuli alone in enhancing vocabulary and sentence construction skills and can aid information processing and memory (UNESCO, 2006).

Teachers' use of ICT for instruction in Universal Basic Education (UBE) based on location

According to Hafkin and Taggard (2008), a series of factors including the geographical location of technological facilities constrain female teachers' access to ICT. In developing countries like Nigeria, most of the technological facilities are concentrated in urban areas. There is lack of adequate infrastructure such as telephone facilities, satellite facilities, electricity, and more especially communication centers in the rural

areas. These therefore indicate that males and females teachers' attitudes towards ICT would depend on the geographical location (rural and urban).

Effectively introducing technology into urban and rural schools is also largely dependent upon the availability and accessibility of ICT resources (e.g hardware, software and communications infrastructure). Clearly, if technology cannot be accessed by the teachers, as in so many educational setting, then it will not be used. ICT resources tend to be more available in urban than rural areas. Schools are increasingly being equipped with computers for teaching, learning and administrative purposes, connectivity is improving and students are enthusiastic about using computers for learning, despite the lack of equipment available (Liverpool, 2002).

One of the policy objects is to promote the use of ICT in developing and sustaining local multimedia content for urban and rural schools. Preliminary survey conducted by Goldstein (1997) showed that despite three decades of government initiatives and academic research, the use of information and communication technology (ICT) in teaching and learning in urban and rural schools remains only partially understood by educationalist and inconsistently practiced in schools.

Teachers' use of ICT for instruction in Universal Basic Education (UBE) based on Qualification

In Nigeria, teachers who are academically qualified (untrained teachers) and those that are professionally qualified (trained teachers) are engaged to carry out instructional processes. By academically qualified teachers, the researcher mean teachers who have academic training as a result of enrolment into an educational institution as a result obtain qualifications such as OND, HND ,B.Sc, B.A, M.A, M.Sc and so on. While

professionally qualified teachers, are teachers who get professional training that gives them professional knowledge, skills, techniques, aptitude as different from the general education. They hold professional teaching qualifications for example, NCE, B.Sc.Ed, B.A(Ed,) M.Ed, and so on (Ololube, 2006).

Professionally competent teachers in the teaching and learning processes may be very good course of action, not only because the students would enjoy the instructional activities, but because they are valuable factors that would enhance the intellectual growth of both teachers and students. Teachers' professional qualification improves their job effectiveness. Ottenbreit-Leftwich, Glazewski, Newby, Ertmer (2010), found that professionally qualified teachers ensure quality in teaching-learning. To attain quality in teaching-learning vis-à-vis ICT material utilization competencies, school leaders have to rely on creating and sustaining a rich and conducive academic environment in which their students and teachers can thrive, learn and grow (Whitty 1996). Olugbemi (2000) noted that professional teachers have a closer understanding of the activities within the school, and even of its potential activities, and strive to promote the stability of the academic environment.

Ayersman (1996) indicates in his research that teachers who are professionally qualified demonstrate a sound understanding of Information and Communication Technology (ICT) operations and concepts, use productivity tool to enhance professional tasks such as correspondence, assessment, classroom materials, presentations in teaching e.t.c. Professional qualified teachers demonstrate introductory knowledge, skills and understanding of concepts related to the use of materials needed for instructional process and the continual growth in technology knowledge and skills to stay abreast of current

and emerging technologies, and informed decisions regarding the use of technology in support of student learning. It is established and to maintain rigorous standards for teacher candidate's knowledge and performance, professional qualified teachers demonstrate proficient and flexible use of different instructional materials and ways of teaching to engage actively all students in learning. Moreover, professional qualified teachers are well versed in the characteristics of students of different ages, abilities, and cultural backgrounds. They are skilled in integrating technology into instruction and creating an environment in which all students can be successful and want to learn. They know who and how to assess learning through various forms of traditional and authentic assessments.

The basic qualifications for ICT applications to be possessed by a teacher of computer in education should include word processing, Internet, email; file navigation, spreadsheets, presentation software and database management systems (Jegade, 2009). The international computer Driver's License and the Diploma and certificate programmes offered by accredited institutions in Zimbabwe have been, to large extent recognized as basic ICT qualifications.

Qualified teachers are often seen as a catalyst in the introduction and effective use of technology in schools. Unfortunately, in many African countries, the lack of trained teachers and the low level of teachers ICT knowledge and skills have been identified as major impediment to effectively introducing technology into schools. For instance, 80% of the pupils in South Africa (one of the most developed countries in Africa) leave school before being exposed to a computer (Haupt and Mintoor, 1997, in Mentz & Mentz, 2003). This problem is further exacerbated by, growing poverty and lack of funding for

the teachers' salaries and the exponential rise in student population in the last two decades (National Universities Communication, 2005) that ironically relates to the admirable Millennium Development Goals concerning free universal primary education. Indeed, it has been observed by many that meeting desperate need for more qualified, competent teachers is the most persistent and daunting challenge facing the African education system in general, and the integration of ICT in particular (Afe, 2002 and Olakulehim (2007).

Teachers use of ICT for instruction in Universal Basic Education Based on Experience

Evidence of the impact on learning and teaching indicates that, where the use of ICT is most effective in enhancing the learning experience, teachers have been able to integrate a number of technologies such as laptops, interactive whiteboard and internet. Such combinations of hardware, software and connectivity allow them to develop innovative approaches to learning and teaching (Becta, 2007).

Pedagogy deals with teacher's experience of multimedia to develop an idea of best practice. The project asks teachers to reflect on their practice and to explain their use of multimedia by means of videotaped records of teaching and learning using ICT. Their experiences are reflected in the development of the European Multimedia Resources Library (EMRL), which would be a repository for evaluation and experience of multimedia products in context. (Wikan & Moister, 2011). Broadly, the project has three Basic areas of interest, which can be summarized as follows:

- The pedagogical implications of educational multimedia is compulsory in school teaching.

- Evaluation of classroom experiences with innovative teaching methods using multimedia.
- An analysis of teacher's assessment of educational software.

Cox, Preston and Cox (1999) report finding of a small project funded by the Teacher Training Agency and Oracle through the Miranda Net project, set up to investigate the factors which have contributed to the continuing use of ICT by experienced ICT teachers in their teaching. Evidence has been collected through a literature search, teacher questionnaires, teacher's reports and interviews. These factors which were found to be most important to these teachers in their teaching were making the lessons more interesting, easier, more fun for them and their pupils/students, more diverse, more motivating for the pupils/students and more enjoyable. Additionally, more personal factors were improving presentation of materials, allowing greater access to computers for personal use, giving more power to the teachers in the school, giving the more prestige, making the teacher's administration more efficient and proving professional support through the internet.

Fisher (1996) survey experienced teachers, by asking them to rank a range of ICT competences which would be useful to trained teachers. As with many others surveys in the area of ICT and learning, the responses did not differentiate between what might be useful to a trainee teacher of History and a trainee teacher of Mathematics. Comber, Colley, Hardgrave & Dorn (1997) found that younger teacher tend to have a more positive attitude and thus also more experience in using computers. Russell, Bebell, O'Dwyer and O'Conner (2003) showed that new teachers had in general a higher level of comfort with technology than the more experienced teachers. There is a mixed evidence

to the types of teacher who adopt and use these new technologies, but it would be seen that both young teachers as well as experienced teachers who have an understanding of ways that technology can be used to support their practice are most open to taking advantage of the potentials that new ICTs offers.

Reluctance to use ICT was more evidence in English and Science, perhaps because teachers in these subjects lack the support and the collective experience which the fuller integration of ICT use into schemes of work provided for many of their Mathematics colleagues. Experienced teachers who are used to other approaches and tools can feel uneasy about using ICT in the classroom, even though many possess technical skills. Evidence of working with teacher over a period of years in both the initial teacher education (ITE) and continuing professional development (CPD) fields would suggest a number of issues for discussion. Teachers have experienced severe pressure in recent years as a result of imposed external influences: ongoing curriculum innovation, innovation overload, and professional denigration by politicians and media deteriorating conditions of service (Mc Carney, 2004).

Research has found that males, younger teachers, teachers with less teaching experience and secondary school teachers are more likely to have higher levels of ICT competence (Jegade & Adelodun, 2003). According to Jegede (2009) computer aided instruction happens to be one of the most required skills for a classroom practitioner but is the least possessed by teachers. This is because it is hardly been part of the training content. Yusuf (2005) found that most teachers in Nigeria do not have the needed experience and competence in the use of computers either for educational or professional

purposes, neither do they have the needed competence in basic computer operations, skills and knowledge in the use of common computer software.

However, some research reported that teacher's experience in teaching did not influence their use of computer technology in teaching (Niederhauser & Stoddard, 2001). Most research showed that teaching experience influences the successful use of ICT in classrooms (Wong & Li, 2008). Giordano, 2007. Hernandez-Ramos, 2005). Gorder (2008) reported that teacher experience is significantly correlated with the actual use of technology. In her study, she revealed that effective use of computer was related to technological comfort levels and the liberty to shape instruction to teacher-perceived student needs. Also, Baek, Jong & Kim (2008) claimed that experienced teachers are less ready to integrate ICT into their teaching.

Similarly, in United States, the (U.S National Centre for Education Statistics, 2000) reported that teachers with less experience in teaching were more likely to integrate computers in their teaching than teachers with more experience in teaching. According to the report, teachers with up to three years teaching experience reported spending 48% of their time utilizing computers, teachers with teaching experience between 4-9 years, spend 45% of their time, and finally teachers with more than 20 years teaching experience utilize computer 33% of their time. The reason to this disparity may be that fresh teachers are more experience in the use of technology in teaching.

Moreso , Lau & Sim (2008) conducted a study on the extent of ICT adoption among 250 secondary school teachers in Malaysia. Their findings revealed that older teachers frequently use computer technology in the classroom more than the younger teachers. The major reason could be that the older teachers having experience in teaching,

classroom management and also competent in the use of computers can easily integrate ICT into their teaching. The result is in agreement with Russell, Bebell, O' Dwyer, & O' Connor, (2003) who found that new teachers who were highly skilled with technology more than older teachers did not incorporate ICT in their teaching. The researchers cited two reasons: new teachers focus could be on how to use ICT instead of how to incorporate ICT in their teaching. Secondly new teachers could experience some challenges in their first few years of teaching and spend most of their time in familiarizing themselves with school's curriculum and classroom management.

More so, in a survey of almost 3,000 teachers, Russell, O' Dwyer, Bebell and Tao (2007) argued that the quality of ICT integration was related to the years of teachers' service. However, Granger, Morbey, Lotherington, Owston and Wideman (2002) conducted a qualitative survey on factors contributing to teacher's successful implementation of ICT in Canada. They interviewed 60 respondents from 12 schools. The findings found no relationship between teachers teaching experience and experience in the use of ICT implying that teachers ICT skill and successful implementation is complex and not a clear production of ICT integration.

Teachers Use of ICT for instruction in Universal Basic Education Based on Training

It is obvious that pre-service education plays an important role in shaping teachers use of ICT in the classroom (Gao, Choy, Wong & Wu (2009); Lim, Chai & Churchill (2010). Literature to date has reported that pre-service teachers who have acquired higher level of technological skills are more willing to use technology in classroom (Paraskeva, Bouta & Papagianna, 2008). It has also been reported that pre-service teachers who

received ICT training possess a sense of self-efficacy with respect to computer use (Lee, Chai, Teo & Chen (2008). Despite these positive reports, many gaps exist in the design and implementation of pre-service ICT integration course (Hnaydn & Barton, 2007). Researchers have lamented that many pre-service teachers are not adequately prepared to use ICT in classrooms (Kay, 2006). Preparing pre-service teacher for ICT integration is a complex job given the fast changing nature of ICT and the multiple sources of knowledge which need to be synthesized. The effectiveness of pre-service education for ICT is also influenced by a host of contextual factors such as university instructors' use of ICT, school readiness, and mentor teachers attitude and so on. (Lim, Chai & Churchill 2010).

However, preparing pre-service teachers for ICT integration is that many pre-service teachers do not have enough exposure to pedagogical use of ICT (Lim, Chai & Churchill 2010). Many teacher education institutes offers only one technology course for teacher preparation which may focus on ICT skills (Mishra, Koehler & Kerelunk (2009).

Nevertheless, teaching ICT skills alone does not adequately prepare pre-service teacher to integrate ICT (Lawless & Pellegrino, 2007). Such recognition has promoted many pre-service ICT course to be designed as integrated courses where content teaching and/or method courses are part of the curriculum (Angeli & Vaamdes 2009).

In terms of ICT and teacher development, the National Policy of Teacher Education (FME, 2007) developed a vision to produce quality highly skilled knowledgeable and creative teachers based on explicit performance standards through pre-service and in-service programme to raise a generation of students who can compete globally (p.6). The goal is to ensure teachers are trained and recruited to teach world-class standard and continue to develop their competence over their entire career (p.6).

ICT was identified as one of the conditions for the achievement of the goal, as ‘the training of teachers on strategies of collaboration, reflection on enforcement of ICT practices and action research (P.5)

One finding of Pelgrum’s (2001) study was that there were not enough training opportunities for pre-service and in-service teachers in the use of ICTs in a classroom environment. Beggs (2000) found that one of the top three barriers to in-service teachers’ use of ICT in teaching students was the lack of training. Recent research in Turkey found that the main problem with the implementation of new ICT in science was the insufficient amount of in-service training programme for science teachers. (Ozden, 2007) and Toprokcı (2006) concluded that limited teacher training in the use of ICT in Turkish school is an obstacle.

According to Becta (2004), the issue of training is certainly complex because it is important to consider several components to ensure the effectiveness of the training. These were time for training, pedagogical training, skill training and an ICT use in initial teacher training. Providing pedagogical training for teachers, rather than simply training them to use ICT tools, which is an important issue (Betta 2004). Cox, Preston & Cox (1999) argued that if pre-service and in-service teachers are to be convinced of the value of using ICT in their teaching, their training should focus on the pedagogical issues. The result of the research by Cox et al (1999) showed that after pre-service and in-service teachers had attained professional development courses in ICT, they still do not know how to use ICT in their classrooms; instead they just know how to run a computer and set up a printer. They explained that this is because the courses only focused on teachers acquiring basic ICT skills and not to teach teachers how to develop the pedagogical

aspect of ICT. According to Newhouse (2002), some initial training is needed for pre-service and in-service teachers to develop appropriate skills, knowledge and attitude regarding the effective use of computers to support learning by their students. It is noted that in-service teachers are not well equipped to teach using ICT. Because of the nature of exposure to ICT, most in-service teachers operate even below the emerging level. This view is in agreement with Adeosun & Maduekwe (2008) that Nigeria pre-service and in-service teachers possess lower level skills in use of ICT. This includes very basic knowledge of computer (low ability to use a computer operating system including basic hardware and the little understanding of basic technology and concepts). Majority of subjects acquired internet/computer skills rather informally, i.e. through self efforts by computer training courses which are self paid, or crash programme often organized by non- governmental organizations (NGOs), corporations and development partners, and sometimes, reliance on friends/relatives. The finding supported Yusuf's study (2005), where he observed that the existing curriculum designed for the training of pre-service teachers in Nigeria does not include the practical usage of ICT materials such as computers and their software, overhead projectors e.t.c. Even when it is included, it is only based on theoretical paradigms. Student teachers hardly come in contact with ICT instructional materials, including those who are running programmes in educational technology. This could be attributed to a number of factors, mostly the lack of training in the use of ICT, as well as the nature of training of some teachers. In a study of primary school teachers' use of ICT, Okafor & Edet (2008) revealed that 99% of sampled teachers were yearning for in-service training that would enhance their teaching

competence and the achievement of the objectives of ICT use in the curriculum of the UBE programmed.

In logistical terms, it is generally much easier to begin with the provision of infrastructure (computers and internet access) in teacher training colleges, most of which already have electricity, than it is to provide such access which scattered more widely across a country. Furthermore, most pre-service trainee teacher are also young, and more open to the use of new technologies than are many, but by no means all older teachers. Computers and the internet can be used in a wealth of ways to enhance teacher education as part of a blended programme for the use of ICT across the pre-service curriculum (Tezci, 2011). Considering both activities that can be undertaken within the colleges, and at a distance and drawing on established example of good practice elsewhere on the world (for examples, UNESCO, 2011; Yates and Bradley, 2000; Smoekh and Davis, 1997) the following are some of the ways in which such technologies can be used in African context:

i. Within African Teacher Training Colleges

- Acquisition of basic ICT skills
- Self paced learning through access to resources on servers, CDs, or where available, on-line.
- Group discussion of audio and video training materials available videos, CDs, DVDs or even on-line.
- Filing of practice teaching sessions, followed by individual review and group discussion (as is currently taking place in some parts of rural China).
- Training in use of Educational Management Information Systems (EMIS).

- At a more advanced level, training in the development of Learning Management system (LMS) and Content Management Systems (CMS)
- Group development of learning resources shared collectively.
- Formative and summative assessment, which can also be undertaken at own pace.
- Introduction to the use of ICT in support of young people with disabilities in the classroom.

ii **At a distance during Teaching Practice**

- Use of e-mails to share lesson plans, information, ideas and content with peers working elsewhere.
- Use internet as a personal support mechanism for people working in rural and isolated areas, enabling them to retain contact with communities and activities in their home regions. While e-mail is not yet widely available in Africa, particularly in rural areas, many towns across the continent are now beginning to gain increasingly reliable internet connectivity, and teachers are often to be found in the growing number of internet cafes that have blossomed. Mobile telephone may also well have potentials for teacher learning in Africa.

The use of new ICT to support blended solution to in-service training needs can best be seen as a contribution of the existing use of distance based methods of support to teachers, with elements of the use of ICT discussed above in the context of pre-service training. In-service delivery training for teachers varies considerably across Africa. (see for example Lewin and Stuart, 2003), and it is important that any attempts to use new ICT in support thereof should build on local practices and experiences. However, the following uses of multimedia computers and the internet can be envisaged as being

particularly important in the delivery of African in-service teacher training programme in the future;

- Provision of in-service training resources in digital format at relevant centers, e.g. teacher training colleges, secondary schools, or district education offices;
- Use of self-testing, both formative and summative
- Use of multimedia (video and audio) in discussions of classroom practice, both individually and in groups.
- Tutorial feedback and support at a distance
- Peer sharing of lesson plans, content and experiences through web-based or e-mail.

In education and in-service training, teachers have to become aware of the interaction between pedagogical objectives and the potential of ICT to support them. Individualized teaching and learning means preparing learning environments, monitoring individual learning processes and assessing a group's learning outcomes. This tasks required in-depth teacher training, pre-service as well as in-service.

Lau and Sim (2008) established that teachers needed training which should be offered on a continuous, rather than a one-off basis so that their IT knowledge is upgraded over time. It is indeed hoped that their benefits from the use of ICT can be fully realized and optimized in teaching. Mechanisms need to be put in place to ensure that teachers utilize computer technology for further development and communication, and training needs to be designed to increase teacher's familiarity with a wider range of ICT applications.

Teachers' use of ICT for instruction in Universal Basic Education (UBE) Based on Gender.

Researcher's and academic's conceptualization of Gender (Male and Female) teachers' pedagogy has changed in recent developments in our understanding of cognition and meta-cognition (Walkins & Mortimore, 1997). Many writers have also suggested that developments in ICT provide every different learning opportunity, and a need to design a new integrated male and female teacher's pedagogy which has been identified (Cornu, 1995). For example, Mcloughlun and Oliver (1999) define pedagogical roles for male and female teachers in a technological-supported classroom as including setting joint tasks, rotating roles, promoting students self management, supporting meta-cognition, fostering multiple perspectives and scaffolding learning. An assumption here is that the use of ICT is changing the pedagogical roles of male and female teachers, and a compelling rationale for using ICT in schools is its potential to act as a catalyst in transforming the teaching and learning process (Hawkridge, 1990). The processes described by (Shulman, 1987) would be necessary but the decisions and outcomes from those processes may be different as male and female teachers' knowledge, beliefs and values change in line with affordances provided by new technologies. A dynamic model for such transforming male and female teacher pedagogy for ICT was derived from the palm project (Somekh & Davis, 1991). The authors identified male and female pedagogical change as the following type of progress;

- * From a view of teaching and learning as discrete, complimentary activities to an understanding that teaching and learning are independent aspects of a single activity.

- * From a sequential to an organic structuring of learning experiences from individualized communicative learning from a view of the teachers rules as an organizer of learning activities to one as shaper of quality learning experiences.
- * From a preoccupation with fitting teaching to a group, to knowledge that teaching needs to be suited to individuals, which call for continual self monitoring to ensure sensitivity to unintended forms of bias and discrimination.
- * From a view of the learning context as confined to the classroom and controlled by the teachers to one of the learning context as a supportive, interactive, whole school culture.
- * From a view of technology as either a tutor or a tool to one where it is part of a complex of interactions with learners, sometimes providing ideas, sometime providing a resource for inquiry and sometime supporting creativity.

Moseley, Higgins, Brameld, Newton & Tymms (1999), in a study of primary school teachers, observed that in achieving either average or above average, gains on measures of relative attainment by pupils who focused on male and female teachers pedagogy using ICT. They found a very complex picture that was difficult to characterize effective teachers using ICT in teaching. The project explained link between teachers' thinking about their teaching behaviours' or actions in the classroom and pupil's learning gains (Castro, Aleman; 2011).

The work indicated that a key feature of the more effective teachers was their use of effective explanations. Observations showed that these teachers use examples and counter-example and involved pupils in explaining and modeling to the class. Teachers who favoured ICT were likely to have well-developed ICT skills and see ICT as an

important tool for learning and instruction. They were also likely to value collaborative working, enquiry and decision making by pupils.

The organization for economic development and corporation (OECD), (2010) presented an overview of the difference between men and women in ICT related employment, ICT education and training. The result indicates that the gender gap with regard to ICT continues. There are significant differences between woman and man in ICT-related employment, with woman having low shares of employment in ICT specialist occupations (for example, software engineers, IT specialist). Among the most intensive users of ICT, women are most heavily represented in office and Secretarial occupations rather than professional ones. In addition, according to the results the differences are also a reflection of educational patterns, with woman tending not to go into ICT education to the same as men. Moreover, as indicated by the results, in terms of ICT access across the whole population, differences are significantly lower. But women tend to have lower access to ICTs (Pcs and the internet) overall and these gaps are heightened amongst older age groups. In regard to actual use of ICT, the OECD findings demonstrate that woman and man tend to use their access differently. Similarly, in a research study conducted by Yuhkymenk and Brown (2009) in Ukraine, the result indicated that male teachers had significant greater access to a computer at home than female teachers and male teachers often have more access to internet than female teachers do. This finding is more in line with the finding of OECD (2010). More so, research study conducted by Caves, Cavas, Karaoglan & Kislal (2009) indicates that the attitudes of females and male science teachers in Turkey do not differ in terms of gender.

Heemskerk and Kiuper (2005) as cited in Markauskaite (2006) reported that males are intensive users of the internet because they believe that they possess the ability to accomplish with machines. Hayen (1999) as cited in Olalere (2005) also noted that a large number of male teachers are not seriously concerned about the integration of ICT into instructional process. In fact, the crop of teachers in most schools lack the required knowledge, techniques and professional capabilities to harness computer technology into teaching and learning (Babalola, Ibitoye & Efunbajo, 2002).

Barrier and Margavio's study (1992) showed that male teachers' attitude towards computer was more negative than that of females' teachers. Surprisingly; Yildirim's study (2010) investigated 120 pre-service teachers attitude towards computer showed no gender differences in attitude towards computer. Kay (1990) has stated that gender-related studies have produced conflicting results. Thus understanding gender-based attitudinal difference is likely to have an important implication.

Gender differences and use of ICT have been reported in several studies. However, studies concerning teacher's gender and ICT use have cited female teachers; low level of computer use due to their limited technology access, skill, and interested (Volman & Van Eck, 2001). Research studies revealed that male teachers used more ICT in their teaching and learning processes than their female counterparts (Kay, 2006; Wozney, Venkatesh & Abrami, 2006). Similarly, Markauskaite (2006), investigated gender differences in self reported ICT experience and ICT literacy among first year graduate trainee teachers. The study revealed significant differences between males and females in technical ICT capabilities, and situational and longitudinal sustainability. Males' scores were higher. Jamieson-Proctor, Burnett, Finger and Watson (2006)

conducted a study on teachers' integration of ICT in school in Queensland State. Result from 929 teachers indicated that female teachers were integrating technology into their teaching less than the male teachers. But the situation was different in Mid-western US basic schools where Breisser (2006) found that females self-perception about technology competence improved while male's self-perceptions about technological dominance remained unchanged in a log-log project. The study was in agreement with (Adams, 2002) that female teachers applied ICT more than the male teachers. This study confirms report by Yukselturk and Bulut (2009) that gender gap has reduced over the past years, presently, a greater number of females than males have used internet and web 2.0 technologies.

Kay (2006), found that male teachers had relatively higher level of computer attitude and ability before computer implementation, but there was difference between males and females regarding computer attitude and ability after the implementation of the technology. He claims that quality preparation on technology can help lessen gender inequalities.

Teacher's Use of ICT for instruction in Universal Basic Education Based on Age

Teachers irrespective of their ages are implored to adopt and integrate ICT into teaching and learning activities, but teachers' preparedness to integrate ICT into teaching determines the effectiveness of the technology and by its sheer existence in the classroom (Jones, 2001). The teachers' age towards technology greatly influences their adoption and integration of computers into their teaching. In a study by Jennings & Onwuegbuzie (2001), teachers of young age were found to be associated with more positive attitude towards ICT. This is in agreement with the report by the U.S National Center for

Education Statistics (2000) which indicates that young teachers score higher on their perception of ICT, and have translated their positive perception into higher degree of ICT use in education. Thus it was hypothesized that teachers of young age make more use of ICT.

Lloyd & Gressard (1984), have claimed that age is the most significant determinant of attitude towards computers. Comber, Colley, Hargreaves & Dorn (1997) found that young age teachers tend to have a more positive attitude and more experience in using computer . Therefore, in studies of computer use by school teachers, the teachers' seniority, which directly correlates with age, become a significant factor. Russell, Bebell, O'Dwyer & O'Conner (2003), showed that young teachers had in general a higher level of comfort with technology usage than the old teachers. Venkatesh & Morris (2000), investigated about age differences in the overlook context of individual adaptation and sustained usage of technology in the school setting /system using the Theory of Planned Behavior. They studied on user reactions and technology usage behavior over a 5-month's period among 355 secondary school teachers being introduced to a new software technology application .The results showed that the decisions of old age teachers and young age teachers were more strongly influenced by their attitude towards using ICT. These groups of teachers adopt very different decision processes in evaluating new technologies. Albirini (2006), found that age was not a significant factor in relation to teachers attitudes towards ICT use. However, it was revealed in a study that age correlated negatively with the Jordanian ELF teachers' attitudes towards ICT use in Jordan ($r = -.13, p < .01$).This result demonstrated that as age of teachers decreased , their attitudes towards ICT increased. This finding confirms the results of Roberts,

Hutchinson & Little's study (2003), that the probability that teachers would use ICT in the classroom was limited by the reality that teachers who were educated 20 years ago were trained by people who themselves were trained before the arrival of computers in schools. Lau & Sim (2008), conducted a study on the extent of ICT adoption among 250 secondary school teachers in Malaysia. Their findings revealed that older teachers frequently use computer technology in the classrooms more than the young teachers.

Research results in some developed nations revealed narrowing gaps across age groups in ICT related behaviours. For example, Help guide (2004) found that older American teachers are exhibiting better computer behaviour than in the former years. This position finds support in Luchatta (2000) but narrowing gap across age group in ICT related behaviour is not a global trend, for example, examining Norway's situation, Hernes, Hestman & Haeland (2000) observed that share of teachers who state that they have a good command of the use of the internet is negatively correlated with age. About 77% of the teachers who are 25 years or younger stated that they have a good command of the use of internet, compared to 35% of the teachers who are 56 years or older. Also around 63% of teachers who are of 25 years or younger versus only 32% of the teachers who are 56 years or older have a positive attitude towards the use of the internet in their own teaching. This is also consistent with the findings of Liang & Chao (2002), as they obtained that Taiwan younger teachers were more literate on internet.

A different approach entirely was that of Williams, Wilson, Richardson, Tuson and Coles (2000) as they compared age and ICT attitude of teachers across primary and secondary schools in Scotland. On secondary school teachers, clear attitudinal difference was not found across age groups. But amongst primary school teachers, it appears that

rather more of the older teachers have a relatively negative attitude towards ICT.

However, it was also revealed that age affects the use of ICT in the classroom by the Canadian teachers (Lam, 2000).

Teachers' Use of ICT for instruction in Universal Basic Education Based on Type of schools

ICT integration in single and mixed schools are needed in order to accomplish many objectives and improve the quality of lessons in all subject areas. ICT increasingly pervades various aspect of our daily lives works, business, teaching – learning, leisure and health. Since ICT leads all processes based on information, every individual in a society should be competent. Thus all single and mixed schools have to be equipped with the necessary ICT in order to provide the next generations with the needed tools and resources for access and use in order to attain the expected skills.

Norris, Sullivan & Poirot (2003) pointed out the importance of accessibility as teachers' use of technology for curricula purposes is almost exclusively a function of their access to that technology. Merely providing single sex and mixed schools with hardware, software and in-service training is not enough. Any in- service training needs follow –up support, peer coaching and peer dialogue to ensure successful utilization of new technology .There must be active involvement of teachers concerned in the whole change process so that there is the element of ownership of the innovation.

Filling the single sex and mixed schools with the necessary ICT facilities neither improves the quality of instruction nor creates more effective learning environments. However, embracing a broader vision and philosophy, single sex and mixed schools should revise present teaching programme, practices and resources where ICT should be

integrated into all levels of an educational system from classrooms to ministries for use in management, teaching and learning activities. Teachers must receive adequate ongoing training, technology use that must match the curriculum's philosophy, theory of learning and adequate numbers of computers that must be conveniently located within the classroom (Al- Bataineh & Brooks (2008).

In addition, Bauer & Kenton (2005) carried out a study about technology integration in single sex and mixed schools. They used a qualitative study to examine the classroom practice of 30 teachers who used computer technology in their instruction. They found that the teachers were highly educated and skilled with technology, innovative and adapt at over- coming obstacles, but they did not integrate technology on a consistent basis as both teaching and learning tool .They stated two reasons regarding these findings: Students did not have enough time at computers and teachers needed extra planning time for technology lessons. Other concerns were out- dated hardware, lack of appropriate software, technical difficulties and students' skill levels. More so, the crops of teachers in mixed schools lack the required knowledge, techniques and professional capabilities to harness technology into teaching and learning (Babalola, Ibitoye & Efunbajo, 2002).

Benchmarks for information and Communication Technology in Teacher Education.

The benchmarks for teacher education programme on the pedagogical use of ICT. The first four benchmarks concern the “what” of teacher education programme; the last two concern the “how”.

Bench mark 1 - Personal ICT Competencies

A prerequisite for using ICT as a pedagogical tool is that the teachers themselves can use ICT as a work tool (e.g., posting course materials in an electronic learning environment), a communication tool (to liaise between schools, parents, local community, and beyond) and an administration tool (Thomas and Knezek, 2008). Teacher education programs, pre -service or in-service, should thus facilitate teachers to become competent personal users of ICT. Minimally, present-day teachers require basic competencies with:

- Office Applications – word processing, Spreadsheets, database, drawing packages, and simple web page editor.
- Resource tools – CD -ROMs, internet, web-portals, different types of search engines.
- Communication tools – email, discussion lists and synchronous chat.

Further, these programs should develop the learner’s ability to use ICT effectively for:

- Communicating between and within students groups;
- Communicating with other teachers;
- Lifelong learning, including self assessment of learning and teaching needs.

Some countries have introduced an “ICT driving License” for these competencies (e.g, Turcsanyi – Szabo, 2008).

Bench mark 2 - ICT as a Mind Tool

Programs should train teachers and students teachers to be able to use ICT as mind tools to represent what they know as they transform information into knowledge

and to engage in and facilitates critical thinking and higher order learning (Van den Berg et al 2008). Minimally, teachers should develop basic competencies to use mind tools for ordering their own thought (e.g. through concept mapping) and those from colleagues and modeling their own environment for optional teaching.

Bench Mark 3 - Social Aspects of ICT use in Education

ICT is having a profound effect on society (Thomas and Knezek, 2008). As a socio-cultural phenomenon, ICT changes leaderships and roles in organizations (Szenwczak and Snodgrass, 2002), as well as teachers roles in schools. It creates opportunities for collaborative knowledge production and problem solving, breaking earlier limits of time, distances and possession of knowledge. At the same time, it also creates new social dysfunctions, such as problems of privacy, escapism or anonymity, lack of commitment and false role images. Pre-service and in-services teachers' education must face. It is important that teachers and student educators:

- Engage as members of a (wired) school community;
- Provide a role model of good ICT practice;
- learn to share and build knowledge;
- Understand the implication of the information age on schools and schooling;
- realize and discuss the impact of ICT on society.

Bench Mark 4 - Adopting ICT in Teaching

Pre-service and in-services teachers' education and professional development programs should prepare teachers to use ICT in different educational setting. In other words not adapting teaching to ICT, but adopting ICT in their teaching. According to Cuban (1993), teachers tend to appropriate new technologies and incorporate them into

their traditionally held views of teaching and learning. He argues that the overhead projector and video made very little impact on teaching styles and so why should computers be any different? Computers, however, are substantially different from previous technologies because they give students access to new ways of thinking through dynamic images, no simulations and models, and a huge array of worth wide and worthless – information. Teachers must find ways of harnessing the power of the new technology. Their jobs would change but their role should become no less important in the same way that the public libraries and books did not make teachers redundant.

There is also a growing, or possibly a renewed, interest in resource-based learning, (Hill and Hannafin, 2001) that aims at achieving both subject and information literacy objectives through exposure to and practice with diverse resources .Students becomes active learners as they use a wide range of resources in different media formats to investigate subject matter prescribed within their classroom curriculum. Teachers become motivators and facilitators in learning processes and provide the initial impetus that drives students to seek information and become creative problem – solvers. The end result is that a “learning culture” is fostered as a climate of active and productive learning. Such an approach is flexible and emphasizes complex skills important for the digital age, such as problem solving and critical thinking.

A note of caution needs to be made that teaching teachers to use ICT outside of meaningful educational contexts must be avoided. This means that aspiring teachers will not only come to know the theory behind why and how to use ICT, but will also develop competencies in;

- Planning for relevant individual, group and whole-class activities.

- Preparing and producing learning materials with the help of ICT.
- Dealing with the possibilities and consequences of using ICT.
- Teaching and learning specialist subjects with ICT and team teaching in situ or at a distance.

Bench Mark 5 - Cooperative Education: Combining Institutional Learning and Learning in the workplace.

Education related theories are introduced to aspirant teachers during their formal pre-service education and professional development, most beginning teachers agree that they actually learnt during practice teaching period. Teacher education institution and schools need to make a transition towards becoming modern knowledge organizations and place a premium on knowledge development and knowledge management. Learning is more than knowledge acquisition. It is an integral process of thinking, producing, communicating, cooperating, and designing by learners, coaching, structuring, assisting, giving feedbacks and teaching by teachers and support staff (Van den Dool and Kirschner, 2003).

Hall et al. (2006), after analyzing professional development projects in the preparing tomorrow's teachers for technology (PT3) grant programme; concluded that success depends on the quality of leadership, administrative support from departments and colleges, available resources and personnel time of learning and faculty's understanding of the relevance proposed changes. It is thus, important for institutions to explicitly specify the competencies it wants its staff members to achieve or possess and to check whether they have been acquired or are present. Feedback (both peer and expert) must also be facilitated. Supervision, reflection and co-operation within the schools can

positively influences teachers beliefs and actions, but these activities are time consuming (Grossman, 2006). Thus, time must be explicit allocated for reflection, monitoring and evaluation of the teachers' personal and professional development in the use of ICT in their teaching.

Bench Mark 6 - Embedding learning about ICT in other content Domains of Teachers Education

Teachers Education programs are usually structured around discipline and courses such as educational psychology, foundations of education, teaching methods, linguistics and unfortunately – multimedia and ICT. Such structure promotes compartmentalization of what is experienced and learned and this inhibits student teachers from integrating insights from different disciplines for solution of practical problems (Merrienboer and Kirschner, 2007). Teachers who learn technology-skills in isolation from methods course may be competent in using technology but unable to use their technology skills to foster student learning (Mims et al., 2006).

A holistic approach can help teachers to deal with complexities that are often encountered in teaching without losing sight of the separate disciplinary elements and the interconnections between them. It allows for the integration of knowledge, skills and attitudes; the coordination of qualitatively different constituent skills and the transfer of what is learned in the taught courses to daily life and work settings.

Empirical Studies on Teachers Use of ICT in Teaching

All over the world, different countries have consistently initiated programs that are directed in making teachers to use ICT in their day to day teaching and learning practices in schools. Jimoyiannis & Komis (2007) noted that countries like UK,

Singapore, China, Australia. European Union (EU), etc. have established programs that aim at enhancing teachers' skills and the importance in using ICT during teaching and learning processes.

A survey by Kandiri (2012) on ICT use in Kenya secondary schools shows that of 2250 ICT teachers that graduated from Universities and other tertiary institutions in 2010, 1350 were absorbed in industrial and ICT service sectors and 900 went to teach ICT in various educational institutions. However, those in teaching service, 189 were in technical institutions and 711 were in secondary schools. This displays a relatively small number of qualified ICT teachers in Kenya schools.

A report by Ministry of Higher Education Science and Technology (Gok, 2010) on secondary school teachers' use of ICT also indicated the number of teachers skilled in ICT in secondary schools were low. The study revealed that out of the number available, few had ICT training effective in use of the use of technology in classroom. Out of 232 teachers in the sample, majority (57%) were reported to have trained at certificate level on basic computer skills, 73% were report to have acquired ICT training through in-service course and 43% were trained by private computer colleges.

Another study by Ayere, Odera & Agak (2010) on e-learning in secondary schools in Kenya, reported that number of teachers in schools had not received any training in ICT use during the formative years at teacher training institutions before joining the profession. 55% of the sampled teachers stated that they did not receive any ICT training at all. However, the study found that 51% of the teachers had taken self-initiative to undertake ICT training during the last three years they had been employed.

Drent & Meeslissen (2008) conducted a study about factors which influence the innovative use of ICT by teacher educators in the Netherlands. A sample of 210 teachers was used for the study. Their study revealed that student – oriented pedagogical approach, positive attitude towards computers, computer experience, and personal entrepreneurship of the teacher educator have a direct positive influence on the innovative use of ICT by the teacher .Further study by Simonson (2008) revealed that teachers’ skills, perception and attitudes were related to their use of ICT in teaching and learning. The more skilled teachers were in ICT, the more likely they were to use it in classroom.

Appraisal of Reviewed literature

This chapter reviewed theoretical and empirical works of some researchers on evaluation of teachers’ use of ICT in teaching at basic education level. Evaluation is an integral part of all aspects of the educational process with the purpose of improving instruction and students learning. Evaluation studies and reports showed that multimedia rooms and computer laboratories are rarely used by teachers and administrators do not encourage or support teachers and students to use them to enhance their teaching and learning.

ICT as a discipline refers to ICT as a subject in the curriculum that serve as instructional resources which encompasses a wide range of technologies including telephones, fax machines, televisions, video, audio recorders, CD players, CD-ROMS, personal organizers, programmable and remote – operated toys radios, computers and laptops.

There are two main theories that were used in explaining the rationale behind ICT use by teachers in teaching at basic education level which are behaviourist theory and social cultural theory of learning. Behaviourist theory sees human behaviour as the product of stimulus and organisms variables. While social cultural theory of learning claims that all human action is mediated by tools.

A review of teachers' use of ICT in teaching at basic education level and empirical studies based on location, qualification, experience, training, gender, and type of schools, age and benchmarks for ICT teacher education was carried out. The reviewed literature indicated that male, younger teachers, teachers with less teaching experienced in secondary schools are more likely to have higher levels of ICT competence.

The reviewed literature showed that most teachers do not have the needed experience and competence in basic computer operations skills and knowledge in the use of common computer software. Thus there was dearth in literature on evaluation of teachers' use of ICT in teaching at basic education level in south south Nigeria. This is gap this has filled.

CHAPTER THREE

RESEARCH METHOD AND PROCEDURE

This chapter deals with the steps taken in carrying out the study. The steps would be discussed under the following sub headings:

- Research Design
- Population of the study
- Sample and sampling technique
- Research instrument
- Validity of the research instrument
- Reliability of the research instrument
- Method of Data collection
- Method of Data Analysis

Research Design

The researcher employed expost-facto research design. In this design, the researcher had no control over the variables of interest and therefore cannot manipulate them because the situation for the study already exists or has already taken place. The variables considered include; location, qualification ,experience, training, gender ,type of school and age of teachers' as the independent variables while the dependent variable is ICT use. Therefore, this research design, evaluate teachers' use of information and communication technology in teaching at basic education level in three states of South South Nigeria (Delta, Edo and Rivers States).

Population of the Study

The target population of the study cut across three states out of the six states in South South Nigeria which consists of 21,617 teachers in basic secondary schools in the three states (Delta 11,754, Edo 5663 and Rivers 4200) drawn from the 56 local Government Areas from these three states. These includes; 25 local Government Areas in Delta State with 362 public secondary schools, 18 local Government Areas in Edo State with 517 public secondary schools and 23 Local Government Areas in Rivers State with 360 public secondary schools as presented in table 1 (a). See Appendix 1

Sample and Sampling Techniques

The sample of this study consists of 1014 respondents representing 20% from three local Government areas each in a state which gives a total number of nine local Government areas of the three States and 25% sampled of schools also from the three local Government areas each in a state which also gives a total number of nine local government Areas of the three states by means of stratified and multi-stage sampling techniques. This was first done by dividing the three States into their various senatorial Districts. The multi-stage sampling technique was adopted to select the sample for the study. In this stage, one local government area was drawn from each senatorial district in Delta, Edo and Rivers States. This gave rise to Oshimili South, Ughelli North and Warri South in Delta State, Oredo, Ovia North East and Etsako West in Edo State and Ahoada West, Okirika and Port Harcourt in Rivers States . The rationale for the selection of local government areas was the Federal government plan in building e-learning programme in schools all over the states. See Table 2, appendix 1.

Research Instrument

The instrument used in this study was a questionnaire titled “Evaluation of Teachers use of Information and Communication Technology” in Teaching at Basic Education Level (ETUICTTBEL) in South South Nigeria”.

The instrument was made up of two sections. Section A consists of the bio data information of the respondents such as, age, sex, qualification, years of teaching experience and training, while section B initially consisted of 60 items which were subjected to factor analysis and 40 items were selected under the following sub-headings: Personal ICT Competence; ICT as a Mind tools; Social Aspects of ICT use in Education; Adopting ICT in Teaching; Cooperative ICT in Education and Embedding Learning about ICT in teaching are designed to find out the view of teachers who are the respondents. Five (5) points scale of very often (5 points), often (4 points), sometimes (3 points), very little (2 points) and Not at all (1 point) was used to score the responses in the instrument. For forty items scale, using a response scale from 1- 5, the minimum value would be 40 and the maximum value would be 200. If a person answered 1 to every item, that overall score would be $40 \times 1 = 40$. If a person answered 5 to each item, the score would be $40 \times 5 = 200$. The scores the respondents obtained were then converted to 100% which were use for testing of the hypotheses. See Appendix 2.

Validity of the Instrument

The instrument was given to the researcher supervisors and two other experts in Measurement and Evaluation in the Faculty of Education, Delta State University, Abraka for the purpose of correction. Some of the items were modified to reflect the view of teachers on the use of ICT in Basic Education. The face validity of the instrument was

considered adequate by expert judgment. For content and construct validity of the instrument factor analysis was used. The principal component analysis was used to estimate the content validity. Using the extraction method, the total cumulative variance was obtained as expressing the content validity of the instrument.

As shown in appendix 3, the content validity of Evaluation of Teachers use of Information and Communication Technology” in Teaching at Basic Education Level (ETUICCTBEL) was estimated for each of the five components. The first and second columns contain the number of factors and the total number of items.. These values indicated the percentage or amount of contribution made to the ETUICCTBEL which explains total cumulative variance of 85.41%. This value is the content validity of the total number of items measuring the variable domain of evaluation of Teachers use of information and communication Technology in Teaching at Basic Education Level. This simply means that 40 items in the ETUICCTBEL has total item coverage of 85.41% and 14.59% are unexplained variance.

On the other hand, the construct validity was estimated by using the rotated factor loading matrixes. The Eigen values were used to select factors that genuinely measures similar construct. The items in the instrument that measures psychological traits had factor loading matrixes that ranged between 0.51 and 0.96. Therefore considering the high range of these rotated factor loading matrixes, it is concluded that the instrument (Evaluation of Teachers’ use of Information and Communication Technology in Teaching at Basic Education Level) was Construct valid.

Reliability of the Instrument

The reliability of the instrument was established by using Cronbach alpha for estimating the internal consistency of the instrument. This yielded an alpha of 0.88, $P \leq .05$ level of significance. For the Personal ICT Competence scale alpha = 0.94, $P \leq .05$ level of significance. ICT as a Mind tool scale alpha = 0.91, $P \leq .05$; Social Aspects of ICT use in Education scale alpha = 0.87, $P \leq .05$; Adopting ICT in Teaching scale alpha = 0.97, $P \leq .05$; Cooperative ICT in Education scale alpha = 0.73, $P \leq .05$ and Embedding learning about ICT scale alpha = 0.56 level of significance. In conclusion, there was good evidence from the above that the scales had good psychometric properties of reliability. See Appendix 4.

Method of Data Collection

The researcher visited the various secondary schools that were used in the study and administered the instrument to the teachers who are the respondents, with the aid of three research assistants from the three States, where the study was conducted. The researcher ensured that the teachers, who were used as respondents, responded to the instrument independently. The completed copies of the questionnaire were collected on the spot by the researcher and the research assistants.

Method of Data Analysis

Mean and standard deviation were used to answer the research questions. A mean of 3.00 was taken as the criterion level of acceptance / cut off mark / bench mark. That is a mean of 3.00 and above was taken as a high extent while a mean below 3.00 was taken as a low extent, while t-test statistics analysis was used to test the stated hypotheses at 0.05 level of significance.

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION

This chapter presents the analysis of data collected for the study according to the research questions and hypotheses. The research questions were answered with mean and standard deviation while the hypotheses were tested with t-test statistic at 0.05 level of significance.

Research Question 1

What is the extent of ICT use in teaching by teachers at basic education level in South South Nigeria?

Table 4.1: Mean and Standard deviation on the extent Teachers use ICT in teaching at basic education level.

S/N	Personal ICT Competencies	\bar{x}	SD	Decision
N = 1014				
1	I can use ICT tools resource for my classes	3.23	0.80	High
2	I can create effective students resources for my classes	3.54	0.67	High
3	I can access ICT resources from a number of education specific sources outside my school.	3.04	0.82	High
4	I ensure that ICT resources in my classroom are relevant to learning activities.	3.06	0.85	High
5	I share ICT resources that have created with other teachers within my school.	2.89	0.72	Low
6	I support other teachers within my schools to ensure relevant of ICT to learning activities.	2.83	0.87	Low
7	I ensure that all ICT resources in my school are easily accessible by staff.	2.78	1.00	Low
8	I actively promote the use of ICT resources within my schools for teaching-learning.	3.20	0.89	High
9	I promote the use of ICT resources beyond my school.	2.89	0.80	Low
	Total Grand Mean	3.05		
ICT as a Mind Tool				
10	I encourage students to use ICT in clarifying thoughts for the purposes of evaluation.	3.00	1.05	High
11	I support students to use ICT to demonstrate their understanding of concepts.	3.22	0.84	High
12	I encourage students to use ICT to process data for problem solving.	3.32	0.89	High
13	I support students to use ICT to improve digital literacy skills.	1.91	1.17	Low
14	Use of ICT to map a student's proffered learning style by identifying areas of improvement.	2.28	1.25	Low
15	Use ICT as instructional software to consolidate learning.	3.01	0.74	High
16	Use ICT as the advance features of search engines to research a topic.	2.78	0.86	Low
17	Use of graphic organizers to visualize teachers / students thinking processes.	3.16	0.72	High
18	Use ICT for instant messaging in communicating to the school.	2.69	1.15	Low
	Total Grand Mean	2.82		
Social Aspect of ICT Use in Education				
19	Use ICT to give information to other teachers about students' performance to support transitions between classes.	2.90	0.81	Low
20	Use ICT to access students' records for the purpose of reflecting on their previous year's performance.	3.02	1.00	High
21	Use ICT for reporting to parents.	3.00	0.73	High
22	Use ICT to capture evidence of student performance.	2.80	0.76	Low
23	Use ICT for student task, such as online test / assignment.	3.05	1.22	High
24	Use ICT to analyze assessment data finding to inform curriculum planning.	3.11	0.88	High
25	Use ICT to give feedback to students on their performance.	3.25	0.80	High
	Total Grand Mean	3.02		
Adopting ICT in Teaching				
26	Use of ICT influences my classroom combinations of students grouping for learning such as individuals.	2.81	0.96	Low
27	Use of ICT influences my classroom organization by providing a range of different activities within a lesson.	2.78	1.15	Low
28	Use of ICT influences my classroom organization by catering for different learning styles.	3.12	0.90	High
29	Use of ICT influences my classroom organization by providing personalized learning opportunities.	2.84	0.94	Low
Cooperative ICT in Education				
30	I undertake ICT professional learning to gain ICT skills that can be applied in my classroom in practical ways.	3.22	0.70	High
31	I ensure I keep up to date on new technologies for teaching-learning.	2.91	0.90	Low
32	I undertake ICT professional learning to lead the use of ICT to strengthen pedagogy practice within my schools.	3.24	0.77	High
33	I undertake ICT professional learning to gain skills that enable integration of ICT into planned learning activities.	3.12	0.92	High
	Total Grand Mean	3.12		
Embedding Learning about ICT				
34	I provide a secure ICT environment.	2.99	0.91	Low
35	I initiate discussion with teacher's on the use of ICT in schools.	3.39	0.73	High
36	I support students' access to ICT anytime / anywhere safe for learning.	2.99	0.91	Low
37	I promote the importance of safe practice in the use of ICT to my schools community.	3.11	0.68	High
38	I use ICT to support students to improve their ability in processing large quantities.	3.60	0.71	High
39	Use ICT to ensure that student manage their files to secure their content for efficient retrieval	1.81	1.24	Low
40	I work to ensure that all teachers / students in my school are aware of the policies required for safe use of ICT.	3.37	0.76	High
	Total Grand Mean	3.04		

Table 4.1, shows the extent the respondents agreed to items 1, 2, 3, 4, 8 on personal ICT competencies with a mean range of 3.04-3.54 and a grand mean of 3.05 which were within the criterion level of 3.00 and above as high extent of ICT use in teaching by teachers at basic education level in south south Nigeria. This implies that they sometimes: can use ICT tools resource for classes; can create effective students resources for classes; can access ICT resources from a number of education specific source outside schools ; ensure that ICT resources in classroom are relevant to learning activities ; and actively promote the use of ICT resources within schools for teaching - learning and items 5, 6, 7, and 9 with a mean range of 2.78- 2.89 on personal ICT competencies indicated low extent of the teachers' use of ICT in teaching.

In items 10, 11, 12, 15, and 17 with mean range of 3.00- 3. 32 on ICT as mind tools, the respondents agreed that they sometimes: encouraged students to use ICT in clarifying thoughts for the purpose of evaluation; support students to use ICT to demonstrate their understanding of concepts; encouraged students to use ICT to process data information for problem solving; use ICT as instructional software to consolidate learning; and use of graphic organizers to visualize teachers / students thinking process. While items 13, 14, 16, and 18 with a mean range of 1.91- 2.78 on ICT as mind tools revealed a low extent.

In social aspect of ICT use in education, the respondents agreed to items 20, 21, 23, 24 and 25 with a mean range of 3.00 -3.25 and grand mean of 3.02 which were within the criterion level of 3. 00 and above as high extent of ICT use in teaching by teachers at basic education level in south south Nigeria. This shows that they sometimes: use ICT to access students records for the purpose of reflecting on their previous year's performance; use ICT for reporting to parents; use ICT for students task, such as online test / assignment; use ICT to analyze assessment data finding to inform curriculum planning; and use ICT to give feedback to students on their performance. While items 19 with a mean of 2.90 on social aspect of ICT use in education confirmed low extents.

In item 28 with a mean range of 3.12 indicates a high extent in adopting ICT in teaching. The respondents agreed that they sometimes: use ICT to influence their classroom organization by catering for different learning styles. While items 26, 27, and 29 with a mean range of 2.78- 2.84 revealed a low extent.

In items 30, 32, 33 with a mean range of 3.12-3.24 and a grand mean of 3.12 revealed a high extent on cooperative ICT in education. The respondents agreed that they sometimes: undertake ICT professional learning to gain ICT skills that can be applied in classroom in practical ways; undertake ICT professional learning that strengthen pedagogy practice within schools; and undertake ICT professional learning to gain skills that enable integration of ICT into planned learning activities . While item 31 with a mean of 2.91 on cooperative ICT in education showed a low extent.

In embedding learning about ICT, the respondents agreed to items 35, 37, 38 and 40 with a mean range of 3.11- 3.60 and a grand mean of 3.04 which were above the criterion level of 3.00 and above as high extent. This indicated that they sometimes: initiate discussion with teacher's on the use of ICT in schools; promote the importance of safe practice in the use of ICT to schools community; use ICT to support students to improve their ability in processing large quantities; and work to ensure that all teachers / students in school are aware of the policies required for safe and use of ICT and items 34, 36 and 39 with a mean range of 1.81- 2.99 on embedding learning about ICT revealed a low extent.

Research Question 2

What is the extent on which urban and rural teachers' use ICT in teaching at basic education level South South Nigeria?

Table 4.2: Mean and Standard deviation of Urban and Rural Teachers on the extent of ICT use in teaching at basic education level.

S/N	Personal ICT Competencies	Urban N = 558			Rural N = 456		
		\bar{x}	SD	Decision	\bar{x}	SD	Decision
1	I can use ICT tool resource for my classes	2.99	0.83	Low	2.76	0.71	Low
2	I can create effective students resources for my classes	2.75	1.01	Low	2.56	1.06	Low
3	I can access ICT resources from a number of education specific sources outside my school.	3.22	0.72	High	3.27	0.77	High
4	I ensure that ICT resources in my classroom are relevant to learning activities.	3.20	0.87	High	3.16	0.82	High
5	I share ICT resources that I have created with other teachers within my school.	2.87	1.29	Low	2.74	1.46	Low
6	I support other teachers within my schools to ensure relevant of ICT to learning activities.	2.97	0.88	Low	2.88	0.92	Low
7	I ensure that all ICT resources in my school are easily accessible by staff.	2.95	0.80	Low	2.93	0.77	Low
8	I actively promote the use of ICT resources within my schools for teaching - learning.	3.14	0.83	High	2.99	0.82	Low
9	I promote the use of ICT resources beyond my school.	3.30	0.62	High	3.50	0.51	High
	Total Grand Mean	3.04			2.98		
	ICT as a Mind Tool						
10	I encourage students to use ICT in clarifying thoughts for the purposes of evaluation.	3.32	0.53	High	3.33	0.47	High
11	I support students to use ICT to demonstrate their understanding of concepts.	3.60	0.68	High	3.74	0.68	High
12	I encourage students to use ICT to process data information for problem solving.	2.91	0.67	Low	2.74	0.63	Low
13	I support students to use ICT to improve digital literacy skills.	3.16	0.94	High	3.23	0.96	High
14	Use of ICT to map a student's proffered learning style in identifying areas for improvement.	2.85	0.70	Low	2.94	0.68	Low
15	Use ICT as instructional software to consolidate learning.	2.85	0.70	Low	3.20	0.40	High
16	Use ICT as the advance features of search engines to research a topic.	3.06	1.08	High	2.66	1.38	Low
17	Use of graphic organizers to visualize teachers / students thinking processes.	3.46	0.77	High	3.93	0.36	High
18	Use ICT for instant messaging in communicating to the school.	3.16	1.06	High	2.80	1.26	Low
	Total Grand Mean	3.15			3.17		
	Social Aspect of ICT Use in Education						
19	Use ICT to give information to other teachers about students' performance to support transitions between classes.	2.82	0.91	Low	2.43	1.50	Low
20	Use ICT to access students' records for the purpose of reflecting on their previous year's performance.	2.96	0.92	Low	1.41	0.91	Low
21	Use ICT for reporting to parents.	3.08	0.85	High	2.35	0.73	Low
22	Use ICT to capture evidence of student performance.	3.19	0.94	High	2.14	0.41	Low
23	Use ICT for student task, such as online test / assignment.	3.13	0.84	High	2.35	0.64	Low
24	Use ICT to analyze assessment data finding to inform curriculum planning.	3.37	0.84	High	2.67	0.57	Low
25	Use ICT to give feedback to students on their performance.	2.91	0.72	Low	2.40	0.74	Low
	Total Grand Mean	3.07			2.25		
	Adopting ICT in Teaching						
26	Use of ICT influences my classroom combinations of students grouping for learning such as small groups.	3.28	0.84	High	2.03	0.90	Low
27	Use of ICT influences my classroom organization by providing a range of different activities within a lesson.	3.11	0.66	High	3.02	0.59	High
28	Use of ICT influences my classroom organization by catering for different learning styles.	3.32	0.61	High	2.86	0.68	Low
29	Use of ICT influences my classroom organization by providing personalized learning opportunities.	2.85	1.16	Low	2.70	1.17	Low
	Total Grand Mean	3.14			2.65		
	Cooperative ICT in Education						
30	I undertake ICT professional learning to gain ICT skills that can be applied in my classroom in practical ways.	3.52	0.75	High	3.68	0.68	High
31	I ensure I keep up to date on new technologies for teaching-learning.	3.08	0.96	High	3.07	0.97	High
32	I undertake ICT professional learning that to strengthen pedagogy practice within schools.	2.97	0.74	Low	2.98	0.71	Low
33	I undertake ICT professional learning to gain skills that enable integration of ICT into planned learning activities.	2.82	1.13	Low	2.69	1.19	Low
	Total Grand Mean	3.10			3.11		
	Embedding Learning about ICT						
34	I provide a safe ICT environment.	3.32	0.90	High	3.44	0.72	High
35	I initiate discussion with teacher's on the use of ICT in schools.	3.23	0.85	High	3.11	0.86	High
36	I support students' access to ICT anytime/anywhere safe for learning.	2.91	0.76	Low	2.94	0.78	Low
37	I promote the importance of safe practice in the use of ICT to my schools community.	3.00	0.95	High	2.98	0.94	Low
38	I use ICT to support students to improve their ability in processing large quantities.	2.97	0.77	Low	2.98	0.79	Low
39	Use ICT to ensure that student manage their files to secure their content for efficient retrieval	3.19	0.54	High	3.18	0.56	High
40	I work to ensure that all teachers / students in my school are aware of the policies required for safe use of ICT.	2.87	1.27	Low	2.89	1.24	Low
	Total Grand Mean	3.07			3.07		

Table 4.2 revealed the extent between urban and rural teachers on the extent of ICT use in teaching at basic education level, with a total grand mean of 3.10 for urban and 2.87 for rural teachers. The Table indicated that urban teachers agreed to items 3, 4, 8 and 9 with a mean range of 3.14-3.30 and a grand mean of 3.04 on personal ICT competencies as high extent which were within the criterion level of 3.00 and above as high extent, and rural teachers agreed to items 3 and 4 with a mean range of 3.16 - 3.50 on personal ICT competencies. This showed that sometimes they: can access ICT sources from a number of education specific sources outside school; ensure that ICT resources in classroom are relevant to learning activities; actively promote the use of ICT resources within schools for teaching-learning; and promote the use of ICT resources beyond school and items 1, 2, 5, 6, and 8 with a mean range of 2.75-2.99 indicated a low extent for both urban and rural teachers on personal ICT competencies.

In ICT as mind tools, urban teachers agreed to items 10, 11, 13, 16, 17, and 18 with a mean range of 3.06-3.60 and a grand mean of 3.15 and rural teachers also agreed to items 10, 13, 15, and 17 with a mean range of 3.20-3.93 and a grand mean of 3.17 which were above the criterion level of 3.00 and above as high extent. This confirmed that they sometimes: encouraged students to use ICT in clarifying thoughts for the purposes of evaluation; support students to use ICT to demonstrate their understanding of concepts; support students to use ICT to improve digital literacy skills; use ICT as the advance features of search engines to research a topic; use of graphic organizers to visualize teachers/students thinking processes; and use ICT for instant messaging in communicating to the school.

In social aspect of ICT use in educating, the urban teachers agreed to items 21, 22, 23 and 24 with a mean range of 3.08-3.37 and a grand mean of 3.07 as high extent. This showed that sometimes they: use ICT for reporting to parents; use ICT to capture evidence of student performance; use ICT for students task, such as online test / assignment; and use ICT to analyze assessment data finding to inform curriculum planning. While rural teachers with a mean range of 1.41- 2.65 and a grand mean 2.67 in items 19,20,21,22,23,24 and 25 indicated a low extent in social aspect of ICT use in education.

In adopting ICT in teaching, urban teachers agreed to items 26, 27, and 28 with a mean ranged of 3.11-3.28 and grand mean of 3.14 that met the criterion level of 3.00 and above as high extent. That is sometimes they: use of ICT influences classroom combinations of students grouping for learning such as such as individuals; use of ICT influences classroom organization by providing a range of different activities within a lesson; and use of ICT influences classroom organization by catering for different learning, while rural teachers agreed to item 27 with a mean of 3.02 and item 29 with a means of 2.85 in adopting ICT in teaching indicated that urban teachers had a low extent. In items 26, 28, and 29 with a mean range of 2.03 -2.86 showed that rural teachers had a low extent.

In cooperative ICT in education, the result indicated that both urban and rural teachers agreed to items 30 and 31 with a mean range of 3.07-3.68 and a grand mean of 3.10 for urban teachers and 3.11 for rural teachers. This implies that they sometimes: undertake ICT professional learning to gain ICT skills and understanding that can be applied in classroom in practical ways; and ensure to keep up to date on new technologies for teaching-learning and items 32 and 33 with a mean range of 2.69-2.98 revealed a low extent.

In embedding learning about ICT in education, urban teachers agreed to items 34, 35, 37 and 39 with a mean range of 3.00- 3.32 and a grand mean of 3.07. While rural teachers agreed to items 34, 35, and 39 with a mean range of 3.11-3.44 and a grand mean of 3.07. That is they sometimes: provide a safe ICT environment; initiate discussion with teachers on the use of ICT in schools; promote the importance of safe and practice in the use of ICT to schools community ; and use ICT to ensure that students manage their files to secure their content for efficient retrieved. While urban teachers with a mean range of 2.87-2.97 in items 36, 38 and 40 had low extent and rural teacher with a mean range of 2.89-2.98 in items 37, 38 and 40 also had low extent in embedding learning about ICT in other content domain in teachers' education.

Research Question 3

What is the extent on which graduate and non-graduate teachers' use ICT in teaching at basic education level in south south Nigeria?

Table 4.3: Mean and Standard deviation of Graduate and Non-graduate Teachers on the extent of ICT use in teaching at basic education level.

S/N		Graduate Teachers N = 485			Non-Graduate Teachers N = 529		
		\bar{x}	SD	Decision	\bar{x}	SD	Decision
Personal ICT Competencies							
1	I can use ICT tool resource for my classes	3.10	0.93	High	2.89	0.78	Low
2	I can create effective students resources for my classes	3.11	1.05	High	1.70	1.13	Low
3	I can access ICT resources from a number of education specific sources outside my school.	3.04	1.04	High	1.48	0.80	Low
4	I ensure that ICT resources in my classroom are relevant to learning activities.	2.92	0.91	High	2.77	0.93	Low
5	I share ICT resources that I have created with other teachers within my school.	3.23	1.08	High	3.06	0.89	High
6	I support other teachers within my schools to ensure relevant of ICT to learning activities.	2.71	0.77	Low	2.33	1.08	Low
7	I ensure that all ICT resources in my school are easily accessible by staff.	2.87	0.99	Low	2.94	0.82	Low
8	I actively promote the use of ICT resources within my schools for teaching-learning.	3.46	0.76	High	3.62	0.77	High
9	I promote the use of ICT resources beyond my school.	3.57	0.50	High	3.23	0.89	High
	Total Grand Mean	3.11			2.67		
ICT as a Mind Tool							
10	I encourage students to use ICT in clarifying thoughts for the purposes of evaluation.	3.39	0.51	High	1.97	1.28	Low
11	I support students to use ICT to demonstrate their understanding of concepts.	3.13	0.90	High	3.14	0.85	High
12	I encourage students to use ICT to process data information for problem solving.	3.07	0.73	High	3.39	0.87	High
13	I support students to use ICT to improve digital literacy skills.	2.89	0.97	Low	2.38	1.18	Low
14	Use of ICT to map a student's proffered learning style in identifying areas for improvement.	2.87	0.71	Low	2.50	1.18	Low
15	Use ICT as instructional software to consolidate learning.	2.88	0.68	Low	2.97	0.78	Low
16	Use as the advance features of search engines to research a topic.	2.66	1.12	Low	2.83	0.73	Low
17	Use of graphic organizers to visualize teachers/student thinking processes.	3.48	0.50	High	3.09	0.70	High
18	Use ICT for instant messaging in communicating to the school.	3.63	0.48	High	2.37	1.21	Low
	Total Grand Mean	3.11			2.74		
Social Aspect of ICT in Teaching							
19	Use ICT to give information to other teachers about students' performance to support transitions between classes.	3.57	0.50	High	2.81	0.83	Low
20	Use ICT to access students' records for the purpose of reflecting on their previous year's performance.	3.06	0.73	High	2.90	1.08	Low
21	Use ICT for reporting to parents.	3.76	0.43	High	3.02	0.82	High
22	Use ICT to capture evidence of student performance.	2.76	0.82	Low	2.72	0.76	Low
23	Use ICT for student task, such as online test / assignment.	3.41	0.49	High	2.80	1.34	Low
24	Use ICT to analyze assessment data finding to inform curriculum planning.	3.54	0.60	High	3.36	0.79	High
25	Use ICT to give feedback to students on their performance.	3.28	0.45	High	2.71	1.33	Low
	Total Grand Mean	3.34			2.90		
Adopt ICT in Teaching							
26	Use of ICT influences my classroom combinations of students grouping for learning such as small groups.	3.42	0.49	High	2.33	1.12	Low
27	Use of ICT influences my classroom organization by providing a range of different activities within a lesson.	2.96	0.74	Low	2.48	1.08	Low
28	Use of ICT influences my classroom organization by catering for different learning styles.	3.63	0.48	High	3.02	1.02	High
29	Use of ICT influences my classroom organization by providing personalized learning opportunities.	2.67	0.61	Low	2.30	0.99	Low
	Total Grand Mean	3.17			2.53		
Cooperative ICT in Education							
30	I undertake ICT professional learning to gain ICT skills that can be applied in my classroom in practical ways.	3.20	0.75	High	2.94	0.87	Low
31	I ensure I keep up to date on new technologies for teaching-learning.	2.90	0.70	Low	2.71	1.09	Low
32	I undertake ICT professional learning that strengthens pedagogy practice within my schools.	3.20	0.60	High	2.85	1.07	Low
33	I undertake ICT professional learning to gain skills that enable integration of ICT into planned learning activities.	3.00	0.63	High	2.23	1.24	Low
	Total Grand Mean	3.08			2.68		
Embedding learning about ICT							
34	I provide a safe ICT environment.	3.20	0.60	High	2.41	1.16	Low
35	I initiate discussion with teacher's on the use of ICT in schools.	2.90	0.54	Low	2.80	1.06	Low
36	I support students' access to ICT anytime / anywhere safe for learning.	3.10	0.70	High	2.48	1.20	Low
37	I promote the importance of safe practice in the use of ICT to my schools community.	3.30	0.78	High	2.54	1.01	Low
38	I use ICT to support students to improve their ability in processing large quantities.	2.80	0.60	Low	2.34	1.21	Low
39	Use ICT to ensure that student manage their files to secure their content for efficient retrieved	2.80	0.87	Low	2.46	1.33	Low
40	I work to ensure that all teachers /students in my school are aware of the policies required for safe use of ICT.	3.20	0.75	High	2.26	1.16	Low
	Total Grand Mean	3.04			2.47		

Table 4.3, shows the extent between graduate and non - graduate teachers on the extent of ICT use in teaching at basic education level with a total grand mean of 3.14 for graduate teachers and grand mean of 2.67. The results in the table revealed that graduate teachers agreed to items 1, 2, 3, 5, 8, and 9 with a mean ranged of 3.04-3.57, and a grand mean of 3.11 as high extent on personal ICT competencies. That sometimes they: can use ICT tool resources for classes; can create effective students resources for classes; can access ICT resources from a number of education specific sources outside school; share ICT resources created with other teachers within school; actively promote the use of ICT resources within schools for teaching-learning; promote the use of ICT resources beyond school. However, non – graduate teachers agreed to items 5, 8 and 9 with a mean ranged of 3.06– 3.62 as high extent, while items 4, 6 and 7 with a mean range of 2.71-2.92 on personal ICT competencies indicated a low extent of graduate teachers, and items 1, 2, 3, 4 6 and 7 with a mean range of 1.48-2.94 also showed low extent on personal ICT competencies by non – graduate teachers.

In ICT as mind tool, graduate teachers agreed to items 10, 11, 12, 17, and 18 with a mean ranged of 3.07-3.63 and a grand mean of 3.11 as high extent which confirmed that sometime they: encouraged students to use ICT in clarifying thoughts for the purposes of evaluation; support students to use ICT to demonstrate their understanding of concepts; encouraged students to use ICT to process data information for problem solving ;use of graphic organizers to visualize teachers/ students thinking processes; and use ICT for instant messaging in communicating to the school. Non- graduate teachers with a mean of range of 3.09-3.39 in items 11, 12 and 17 had a high extent on ICT as a mind tool. Moreso, graduate teachers with a mean range of 2.66-2.89 in items 13,14,15 and 16 had low extent, while non-graduate teachers with a mean range of 1.97-2.97 in items 10, 13,14,15,16and 18 had low extent on ICT as a mind tool.

In social aspect of ICT use in education, the graduate teachers agreed to items 19, 20, 21, 23, 24 and 25 with a mean range of 3.06- 3.76 and a grand mean of 3.34. Non-graduate teachers agreed to items 21 and 24 with a mean range of 3.02- 3.36 as high extent of ICT use. This implied that sometimes they: use ICT to give information to other teachers about students performance to support transitions between classes; use ICT to access students records for the purpose of reflecting on their previous year's performance; use ICT for reporting to parents; use ICT for students task, such as online test / assignment; use ICT to analyze assessment data finding to inform curriculum planning; and use ICT to give feedback to students on their performance. While item 22 with a mean of 2.76 showed a low extent of graduate teachers on social aspect of ICT in teaching; and non-graduate teachers with a mean range of 3.02-3.36 in items 21 and 24 had a high extent on social aspect of ICT use, while non- graduate teachers with a mean range of 2. 71- 2. 90 items 19, 20, 22, 23 and 25 indicated a low extent on social aspect of ICT use.

Adopting ICT in teaching, graduate teachers agreed to items 26, 28, with a mean range of 3.42-3.63 and grand mean of 3.17, while non- graduate teachers agreed to item 28 with a mean of 3.02 as high extent. This revealed that sometimes they: use ICT to influence classroom combinations of students grouping for, such as, small groups in class; and use ICT to influence classroom organization by catering for different learning styles, and items 27 and 29 with a mean range of 2.67-2.96 showed a low extent by graduate teachers and items 26, 27 and 29 with a mean ranged of 2.30-2:48 indicated a low extent by non graduate teachers.

In cooperative ICT in teaching, graduate teachers agreed to items 30, 32, and 33 with a mean range of 3.00-3.20 and a grand mean of 3.08 as a high extent. This indicated that sometimes they: undertake ICT professional learning to gain ICT skills that can be applied in classroom in practical ways; undertake ICT professional learning that strengthen pedagogy practice within school; and undertake ICT profession learning to gain skills that enable integration of ICT into planned learning activities. Items 31 with a mean of 2.90 indicated a low extent by graduate teachers. While Items 30, 31, 32 and 33 with a mean ranged of 2. 23- 2. 94 established a low extent by non graduate teachers.

In embedding learning about ICT in education, graduate teachers agreed to item 34, 36, 39 and 40 with a mean range of 3.30 -3.30 and a grand mean of 3.04 as a high extent. This indicated that sometimes they: provide a safe ICT environment; support students access to ICT anytime / anywhere safe for learning; promote the importance of safe practice in the use of ICT to schools community; and work to ensure that all teachers / students in school are aware of the polices required for safe use of ICT. Items 35, 38 and 39 with a mean of 2.80-2.90 showed a low extent of graduate teachers on embedding learning about ICT in education. While items 34, 35, 36, 37, 38, 39 and 40 with a mean ranged of 2.26 - 2.85 and a grand of 2.47 revealed a low extent of non- graduate teachers in embedding learning about ICT in education.

Research Question 4

What is the extent on which less experienced and experienced teachers' use ICT in teaching at basic education level in South-South Nigeria?

Table 4.4: Mean and Standard deviation of Experienced and Less experienced teachers' on the extent of ICT use in teaching at basic educating level.

S/N	Personal ICT Competencies	N = 404 Experienced Teachers			N = 610 Less experienced Teachers		
		\bar{x}	SD	Decision	\bar{x}	SD	Decision
1	I can use ICT tools resource for my classes	3.70	0.46	High	3.65	0.51	High
2	I can create effective students resources for my classes	3.34	0.47	High	3.24	0.65	High
3	I can access ICT resources from a number of education specific sources outside my school.	3.46	0.50	High	3.38	0.64	High
4	I ensure that ICT resources in my classroom are relevant to learning activities.	3.06	0.44	High	3.05	0.49	High
5	I share ICT resources that I have created with other teachers within my school.	3.57	0.50	High	3.54	0.53	High
6	I support other teachers within my schools to ensure relevant of ICT to learning activities.	2.81	0.80	Low	2.77	0.80	Low
7	I ensure that all ICT resources in my school are easily accessible by staff.	3.42	0.49	High	3.41	0.52	High
8	I actively promote the use of ICT resources within my schools for teaching-learning.	3.44	0.50	High	3.43	0.52	High
9	I promote the use of ICT resources beyond my school.	3.10	0.30	High	3.11	0.37	High
	Total Grand Mean	3.32			3.29		
	ICT as a Mind Tool						
10	I encourage students to use ICT in clarifying thoughts for the purposes of evaluation.	3.50	0.50	High	3.49	0.56	High
11	I support students to use ICT to demonstrate their understanding of concepts.	2.67	0.70	Low	2.70	0.71	Low
12	I encourage students to use ICT to process data information for problem solving.	3.77	0.42	High	3.75	0.47	High
13	I support students to use ICT to improve digital literacy skills.	2.36	0.48	Low	2.31	0.54	Low
14	Use of ICT to map a student's proffered learning style by identifying areas for improvement.	1.67	0.47	Low	1.70	0.55	Low
15	Use ICT as instructional software to consolidate learning.	2.06	0.85	Low	2.12	0.88	Low
16	Use as the advance features of search engines to research a topic.	2.73	0.89	Low	2.71	0.88	Low
17	Use of graphic organizers to visualize teachers / students thinking processes.	2.03	0.71	Low	2.09	0.74	Low
18	Use ICT for instant messaging in communicating to the school.	1.67	0.47	Low	1.73	0.58	Low
	Total Grand Mean	2.50			2.51		
	Social Aspect of ICT in Teaching						
19	Use ICT to give information to other teachers about students' performance to support transitions between classes.	3.48	0.50	High	3.47	0.50	High
20	Use ICT to access students' records for the purpose of reflecting on their previous year's performance.	3.07	0.44	High	3.07	0.44	High
21	Use ICT for reporting to parents.	3.57	0.50	High	3.56	0.50	High
22	Use ICT to capture evidence of student performance.	2.80	0.78	Low	2.80	0.79	Low
23	Use ICT for student task, such as online test / assignment.	3.44	0.50	Agree	3.43	0.50	High
24	Use ICT to analyze assessment data finding to inform curriculum planning.	3.44	0.50	High	3.44	0.50	High
25	Use ICT to give feedback to students on their performance.	3.10	0.31	High	3.10	0.30	High
	Total Grand Mean	3.27			3.27		
	Adopting ICT in Teaching						
26	Use of ICT influences my classroom combinations of students grouping for learning such as small groups in class.	3.49	0.50	High	3.50	0.50	High
27	Use of ICT influences my classroom organization by providing a range of different activities within a lesson.	2.67	0.71	Low	2.68	0.70	Low
28	Use of ICT influences my classroom organization by catering for different learning styles.	3.76	0.43	High	3.77	0.42	High
29	Use of ICT influences my classroom organization by providing personalized learning opportunities.	2.38	0.49	Low	2.37	0.48	Low
	Total Grand Mean	3.08			3.08		
	Cooperative ICT in Education						
30	I undertake ICT professional learning to gain ICT skills that can be applied in my classroom in practical ways.	1.67	0.47	Low	1.66	0.47	Low
31	I ensure I keep up to date on new technologies for teaching-learning.	2.07	0.86	Low	2.10	0.85	Low
32	I undertake ICT professional learning to lead the use of ICT to strengthen pedagogy practice within my schools.	2.73	0.89	Low	2.74	0.90	Low
33	I undertake ICT professional learning to gain skills that enable integration of ICT into planned learning activities.	2.03	0.71	Low	2.00	0.72	Low
	Total Grand Mean	2.13			2.13		
	Embedding learning about ICT						
34	I provide a safe ICT environment.	1.67	0.47	Low	1.67	0.47	Low
35	I initiate discussion with teacher's on the use of ICT in schools.	2.97	0.78	Low	2.83	1.03	Low
36	I support students access to ICT anytime/ anywhere safe tor learning.	2.77	1.13	Low	2.58	1.18	Low
37	I promote the importance of safe practice in the use of ICT to my schools community.	3.04	0.70	High	3.03	0.70	High
38	I use ICT to support students to improve their ability in processing large quantities.	3.28	0.78	High	3.29	0.78	High
39	Use ICT to ensure that student manage their files to secure their content for efficient retrieval.	3.36	0.71	High	3.36	0.71	High
40	I work to ensure that all teachers / students in my school are aware of the policies required for safe use of ICT.	3.32	0.86	High	3.31	0.86	High
	Total Grand Mean	2.92			2.87		

Table 4.4 shows that there was no difference between experienced and less experienced teachers on the extent of ICT use in teaching at basic education level with a total grand mean of 2.87 for experienced teachers and 2.86 for less experienced teachers. Both experienced and less -experienced teachers agreed to items 1, 2, 3, 4, 5, 7, 8 and 9 with a mean range of 3.05-3.70 and a grand mean of 3.32 for experienced teachers and 3.29 for less-experienced teachers on personal ICT competencies .This implies that both experienced and less- experienced teachers : can use ICT tools resource for classes; can create effective students resources for classes; can access ICT resources from a number of education specific sources outside school; ensure that ICT resources in classroom are relevant to learning activities; share ICT resources created with other teachers within school; support other teachers within schools to ensure relevant of ICT to learning activities; ensure that all ICT resources in school are easily accessible by staff; actively promote the use of ICT resources within schools for teaching-learning; and promote the use of ICT resources beyond school and items 6 with a mean of 2.81 and 2.77 indicated a low extent on personal ICT competencies for both experienced and less experienced teachers.

In ICT as mind tool both experienced and less- experiences teachers agreed to items 10 and 12 with mean range of 3.49-3.77 as high extent which were above the criterion level of 3.00 and above. This indicated that they sometimes: encouraged students to use ICT in clarifying thoughts for the purposes of evaluation ; and support students to use ICT to demonstrate their understanding of concepts and items 11, 13, 14, 15, 16, 17 and 18 with a mean range of 1.67 -2.73 as a low extent.

In social aspect of ICT in teaching, both experienced and less experienced teachers agreed to item 19, 20, 21, 23, 24, 25 with a mean of range of 3.10-3.57 and a grand mean of 3.27 as a high extent. The results indicated that they sometimes: use ICT to give information to other teacher about student performance to support transitions between classes; use ICT to access students records for the purpose of reflecting on their previous year's performance; use ICT for reporting to parents; use ICT for students tasks, such as online test / assignment; use ICT to analyze assessment data finding to inform curriculum planning; and use ICT to give feedback to student on their performance .while items 22 with a mean of 2. 80 showed a low extent.

In adopting ICT in teaching, both experienced and less- experienced teachers agreed to items 26 and 28 with a mean range of 3.49-3.77 and a grand mean of 3.08 indicated a high extent adopting ICT in teaching. This implies that sometimes they: use of ICT influences classroom combinations of students grouping for learning such as small groups in class; and use of ICT influences classroom organization by catering for different learning styles, while items 27 and 29 with a mean range of 2.37-2.68 showed low extent on both experienced and less-experienced teachers in adopting ICT in teaching.

In cooperative ICT in education, both experienced and less experience teachers have a mean range of 1.66- 2.73 and a grand mean of 2.13 which revealed a low extent in items 30, 31, 32 and 33.

In embedding learning about ICT, both experience and less experienced teachers agreed to items 37, 38, 39, and 40 with a mean range of 3.03-3.36. That is they sometimes: promote the importance of safe practice in the use of ICT to schools community; use ICT to support students to improve their ability in processing large quantities; use ICT to ensure that student manage their files to secure their content and enable efficient retrieval; and work to ensure that all teachers / students in school are aware of the policies required for safe use of ICT .while items 34, 35, and 36 with a mean ranged of 1. 67- 2.97 showed a low extent in embedding learning about ICT in teaching.

Research Question 5

What is the extent on which pre – service and in-service teachers’ use ICT in teaching at basic education level in South-South Nigeria?

Table 4.5: Mean and Standard deviation of Pre-service and In-service Teachers on the extent of ICT use in Teaching at basic Education level.

S/N	Personal ICT Competencies	Pre-service Teachers N = 537			In-service Teachers N = 477		
		\bar{x}	SD	Decision	\bar{x}	SD	Decision
1	I can use ICT tool resource for my classes	2.99	0.83	Low	2.76	0.71	Low
2	I can create effective use of ICT students resources for my classes	2.75	1.01	Low	2.55	1.06	Low
3	I can access ICT resources from a number of education specific sources outside my school.	3.22	0.72	High	3.28	0.77	High
4	I ensure that ICT resources in my classroom are relevant to learning activities.	3.19	0.88	High	3.15	0.83	High
5	I share ICT resources that I have created with other teachers within my school.	2.88	1.28	Low	2.74	1.46	Low
6	I support other teachers within my schools to ensure relevant to learning activities.	2.98	0.88	Low	2.89	0.92	Low
7	I ensure that all ICT resources in my school are easily accessible by staff / students.	2.95	0.81	Low	2.92	0.79	Low
8	I actively promote the use of ICT resources within my schools for teaching-learning.	3.13	0.83	High	2.98	0.82	Low
9	I promote the use of ICT resources beyond my school.	3.29	0.62	High	3.49	0.50	High
	Total Grand Mean	3.04			2.97		
	ICT as a Mind Tool						
10	I encourage students to use ICT in clarifying thoughts for the purposes of evaluation.	3.33	0.54	High	3.33	0.47	High
11	I support students to use ICT to demonstrate their understanding of concepts.	3.59	0.68	High	3.75	0.66	High
12	I encourage students to use ICT to process data information for problem solving.	2.92	0.67	Low	2.75	0.63	Low
13	I support students to use ICT to improve digital literacy skills.	3.15	0.94	High	2.23	0.96	Low
14	Use of ICT to map a student’s proffered learning style by identifying areas for improvement.	2.85	0.70	Low	2.94	0.69	Low
15	Use ICT as instructional software to consolidate learning.	2.83	0.95	Low	3.19	0.39	High
16	Use as the advance features of search engines to research a topic.	3.07	1.07	High	2.64	1.38	Low
17	Use of graphic organizers to visualize and structure their thinking processes.	3.44	0.77	High	3.94	0.35	High
18	Use ICT for instant messaging in communicating to the school.	2.86	1.23	Low	3.15	1.08	High
	Total Grand Mean	3.12			3.10		
	Social Aspect of ICT use in Education						
19	Use ICT to give information to other teachers about students’ performance to support transitions between classes.	2.81	0.92	Low	2.41	1.50	Low
20	Use ICT to access students’ records for the purpose of reflecting on their previous year’s performance.	2.97	0.90	Low	1.40	0.89	Low
21	Use ICT for reporting to parents.	3.07	0.86	High	2.36	0.73	Low
22	Use ICT to capture evidence of student performance.	3.20	0.95	High	2.13	0.40	Low
23	Use ICT for student task, such as online test / assignment.	3.13	0.82	High	2.33	0.68	Low
24	Use ICT to analyze assessment data finding to inform curriculum planning.	3.39	0.83	High	2.66	0.57	Low
25	Use ICT to give feedback to students on their performance.	2.91	0.72	Low	2.41	0.74	Low
	Total Grand Mean	3.04			2.24		
	Adopt ICT in Teaching						
26	Use of ICT influences my classroom combinations of students grouping for learning such as small groups in class.	3.30	0.84	High	2.02	0.89	Low
27	Use of ICT influences my classroom organization by providing a range of different activities within a lesson.	3.10	0.67	High	3.02	0.58	High
28	Use of ICT influences my classroom organization by catering for different learning styles.	3.31	0.62	High	2.85	0.68	Low
29	Use of ICT influences my classroom organization by providing personalized learning opportunities.	2.82	1.16	Low	2.71	1.16	Low
	Total Grand Total	3.13			2.65		
	Cooperative ICT in Education						
30	I undertake ICT professional learning to gain ICT skills that can be applied in my classroom in practical ways.	3.55	0.74	High	3.66	0.68	High
31	I ensure I keep up to date on new technologies for teaching-learning.	3.09	0.96	High	3.06	1.00	High
32	I undertake ICT professional learning that strengthens pedagogy practice within my schools.	2.97	0.74	Low	3.00	0.74	High
33	I undertake ICT professional learning to gain skills that enable integration of ICT into planned learning activities.	2.80	1.14	Low	2.71	1.18	Low
	Total Grand Mean	3.10			3.11		
	Embedding learning about ICT						
34	I provide a safe ICT environment.	3.34	0.87	High	3.42	0.73	High
35	I initiate discussion with teacher’s on the use of ICT in schools.	3.20	0.85	High	3.11	0.85	High
36	I support students access to ICT anytime/anywhere safe for learning.	2.92	0.76	Low	2.94	0.77	Low
37	I promote the importance of safe practice in the use of ICT to my schools community.	2.99	0.95	Low	2.99	0.94	Low
38	I use ICT to support students to improve their ability in processing large quantities.	2.98	0.78	Low	2.98	0.79	Low
39	Use ICT to ensure that student manage their files to secure their content for efficient retrieval	3.19	0.55	High	3.18	0.56	High
40	I work to ensure that all teachers / students in my school are aware of the policies required for safe use of ICT.	2.88	1.27	Low	2.87	1.25	Low
	Total Grand Mean	3.07			3.07		

Table 4.5, indicated the extent between pre- service and in –service teachers on the extent of ICT use in teaching at basic education level with total grand mean of 3.08 for pre-service teachers and total grand mean of 2.86 for in-service teachers. The result showed that both pre- service and in service teachers agreed to items 3, 4 and 9 with a mean ranged of 3.15-3.49 and a grand mean of 3.04 for pre- service teachers which met the criterion level of 3.00 and above as a high extent on personal ICT competencies. This indicated that sometimes they: can access ICT resources from a number of education specific source outside school; ensure that ICT resources in classroom are relevant to learning activities; actively promote the use of ICT resources within schools for teaching-learning; and promote the use of ICT resources beyond school. While items 1, 2, 5, 6 and 7 with a mean range of 2.74- 2.98 on personal ICT competencies indicated a low extent.

In ICT as a mind tool, pre- service teachers agreed to items 10, 11, 13, 16, and 17 with a mean range of 3.07- 3.59 and in service teachers agreed to items 10, 11, 15, 17 and 18 with a mean range of 3.19- 3.94 and a grand mean of 3.92 for pre- service and 3.10 for in-services which were within the criterion level of 3.00 and above as high extent. That is they sometimes: encouraged students to use ICT in clarifying thought for the purpose of evaluation; support students to use ICT to demonstrate their understanding of concepts; support students to use ICT to improve digital literacy skills; use ICT as the advance feature of search engines to research a topic; use of graphic organizers to visualize teachers/students thinking processes; and use ICT as instructional software to consolidate learning.

Pre- service teachers agreed to items 21, 22, 23 and 24 with a mean range of 3.07- 3.39 and a grand mean of 3.04 on social aspect of ICT use in education which met the criterion level of 3.00 and above as high extent. This showed that they sometimes: use ICT for reporting to parents; use ICT to capture evidence of student performance; use ICT for student task , such as online test / assignment; and us ICT to analyze assessment data finding to inform curriculum planning. Nevertheless, items 19, 20, 21, 22, 23, 24 and 25 indicated a mean range of 1.40- 2.66 which showed a low extent of in-service teachers on social aspect of ICT use in education.

In items 26, 27, and 28 with a mean range of 3.10- 3.31 and a grand mean of 3.13 as high extent in adopting ICT in teaching. Pre-service teachers agreed that sometimes

they: use ICT to influence classroom combinations of students grouping for learning such as, small groups in class; use ICT to influence classroom organization by providing a range of different activities within a lesson; and use ICT to influence classroom organization by catering for different learning styles and items 27 with a mean of 3.02, showed that in service teachers adopted ICT in teaching. However, items 26, 28, and 29 with a mean range of 2.02-2.85 indicated a low extent.

In cooperative ICT in education, pre- service teachers agreed to items 30 and 31 with a mean, range of 3.09-3.55 and a grand mean of 3.10. In- service teachers agreed to items 30, 31 and 32 with a mean range of 3.00-3.66 and a grand mean of 3.11 as a high extent in cooperative ICT in education. That sometimes they: undertake ICT professional learning to gain ICT skills that can be applied in classroom in practical ways; and ensure to keep up to date on new technologies for teaching-learning and items 32 and 33 with a mean of 2.80-2.71 showed low extent.

Embedding learning about ICT, both pre- service and in service teachers agreed to items 34, 35, and 36 with a mean range of 3.11-3.20 and a grand mean of 3.07 which met the criterion level of 3.00 and above as high extent. That they sometimes: provide a safe ICT environment; initiate discussion with teachers on the use of ICT in school; and use ICT to ensure that student manage their file secure their content for efficient retrieval and items 36, 37, 38 and 40 with a mean range of 2.87-2.99 indicated low extent on embedding learning about ICT in teaching by pre- service and in service teachers.

Research Question 6

What is the extent on which male and female teachers' use ICT in teaching at basic education level in South-South Nigeria?

Table 4.6: Mean and Standard deviation of Male and Female Teachers on the extent of ICT use in teaching at basic education level

S/N	Personal ICT Competencies	Male Teachers N = 487			Female Teachers N = 527		
		\bar{x}	SD	Decision	\bar{x}	SD	Decision
1	I can use ICT tool resource for my classes	3.04	0.94	High	2.89	0.78	Low
2	I can create effective use of ICT students resources for my classes	2.99	1.05	Low	1.70	1.13	Low
3	I can access ICT resources from a number of education specific sources outside my school.	2.98	1.04	Low	1.48	0.80	Low
4	I ensure that ICT resources in my classroom are relevant to learning activities.	2.84	0.91	Low	2.77	0.93	Low
5	I share ICT resources that I have created with other teachers within my school.	3.15	1.09	High	3.07	0.89	High
6	I support other teachers within my schools to ensure relevant of ICT to learning activities.	2.67	0.77	Low	2.33	1.07	Low
7	I ensure that all ICT resources in my school are easily accessible by staff and students.	2.83	0.98	Low	2.94	0.82	Low
8	I actively promote the use of ICT resources within my schools for teaching-learning.	3.38	0.79	High	3.62	0.77	High
9	I promote the use of ICT resources beyond my school.	3.53	0.50	High	3.23	0.98	High
	Total Grand Mean	3.05			2.67		
	ICT as a Mind Tool						
10	I encourage students to use ICT in clarifying thoughts for the purposes of evaluation.	3.35	0.50	High	1.97	1.28	Low
11	I support students to use ICT to demonstrate their understanding of concepts.	3.13	0.90	Agree	3.15	0.85	Agree
12	I encourage students to use ICT to process data information for problem solving.	3.01	0.71	High	3.39	0.86	High
13	I support students to use ICT to improve digital literary skills.	2.80	0.92	Low	2.38	1.18	Low
14	Use ICT to map a student's proffered learning style by identifying areas for improvement.	2.81	0.74	Low	2.50	1.18	Low
15	Use ICT as instructional software to consolidate learning.	2.84	0.70	Low	2.97	0.78	Low
16	Use as the advance features of search engines to research a topic.	2.66	1.11	Low	2.83	0.79	Low
17	Use of graphic organizers to visualize teachers/students thinking processes.	3.48	0.50	High	3.10	0.70	High
18	Use ICT for instant messaging in communicating to the school.	3.63	0.48	High	2.37	1.21	Low
	Total Grand Mean	3.08			3.08		
	Social Aspect of ICT use in Education						
19	Use ICT to give information to other teachers about students' performance to support transitions between classes.	3.57	0.49	High	2.81	0.83	Low
20	Use ICT to access students' records for the purpose of reflecting on their previous year's performance.	3.06	0.73	High	2.89	1.08	Low
21	Use ICT for reporting to parents.	3.76	0.43	High	3.02	0.82	
22	Use ICT to capture evidence of student performance.	2.76	0.82	Low	2.72	0.76	Low
23	Use ICT for student task, such as online test / assignment.	3.41	0.49	High	2.80	1.34	Low
24	Use ICT to analyze assessment data finding to inform curriculum planning.	3.54	0.60	High	3.37	0.79	High
25	Use ICT to give feedback to students on their performance.	3.28	0.45	High	2.71	1.33	Low
	Total Grand Mean	3.34			2.90		
	Adopt ICT in Teaching						
26	Use of ICT influences my classroom combinations of students grouping for learning such as small groups in class.	3.42	0.49	High	2.33	1.11	Low
27	Use of ICT influences my classroom organization by providing a range of different activities within a lesson.	2.96	0.74	Disagree	2.48	1.08	Low
28	Use of ICT influences my classroom organization by catering for different learning styles.	3.63	0.48	High	3.02	1.02	High
29	Use of ICT influences my classroom organization by providing personalized learning opportunities.	2.67	0.61	Low	2.30	0.99	Low
	Total Grand Mean	3.17			2.53		
	Cooperative ICT in Education						
30	I undertake ICT professional learning to gain ICT skills that can be applied in my classroom in practical ways.	3.19	0.75	High	2.94	0.87	Low
31	I ensure I keep up to date on new technologies for teaching-learning.	2.89	0.70	Low	2.71	1.09	Low
32	I undertake ICT professional learning that strengthens pedagogy practice within my schools.	3.18	0.60	High	2.85	1.08	Low
33	I undertake ICT professional learning to gain skills that enable integration of ICT into planned learning activities.	2.99	0.63	Low	2.23	1.24	Low
	Total Grand Mean	3.06			2.68		
	Embedding learning about ICT						
34	I provide a safe ICT environment.	3.18	0.59	High	2.41	1.16	Low
35	I initiate discussion with teacher's on the use of ICT in schools.	2.89	0.53	Low	2.80	1.06	Low
36	I support students' access to ICT anytime/ anywhere safe for learning.	3.08	0.70	High	2.48	1.20	Low
37	I promote the importance of safe practice in the use of ICT to my schools community.	3.28	0.77	High	2.53	1.01	Low
38	I use ICT to support students to improve their ability in processing large quantities.	2.79	0.60	Low	2.35	1.21	Low
39	Use ICT to ensure that student manage their files to secure their content for efficient retrieval.	2.80	0.87	Low	2.46	1.32	Low
40	I work to ensure that all teachers/ students in my school are aware of the policies required for safe use of ICT.	3.18	0.75	High	2.27	1.16	Low
	Total Grand Mean	3.03			2.47		

Table 4.6 indicated the extent between male and female teachers on the extent of ICT use in teaching at basic education level with a total grand mean of 3.12 for male teachers and total grand mean of 2.72 for female teachers. The results in the table showed that male teachers agreed to items 1, 5, 8, and 9 with a mean range of 3.04-3.52 and grand mean of 3.05 as high extent on personal ICT competencies. This implies that sometimes they can use ICT tool resources for classes; share ICT resources created with other teachers within school; actively promote the use of ICT resources within school for teaching-learning; and share and promote the use of ICT resources beyond school. More so items 2, 3, 4, 6 and 7 with a mean range of 2.67- 2.99 indicated a low extent on male teachers. While in items 5, 8 and 9 with a mean range of 3.07- 3.62 on personal ICT competencies showed a high extent of female teachers. However items, 1, 2, 3, 4, 6 and 7 with a mean range of 1.48- 2.94 on personal ICT competencies indicated a low extent on female teachers.

In items 10,11,12,17 and 18 with a mean range of 3.01-3.63 and a grand mean of 3.08 on ICT as mind tools, male teachers agreed that sometimes they: encouraged students to use ICT in clarifying thoughts for the purpose of evaluation; support students to use ICT to demonstrate their understanding of concepts; encouraged students to use ICT to process data information for problem solving; use graphic organizers to visualize teachers/students thinking processes; and use ICT for instant messaging in communicating to the school. Therefore, items 13, 14, 15 and 16 with a mean range of 2.66-2.84, indicated a low extent of male teachers on ICT as a mind tools in teaching. While female teachers agreed to items 11, 12, and 17 with a mean range of 3.10- 3.39 as high extent on ICT as a mind tool in teaching. However, items 10, 13, 14, 15, 16 and 18 with a mean range of 1.97- 2.97 revealed a low extent on female teachers on ICT as mind tools in teaching.

Male teachers agreed to items 19, 20, 21, 23, 24 and 25 on social aspect of ICT use in education with a mean range of 3.06-3.76 and a grand mean of 3.34 as a high extent. This indicated that they sometimes: use ICT to give information to other teachers about students performance to support transitions between of classes; use ICT to access students records for the purpose of reflecting on their previous year's performance; use ICT for reporting to parents; use ICT for student task, such as online test /assignment; use

ICT to analyze assessment data finding to inform curriculum planning; and use ICT to give feedback to students on their performance and item 22 with a mean of 2.76 indicated a low extent of male teachers. Female teacher agreed to items 21 and 24 with a mean range of 3.02-3.37 as a high extent on social aspect of ICT use in education and items 22 and 25 with a mean range of 2.71- 2.89 indicated a low extent on social aspect of ICT use in education by female teachers.

Male teachers agreed to items 26 and 28 with a mean range of 3.42-3.63 and a grand mean of 3.17 as a high extent in adopting ICT in teaching. This revealed that sometimes they: use ICT to influence classroom combination of students grouping for learning such as small groups in class; and use ICT to influence classroom organization by catering for different learning styles and items 27 and 29 with a mean range of 2.67-2.96 indicated a low extent. Female teachers agreed to item 28 with a mean of 3.02 as a high extent. While items 26, 27 and 29 with a mean range of 2.30-2.48 revealed a low extent of female teachers in adopting ICT in teaching.

Items 30 and 32 have a mean range of 3.18 - 3.19 and grand mean of 3.06 as high extent that were agreed by male teachers on cooperative ICT in education. That is they sometimes: undertake ICT professional learning to gain ICT skills that can be applied in classroom in practical ways; and undertake ICT professional learning that strengthens pedagogy practice within schools while items 31 and 33 with a mean range of 2.89-2.99 indicated a low extent on male teachers. In items 30, 31, 32 and 33 with a mean range of 2.23-2.94 and a grand mean of 2.68 indicated a low extent of female teachers in cooperatives ICT in education.

Embedding learning about ICT, male teachers agreed to items 34, 36, 37, and 40 with a mean range of 3.08- 3.28 and a grand mean of 3.03 as a high extent. That is they sometimes: provide a safe ICT environment; support students' access to ICT anytime/ anywhere safe for learning; and work to ensure that all teachers /students in school are aware of the policies required for safe use of ICT. However, items 35, 38 and 39 with a mean range of 2.79-2.89 indicated a low extent by male teachers. In items 34, 35, 36, 37, 38, 39 and 40 with a mean range of 2.27-2.80 and a grand mean of 2.47 indicated a low extent of female teacher in embedding learning about ICT in teaching.

Research Question 7

What is the extent on which teachers' in single sex and mixed schools use ICT in teaching at basic education level in South-South Nigeria?

Table 4.7: Mean and Standard deviation of Single sex and Mixed school Teachers on the extent of ICT use in teaching at basic education level.

S/N		Single Sex School Teachers N = 497			Mixed School Teachers N = 517		
		\bar{x}	SD	Decision	\bar{x}	SD	Decision
	Personal ICT Competencies						
1	I can use ICT tool resource for my classes	3.51	0.63	High	3.71	0.45	High
2	I can create effective use of ICT students resources for my classes	3.29	0.49	High	3.34	0.47	High
3	I can access ICT resources from a number of education specific sources outside my school.	3.42	0.52	High	3.46	0.50	High
4	I ensure that ICT resources in my classroom are relevant to learning activities.	3.03	0.45	High	3.06	0.45	High
5	I share ICT resources that I have created with other teachers within my school.	3.50	0.54	High	3.58	0.49	High
6	I support other teachers within my schools to ensure relevant of ICT to learning activities.	2.81	0.80	Low	2.82	0.80	Low
7	I ensure that all ICT resources in my school are easily accessible by staff.	3.34	0.55	High	3.42	0.49	High
8	I actively promote the use of ICT resources within my schools for teaching-learning.	3.36	0	High	3.44	0.50	High
9	I promote the use of ICT resources beyond my school.	3.08	0.29	High	3.10	0.30	High
	Total Grand Mean	3.26			3.33		
	ICT as a Mind Tool						
10	I encourage students to use ICT in clarifying thoughts for the purposes of evaluation.	3.42	0.53	High	3.49	0.50	High
11	I support students to use ICT to demonstrate their understanding of concepts.	2.67	0.70	Low	2.66	0.70	Low
12	I encourage students to use ICT to process data information for problem solving.	3.65	0.54	High	3.77	0.42	High
13	I support students to use ICT to improve digital literacy skills.	2.36	0.48	Low	2.37	0.48	Low
14	Use of ICT to map a student's proffered learning style by identifying areas for improvement.	1.67	0.47	Low	1.67	0.47	Low
15	Use ICT as instructional software to consolidate learning.	2.07	0.85	Low	2.07	0.86	Low
16	Use as the advance features of search engines to research a topic.	2.74	0.89	Low	2.73	0.89	Low
17	Use of graphic organizers to visualize teachers/students thinking processes.	2.03	0.71	Low	2.03	0.71	Low
18	Use ICT for instant messaging in communicating to the school.	1.67	0.47	Low	1.67	0.47	Low
	Total Grand Mean	2.48			2.50		
	Social Aspect of ICT use in Education						
19	Use ICT to give information to other teachers about students' performance to support transitions between classes.	3.46	0.50	High	3.48	0.50	High
20	Use ICT to access students' records for the purpose of reflecting on their previous year's performance.	3.06	0.44	High	3.07	0.44	High
21	Use ICT for reporting to parents.	3.57	0.50	High	3.56	0.50	High
22	Use ICT to capture evidence of student performance.	3.57	0.50	High	2.79	0.78	Low
23	Use ICT for student task, such as online test / assignment.	3.37	0.49	High	3.44	0.50	High
24	Use ICT to analyze assessment data finding to inform curriculum planning.	3.40	0.53	High	3.43	0.50	High
25	Use ICT to give feedback to students on their performance.	3.05	0.30	High	3.10	0.31	High
	Total Grand Mean	3.35			3.27		
	Adopt ICT in Teaching						
26	Use of ICT influences my classroom combinations of students grouping for learning such as small groups in class.	3.46	0.52	High	3.50	0.50	High
27	Use of ICT influences my classroom organization by providing a range of different activities within a lesson.	2.67	0.70	Low	2.68	0.7	Low
28	Use of ICT influences my classroom organization by catering for different learning styles.	3.77	0.42	High	3.76	0.43	High
29	Use of ICT influences my classroom organization by providing personalized learning opportunities.	2.37	0.48	Low	2.38	0.49	Low
	Total Grand Mean	3.07			3.08		
	Cooperative ICT in Education						
30	I undertake ICT professional learning to gain ICT skills that can be applied in my classroom in practical ways.	1.67	0.47	Low	1.66	0.47	Low
31	I ensure I keep up to date on new technologies for teaching-learning.	2.09	0.85	Low	2.08	0.86	Low
32	I undertake ICT professional learning that strengthens pedagogy practice within my schools.	2.74	0.90	Low	2.74	0.89	Low
33	I undertake ICT professional learning to gain skills that enable integration of ICT into planned learning activities.	2.01	0.71	Low	2.03	0.71	Low
	Total Grand Mean	2.13			2.13		
	Embedding learning about ICT						
34	I provide a safe ICT environment.	1.67	0.47	Low	1.67	0.47	Low
35	I initiate discussion with teacher's on the use of ICT in schools.	2.76	1.07	Low	2.93	0.81	Low
36	I support students' access to ICT anytime/anywhere safe for learning.	2.46	1.22	Low	2.87	1.06	Low
37	I promote the importance of safe practice in the use of ICT to my schools community.	2.76	0	Low	2.73	0.65	Low
38	I use ICT to support students to improve their ability in processing large quantities.	3.24	0.79	Low	3.28	0.78	High
39	Use ICT to ensure that student manage their files to secure their content for efficient retrieval	3.32	0.72	High	3.37	0.71	High
40	I work to ensure that all teachers / students in my school are aware of the policies required for safe use of ICT.	3.24	0.87	High	3.33	0.86	High
	Total Grand Mean	2.78			2.88		

Table 4 7, indicated that there was no difference between single sex and mixed school teachers on the extent of ICT use in teaching at the basic education level with a total grand mean of 2.85 for teachers in single sex school and total grand mean of 2.87

for teachers in mixed schools. Both teachers in single sex and mixed school agreed to items 1, 2, 3, 4, 5, 7, 8 and 9 with a mean range of 3.03- 3.71 and a grand mean of 3.26 for teachers in single sex school and 3.33 for teachers in mixed school as high extent on personal ICT competencies. This revealed that sometimes they: can use ICT tool resource for classes; can create effective students resources for classes; can access ICT resources from a number of education specific sources outside school; ensure that ICT resources in classroom are relevant to learning activities; share ICT resources created with other teachers within school; ensure that all ICT resources in school are easily accessible by staff / students; actively promote the use of ICT resources within school for teaching-learning; and promote the use of ICT resources beyond school and items 6 with a mean range of 2.81-2.82 revealed a low extent teachers in single sex and mixed schools on personal ICT competence.

In ICT as mind tool, both teachers in single sex and mixed schools agreed to items 10 and 12 with a mean range of 3.42-3.77 as high, extent. This showed that they sometimes; encouraged students to use ICT in clarifying thought for the purposes of evaluation; and encouraged student to use ICT to process data information for problem solving and items 11, 13, 14, 15, 16, 17 and 18 with a mean range of 1.67- 2. 74 indicated a low extent.

In social aspect of ICT in teaching, teachers in single sex schools agreed to items 19, 20, 21, 22, 23, 24 and 25 with a mean range of 3.05-3. 57 and a grand mean of 3.35 as high extent and teachers in mixed schools agreed to items 19, 20, 21, 23, 24 and 25 with a mean range of 3.07-3.56 with a grand mean of 3.27 as a high extent. This indicated that they sometimes: use ICT to give information to other teachers about students performance to support transitions between classes; use ICT to access student records for the purpose of reflecting on their previous year's performance; use ICT for student task, such as online test / assignment; use ICT to analyze assessment data finding to inform curriculum planning; and use ICT to give feedback to students on their performance and item 22, with a mean of 2. 79 indicated a low extent by teachers in mixed schools.

In adopting ICT in teaching, teachers in both single and mixed schools agreed to items 26 and 28 with a mean range of 3.46-3.77 and a grand mean of 3.07 as a high extent. That is they sometimes: use ICT to influence classroom combinations of students

grouping for learning such as small groups in class; and use ICT to influence classroom organization by catering for different learning styles. However, items 27 and 29 with a mean range of 2.37- 2.68 indicated low extent of teachers in single sex and mixed schools in adopting ICT in teaching at basic education.

In cooperative ICT in education both teachers in single sex and mixed schools had a mean range of 1.66-2.74 and a grand mean of 2.13 which showed a low extent adopting ICT in teaching at basic education.

In embedding learning about ICT, both teachers in single and mixed schools agreed to items 38,39 and 40 with a means range of 3.24- 3.37 as a high extent. That is they sometimes: use ICT to support students to improve their ability in processing large quantities; use ICT to ensure that student manage their files to secure their content for efficient retrieval; and work to ensure that all teachers / students in school are aware of the policies required for safe use of ICT. While items 34, 35, 36, and 37 with a mean range of 1.67- 2.93 revealed a low extent by both teachers in single sex and mixed schools in embedding learning about ICT in teaching at basic education level.

Research Question 8

What is the extent on which young and old teachers' use of ICT in teaching at basic education level in South-South Nigeria?

Table 4.8: Mean and Standard deviation of Young and Old teachers on the extent of ICT use in teaching at basic education level.

S/N		Young Teachers N = 603			Old Teachers N = 411		
		\bar{x}	SD	Decision	\bar{x}	SD	Decision
Personal ICT Competencies							
1	I can use ICT tool resource for my classes	3.01	0.89	High	2.97	0.82	Low
2	I can create effective use of ICT students resources for my classes	2.78	1.24	Low	1.77	1.14	Low
3	I can access ICT resources from a number of education specific sources outside my school.	2.76	1.14	Low	1.46	0.82	Low
4	I ensure that ICT resources in my classroom are relevant to learning activities.	2.89	0.92	Low	2.78	0.93	Low
5	I share ICT resources that I have created with other teachers within my school.	3.15	1.05	High	3.15	0.89	High
6	I support other teachers within my schools to ensure relevant to learning activities.	2.60	0.86	High	2.40	1.08	Low
7	I ensure that all ICT resources in my school are easily accessible by staff /students.	2.89	0.94	Low	2.95	0.84	Low
8	I actively promote the use of ICT resources within my schools for teaching-learning.	3.48	0.77	High	3.64	0.76	High
9	I promote the use of ICT resources beyond my school.	3.50	0.64	High	3.24	0.98	High
	Total Grand Mean	3.01			2.71		
ICT as a Mind Tool							
10	I encourage students to use ICT in clarifying thoughts for the purposes of evaluation.	3.27	0.75	High	1.77	1.22	Low
11	I support students to use ICT to demonstrate their understanding of concepts.	3.15	0.89	High	3.13	0.85	High
12	I encourage students to use ICT to process data information for problem solving.	3.12	0.77	High	3.42	0.85	High
13	I support students to use ICT to improve digital literary skills.	2.58	1.13	Low	2.69	1.20	Low
14	Use of ICT to map a student's preferred learning style by identifying areas for improvement.	2.70	0.77	Low	2.69	1.12	Low
15	Use ICT as instructional software to consolidate learning.	2.70	0.91	Low	2.92	0.81	Low
16	Use as the advance features of search engines to research a topic.	2.72	1.08	Low	2.79	0.77	Low
17	Use of graphic organizers to visualize teachers/students thinking processes.	3.46	0.54	High	3.02	0.69	High
18	Use ICT for instant messaging in communicating to the school.	3.53	0.64	High	2.16	1.19	Low
	Total Grand Mean	3.03			2.73		
Social Aspect of ICT use in Education							
19	Use ICT to give information to other teachers about students performance to support transitions between classes.	3.45	0.65	High	2.98	0.81	Low
20	Use ICT to access students' records for the purpose of reflecting on their previous year's performance.	3.03	0.76	High	2.90	1.13	Low
21	Use ICT for reporting to parents.	3.61	0.54	High	3.03	0.89	High
22	Use ICT to capture evidence of student performance.	2.79	0.80	Low	2.67	0.77	Low
23	Use ICT for student task, such as online test /assignment.	3.39	0.61	High	2.65	1.39	Low
24	Use ICT to analyze assessment data finding to inform curriculum planning.	3.46	0.69	High	3.44	0.73	High
25	Use ICT to give feedback to students on their performance.	2.92	0.94	Low	3.08	1.18	High
	Total Grand Mean	3.24			2.96		
Adopt ICT in Teaching							
26	Use of ICT influences my classroom combinations of students grouping for learning such as small groups in class.	3.33	0.61	High	2.16	1.13	Low
27	Use of ICT influences my classroom organization by providing a range of different activities within a lesson.	2.95	0.83	Low	2.37	1.04	Low
28	Use of ICT influences my classroom organization by catering for different learning styles.	3.52	0.59	High	3.02	1.09	High
29	Uses of ICT influence my classroom organization by providing personalized learning opportunities.	2.72	0.69	Low	2.11	0.93	Low
	Total Grand Mean	3.13			2.42		
Cooperative ICT in Education							
30	I undertake ICT professional learning to gain ICT skills that can be applied in my classroom in practical ways.	3.19	0.75	High	2.88	0.89	Low
31	I ensure I keep up to date on new technologies for teaching-learning.	2.91	0.75	Low	2.64	1.13	Low
32	I undertake ICT professional learning to lead the use of ICT to strengthen pedagogy practice within my schools.	3.24	0.62	High	2.72	1.12	Low
33	I undertake ICT professional learning to gain skills that enable integration of ICT into planned learning activities.	2.81	0.88	Low	2.30	1.24	Low
	Total Grand Mean	3.04			2.64		
Embedding learning about ICT							
34	I provide a safe ICT environment.	2.96	0.88	Low	2.53	1.14	Low
35	I initiate discussion with teacher's on the use of ICT in schools.	2.69	0.84	Low	3.10	0.81	High
36	I support students' access to ICT anytime/anywhere safe for learning.	2.80	0.97	Low	2.74	1.14	Low
37	I promote the importance of safe practice in the use of ICT to my schools community.	3.16	0.89	High	2.51	1.00	Low
38	I use ICT to support students to improve their ability in processing large quantities.	2.64	0.82	Low	2.44	1.19	Low
39	Use ICT to ensure that student manage their files to secure their content for efficient retrieval	2.47	1.05	Low	2.85	1.24	Low
40	I work to ensure that all teachers/ students in my school are aware of the policies, required for safe use of ICT.	3.10	0.93	High	2.32	1.17	Low
	Total Grand Mean	2.83			2.64		

Table 4.8, revealed the extent between young and old teachers on the extent of ICT use in teaching at basic education level with a total grand mean of 3.04 for young teachers and a total grand mean of 2.68 for old teachers. This indicated that young teachers agreed to items 1, 5, 8 and 9 with a mean range of 3.01-3.50 and a grand mean of 3.01 as high extent. That is they sometimes; can use ICT tool resources for classes; share ICT resources created with other teachers within school; actively promote the use of ICT resources beyond school and old teachers agreed to items 5, 8 and 9 with a mean range of 3.15- 3.64 as high extent on personal ICT competencies. However items 2, 3, 4, 6, and 7 with a mean range of 2.60- 2.89 indicated a low extent by young teachers on personal ICT competencies while items 1, 2, 3, 4 6, and 7 and with a mean range of 1.46- 2.97 showed a low extent by old teachers on personal ICT competencies.

ICT as mind tool, young teachers agreed to items 10, 11, 12, 17, and 18 with a mean range of 3.12-3.53 and a grand mean of 3.03 as high extent, also old teachers agreed to items 11, 12, and 17 with a mean range of 3.02-3.42 as high extent on mind tools. This implies that they sometimes: encouraged student to use ICT in clarifying thoughts for the purpose of evaluation; support students to use ICT to demonstrate their understanding of concepts; encouraged students to use ICT to process data information for problem solving; use of graphic organizers to visualize teachers/students thinking processes; and use ICT for instant messaging in communicating to the school.

In social aspect of ICT use in education, young teachers agreed to items 19, 20, 21, 23, and 24 with a mean range of 3.03-3.61 and a grand mean of 3.24 as high extent also old teachers agreed to items 21, 24, and 25 with a mean range of 3.03-3.44 as a high extent. That is they sometimes: use ICT to give information to other teachers about students performance to support transitions between classes; use ICT to access students records for the purpose of reflecting on their previous year's performance; use ICT for reporting to parents; use ICT to analyze assessment data finding to inform curriculum planning; and use ICT to give feedback to students on their performance. However, items 22 and 25 with a mean range of 2.79- 2.92 indicated a low extent by young teachers, while items 19, 20, 22, and 23 with a mean range of 2.65-2.98, also indicated a low extent by old teachers.

In adopting ICT in teaching, items 26 and 28 with a mean range of 3.33-3.52 and a grand mean of 3.13 as high extent by young teachers. While item 28 with a mean of 3.02 indicated a high extent by old teachers. That is sometimes they: use ICT to influence classroom combinations of students grouping for learning such as small groups in class; and use ICT to influence classroom organization by catering for different learning styles, while items 27 and 29 with a mean range of 2.72 -2.95 as low extent by young teachers. More so, items 26, 27, and 29 with a mean range of 2.11- 2.27 and a grand mean of 2.42 indicated low extent by old teachers.

In cooperative ICT in education, young teachers agreed to items 30 and 32 with a mean range of 3.19-3.24 as a high extent. That is they sometimes: undertake ICT professional learning to gain ICT skills that can be applied in classroom in practical ways; and undertake ICT professional learning that strengthen pedagogy practice within schools .Items 31 and 33 with a mean range of 2.81-2.91 indicated a low extent. Therefore, items 30, 31, 32 and 33 with a mean range of 2.30-2.88 and a grand mean of 2.64 showed a low extent by old teachers cooperating ICT in education.

In embedding learning about ICT, young teachers agreed to items 37 and 40 with a mean range of 3.10-3.16 and old teachers agreed to items 35 with a mean of 3.10 as high extent. That is they sometimes: promote the importance of safe practice in the use of ICT to schools community; and work to ensure that all teachers / students in school are aware of the policies required for safe use of ICT, also items 34, 35, 36, 38 and 39 with a mean range of 2.47- 2.96 indicated a low extent by young teachers. Nevertheless, items 34, 36, 37, 38, and 39 and 40 with a mean range of 2.32 – 2.85 also revealed a low extent as identified by old teachers in embedding learning about ICT in teaching at basic education level.

Hypothesis 1

There is no significant difference between urban and rural teachers use of ICT in teaching at basic education level in South South Nigeria.

Table 4.9:t-test analysis of Urban and Rural Teachers use of ICT in teaching at basic education level.

Respondents	N	\bar{x}	SD	DF	t-cal	t-Crit	Level of sign	Decision
Urban Teachers	558	58.68	6.98					
Rural Teachers	456	57.77	6.57	1012	2.100	1.96	0.05	Significant (Rejected)

The results in Table 4.9 revealed that the t-calculated value of 2.100 was greater than the t-critical value of 1.96. Therefore, the null hypothesis was rejected. This implied that there was significant difference between urban and rural teachers use of ICT in teaching at basic education level in South South Nigeria.

Hypothesis 2

There is no significant difference between graduate and non- graduate teachers use of ICT in teaching at basic education level in South South Nigeria.

Table 4:10: t- test analysis of Graduate and Non- Graduate Teachers use of ICT in teaching at basic education level.

Respondents	N	\bar{x}	SD	DF	t-cal	t-Crit	Level of sign	Decision
Graduate Teachers	485	53.85	8.25					
Non-Graduate Teachers	529	50.23	8.52	1012	6.840	1.96	0.05	Significant (Rejected)

In the Table 4.10, the t-calculated value of 6.840 was greater than the t-critical value of 1.96. Hence, the null hypothesis was rejected. This indicates that there was significant difference between graduate and non-graduate teachers use of ICT in teaching at basic education level in South-South Nigeria.

Hypothesis 3

There is no significant difference between less experienced and experienced teachers' use of ICT in teaching at basic education level in South South Nigeria.

Table 4.11: t-test analysis of Less Experienced and Experienced teachers' use of ICT in teaching at basic education level

Respondents	N	\bar{x}	SD	DF	t-cal	t-Crit	Level of sign	Decision
Less Experience Teachers	610	52.08	8.09					Not
Experienced Teachers	404	51.36	8.85	1012	1.329	1.96	0.05	Significant (Accepted)

Table 4.11, showed, that the t-calculated value of 1.329 was less than the t-critical value of 1.96, however, the null hypothesis was accepted. This showed that there was no significant difference less experienced and experienced teachers' use of ICT in teaching at basic education level in South South Nigeria.

Hypothesis 4

There is no significant difference between pre-service and in-service teachers use of ICT in teaching at basic education level in South South Nigeria.

Table 4.12: t-test analysis of Pre-service and In-service Teachers use of ICT in teaching at basic education level.

Respondents	N	\bar{x}	SD	DF	t-cal	t-Crit	Level of sign	Decision
Pre-service Teachers	537	54.77	7.06					
In-service Teachers	477	49.67	8.06	1012	10.722	1.96	0.05	Significant (Rejected)

Table 4.12, indicated that the t-calculated value of 10.722 was greater than the t-critical value of 1.96. Hence, the null hypothesis was rejected. This showed that there was significant difference between pre-service and in-service teachers use of ICT in teaching at basic education level in South South Nigeria.

Hypothesis 5

There is no significant difference between male and female teachers use of ICT in teaching at basic education level in South South Nigeria.

Table 4.13: t-test analysis of Male and Female Teachers use of ICT in teaching at basic education level.

Respondents	N	\bar{x}	SD	DF	t-cal	t-Crit	Level of Sign	Decision
Male Teachers	487	51.75	7.74					
Female Teachers	527	45.73	11.31	1012	9.80	1.96	0.05	Significant (Rejected)

In Table 4.13, the t-calculated value of 9.80 was greater than the t-critical value of 1.96. Therefore, the null hypothesis was rejected. This revealed that there was significant difference between male and female teachers use of ICT in teaching at basic education level in South South Nigeria.

Hypothesis 6

There is no significant difference between single sex and mixed schools teachers use of ICT in teaching at basic education level in South South Nigeria.

Table 4.14: t-test analysis of Single sex and Mixed School Teachers use of ICT in teaching at basic education level.

Respondents	N	\bar{x}	SD	DF	t-cal	t-Crit	Level of sign	Decision
Single sex school teachers	497	47.59	8.24					Not Significant
Mixed school teachers	517	46.78	5.66	1012	1.517	1.96	0.05	Significant (Accepted)

The results in Table 4.14, indicated that the t-calculated value of 1.817 was less than the t-critical value of 1.96. Hence, the null hypothesis was accepted. This implied that there was no significant difference between single sex and mixed school teachers use of ICT in teaching at basic education level in South-South Nigeria.

Hypothesis 7

There is no significant difference between young and old teachers use of ICT in teaching at basic education level in South-South Nigeria.

Table 4.15: t-test analysis of Young and Old Teachers use of ICT in teaching at basic education level

Respondents	N	\bar{x}	SD	DF	t-cal	t-Crit	Level of sign	Decision
Young Teachers	603	52.66	7.52					
Old Teachers	411	50.64	5.89	1012	4.571	1.96	0.05	Significant (Rejected)

Table 4.15, showed that the t-calculated value of 4.571 was greater than the t-critical value of 1.96. Therefore, the null hypothesis was rejected. This indicated that there was significant difference between young and old teachers use of ICT in teaching at basic education level in South South Nigeria.

Discussion of Results

The findings of the results were discussed under the following subheadings;

Urban and Rural Teachers use of ICT in Teaching at Basic Education Level.

The finding in research question 2, Table 4.2 showed the difference between urban and rural teachers on the extent of ICT use in teaching at basic education level with a total grand mean of 3.10 for urban and 2.87 for rural. This also indicated the grand means for items 1-9 on personal ICT competencies as 3.04 and 2.98; items 10 -18 on ICT as a mind tools were 3.15 and 3.17; items 19 -25 on social aspect of ICT used in education were 3.07 and 2.25; items 26-29 on adopting ICT in teaching were 3.14 and 2.65; items 30 -33 on cooperative ICT in education were 3.10 and 3.11 and items 34-40 on embedding learning about ICT were 3.07 for urban and rural teachers. This implies that urban teachers have high extent on personal ICT competencies, social aspect of ICT use in education and adopting ICT in teaching than the rural teachers at basic education level.

The result in hypothesis 1 revealed that there was significant difference between urban and rural teachers use of ICT in teaching at basic education level. This finding supports the view of Liverpool (2002) which indicated that the ICT resources tend to be more available in urban schools than in rural schools .That is teachers in urban schools are increasingly being equipped with computer for teaching, learning and administrative purposes than teachers in rural schools.

Graduate and Non-Graduate Teachers Use of ICT in Teaching at Basic Education Level

The results in research question 3, Table 4.3 on graduate and non – graduate teachers use of ICT in teaching, indicated that the grand means of items 1-9 on personal ICT competencies were 3.11 and 2.67; items 10-18 on ICT as a mind tools were 3.11 and 2.74; items 19-25 on social aspect of ICT use in education were 3.34 and 2.90; items 26-29 on adopting ICT in teaching were 3.17 and 2.53; items 30-33 on cooperative ICT in education were 3.08 and 2.68 and items 34-40 on embedding learning about ICT were 3.04 and 2.47. This revealed that graduate teachers have high extent on personal ICT competencies, ICT as mind tools, social aspect of ICT use in education, adopting ICT in teaching, cooperative ICT in education and embedding learning about ICT in teaching than the non-graduate teachers at basic education level.

The finding in hypothesis 2 indicated that there was significant difference between graduate and non-graduate teachers use of ICT in teaching at basic education level. The study is in support of the results of Abdal-Haqq (1995), and Basu (1997) who find that graduate teachers demonstrate introductory knowledge skills and understanding of concepts related to the use of materials needed for instructional process and the continual growth in technology knowledge and skills to stay abreast of current and emerging technologies, and informed decisions regarding the use of ICT in support of student learning than their non-graduate counterparts. This indicated that graduate teachers were taught computer during their training programme in school. The study also support the finding of Markauskaite (2006) who indicated that there was significant

difference between graduate and non-graduate teachers in technical ICT capabilities and situational and longitudinal sustainability.

Less Experienced and Experienced Teachers Use of ICT in Teaching at Basic Education Level

In research question 4, Table 4.4 on experienced and less experienced teachers use of ICT in teaching, showed that the grand means for items 1-9 on personal ICT competencies were 3.32 and 3.29; items 10-18 on ICT as a mind tools were 2.50 and 2.51; item 19 -25 on social aspect of ICT in teaching was 3.27; items 26 -29 on adopting ICT in teaching was 3.08; items 30 -33 on cooperative ICT in education was 2.13 and items 34 -40 on embedding learning about ICT were 2.92 and 2.87. This showed that both experienced and less experienced teachers have high extent on personal ICT competencies, and social aspect of ICT in teaching. While they have low extent on ICT as a mind tools, adopting ICT in teaching, cooperative ICT in education and embedding learning about ICT in basic education level.

The finding in hypothesis 3 revealed that there was no significant difference between less experienced and experienced teachers' use of ICT in teaching at basic education level in South South Nigeria. This finding is at variance with U.S National Centre for Education Statistics (2000), which stated that less experienced in teaching were more likely to integrate ICT in their teaching than teachers with more experienced in teaching. According to the report, teachers with up to three years teaching experience reported spending 48% of their time utilizing ICT, teachers with teaching experience between 4 - 9 years, spending 45% of their time and finally, teachers with more than 20 years teaching experience utilize ICT 33% of their time. The reason to this could be that

fresh teachers are more experienced in using technology. However, the study supports the studies of Granger, Morbey, Lotherington, Owston & Wideman (2002) who conducted a qualitative survey on factors contributing to teacher's successful implementation of ICT in Canada. They interviewed 60 respondents from 12 schools. The findings found no relationship between less experienced and experienced teacher's use of ICT in teaching. This implies that teacher' ICT skills and successful implementation is complex and not a clear predictor of ICT integration.

Pre-Service and In-Service Teachers Use of ICT in Teaching at Basic Education Level

The result in research question 5, Table 4.5 on pre-service and in-service teachers use of ICT in teaching, revealed that the grand means for items 1-9 on personal ICT competencies were 3.04 and 2.97; items 10-18 on ICT as a mind tools were 3.12 and 3.10; items 19 -25 on social aspect of ICT use in education 3.04 and 2.24; items 26 -29 on adopting ICT in teaching were 3.13 and 2.65; items 30 -33 on cooperative ICT in education were 3.10 and 3.11 and items 34 -40 on embedding learning about ICT was 3.07 for both pre-service and in-service teachers. This indicated that pre-service teachers have a high extent on personal ICT competencies, social aspect of ICT use in education and adopting ICT in teaching than the in-service teachers at basic education level.

In hypothesis 4, the result indicated that there was significant difference between pre-service and in-service teachers use of ICT in teaching at basic education level in South South Nigeria. The finding is in agreement with Paraskeva, Bouta & Papagianna, (2008) for literature to has reported that pre-service teachers who have acquired higher level of technological skills are more willing to use technology in classroom them their

in-service teachers. The finding is also in line with Muller and his colleagues (2008), which stated that in a study of 400 pre-service teachers showed that professional development and the continuity support of good practice are among the greatest determinants of successful ICT use in classroom than their in-service teachers. The study was also in agreement with Ozoden (2007) in his recent research in Turkey; found that the main problem with the implementation of ICT in science was the insufficient amount of in-service training programs for science teachers.

Male and Female Teachers Use of ICT in Teaching at Basic education Level

The finding in research question 6, Table 4.6 on male and female teachers use of ICT in teaching, indicated that the grand means for items 1-9 on personal ICT competencies were 3.05 and 2.67; items 10 -18 on ICT as a mind tools was 3.08; items 19 -25 on social aspect of ICT use in education were 3.34 and 2.90; items 26-29 on adopting ICT in teaching were 3.17 and 2.53; items 30-33 on cooperative ICT in education were 3.06 and 2.68 and items 34-40 on embedding learning about ICT were 3.03 and 2.47. This implies that Male teachers have high extent on personal ICT competencies; social aspect of ICT use in education, adopting ICT in teaching, cooperative ICT in education and embedding learning about ICT than female teachers at basic education level.

Finding in hypothesis 5, showed that there was significant difference between male and female teachers use of ICT in teaching at basic education level in South South Nigeria. This finding was in agreement to Volman & Van Eck, (2001) that gender differences and the use of ICT have been reported in several studies. However, studies concerning teachers' gender and ICT use have cited female teachers' low levels of ICT use due to their limited technology access, skill and interest. Similarly (Kay, 2006;

Wonzey, Venkatesh, Abrami (2006) revealed that male teachers used ICT more in their teaching and learning processes than their female counterparts. This study was at variance to Jamieson- Proctor, Burnett, Finger and Waston (2006) who conducted a study on teachers' integration of ICT in schools in Queensland State. Results from 929 teachers indicated that female teachers were integrating ICT into their teaching less than the male teachers. The study was also at variance to Adams (2002) that female teachers applied ICT more than the male teachers.

Single Sex and Mixed School Teachers Use of ICT in Teaching at Basic Education Level.

The finding in research question 7, table 4.7 on teachers in single sex and mixed schools on ICT use in teaching, indicated that the grand means for items 1-9 on personal ICT competencies were 3.26 and 3.33; items 10-18 on ICT as a mind tools were 2.48 and 2.50; items 19-25 on social aspect of ICT use in education were 3.35 and 3.27; items 26-29 on adopting ICT in teaching were 3.07 and 3.08; items 30-33 on cooperative ICT in education was 2.13 and items 34 -40 on embedding learning about ICT were 2.78 and 2.88. This revealed that both teachers in single sex and mixed school have high extent on personal ICT competencies, social aspect of ICT use in education and adopting ICT in teaching. While they have low extent in ICT as a mind tools, cooperative ICT in education and embedding learning about ICT at basic education level.

Result in hypothesis 6, revealed that there was no significant difference between single sex and mixed school teachers use of ICT in teaching at basic education level in South South Nigeria. This finding concur to Schiller, (2011) that more research support the idea that teachers behaviour in single sex and mixed schools determines success or

failure of schools to implement ICT in its activities. From the study, it can be concluded that teacher's behaviour in single sex and mixed sex schools are very important in implementation of ICT in schools. In school, positive behaviour towards ICT would manifest itself by the way the teachers in both schools uses ICT and encouraged others to use it. The study was also in agreement with Nicholson, Gelpi, Young and Sulzby (1998) who reported on teachers in single sex and mixed schools and found that both fostered a positive attitude towards technology use in classroom.

Young and Older Teachers Use of ICT in Teaching at Basic Education Level

The finding in research question 8, table 4.8 on young and old teachers use of ICT in teaching showed that the grand means for items 1-9 on personal ICT competencies were 3.01 and 2.71; items 10 -18 on ICT as a mind tools were 3.03 and 2.73; items 19 -25 on social aspect of ICT use in education were 3.24 and 2.96; items 23 -29 on adopting ICT in teaching were 3.13 and 2.42; items 30 -33 on cooperative ICT in education were 3.04 and 2.64 and items 34 -40 on embedding learning about ICT were 2.83 and 2.64. This showed that young teachers have high extent on personal ICT competencies, ICT a mind tools, social aspect of ICT use in education, adopting ICT in teaching than the old teachers at basic education level. While both young and old teachers have a low extent on embedding learning about ICT in teaching at basic education level.

In hypothesis 7, there was significant difference between young and old teachers use of ICT in teaching at basic education level in South South Nigeria. This studies supports the studies of Russell, Bebell, O'Dwyer and O'Connor, (2003) who found that young teachers who where highly skilled with technology incorporate ICT in teaching than old teachers who did not incorporate ICT in their teaching. The study is also in line

with Jennings and Onwuegbuzie (2001), which stated that young teachers were found to be associated with more positive attitudes towards ICT. This was in agreement with the report by the U.S National Centre for Education Statistics (2000) which indicated that young teachers score higher on their perception of ICT, and have translated their positive perception into higher degree of ICT use in education. This indicates that young teachers make more use of ICT in schools, compared to the old teachers.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

This Chapter presents the summary of research findings, and conclusion, recommendations, contribution to knowledge, and suggestions for further studies.

Summary of the Study

The study evaluated teachers' use of information and communication technology in teaching at basic education level in South South Nigeria. The study also evaluated urban, rural, graduate, non-graduate, less experienced, experienced, pre-service, in-service, male, female, young, and old teachers, single sex and mixed schools teachers. Eight research questions were raised and seven null hypotheses were formulated to guide the study.

The study was based on behaviourist theory and social-cultural theories of learning. The behaviourist theory sees human behaviour as the product of stimulus variables and organism variables, while the social- cultural theories of learning claim that all human's action was mediated by tools. The conceptual model was seated on accreditation model which relies on expert's opinion to determine the quality of programme. The population of the study consisted of 21617 teachers in basic secondary schools in three states out of six states in South South Nigeria (Delta, Edo and Rivers States). Multi-stage sampling procedure was used and stratified random and simple random sampling techniques were used to draw a sample of 1014 respondents from three states. The study was a descriptive survey of expost - facto research design that employed questionnaire in sampling the opinions of the respondents. The instrument was titled

“Questionnaire on Evaluation of Teachers use of Information and Communication Technology in Teaching at Basic Education Level” (QETUICTBEL). The questionnaire was validated at its face by expert judgment. For content and construct validity of the instrument factor analysis was used. The reliability coefficient of the instrument was obtained by using Cronbach Alpha for estimating the internal consistency of the instrument which yielded an alpha reliability of 0.88. The research questions were answered using mean and standard deviation while the hypotheses were analyzed by using t-test statistics at 0.05 level of significance.

Findings

The following findings were obtained in the study;

1. There was a significant difference between urban and rural teachers on the extent of ICT use in teaching at basic education level in South South Nigeria.
2. There was a significant difference between graduate and non- graduate teachers on the extent of ICT use in teaching at basic education level between in South South Nigeria.
3. There was no significant difference between less experienced and experienced teachers on the extent of ICT use in teaching at basic education level in South South Nigeria.
4. There was a significant difference between pre-service and in-service teachers on the extent of ICT use in teaching at basic education level in South South Nigeria.
5. There was a significant difference between male and female teachers on the extent of ICT use in teaching at basic education level in South South Nigeria.

6. There was no significant difference between single sex and mixed school teachers on the extent of ICT use in teaching at basic education level in South South Nigeria.
7. There was a significant difference between young and old teachers on the extent of ICT use in teaching at basic education level in South-South Nigeria.

Conclusion

Based on the findings, the following conclusions were drawn: The study revealed that urban, graduate, pre-service, male and young teachers had high extent on ICT use in teaching at basic education level in South South Nigeria .Non-graduate teachers, less experienced teachers and experienced teachers, in-service teachers, female teachers and teachers in single sex and mixed schools had low extent on ICT use in teaching at basic education level in South-South Nigeria.

Recommendations

In view of the findings, the following recommendations were made:

1. ICT skills standards for teaching should be set up for urban, rural, graduate, non-graduate ,pre-service ,in-service, male, female, young, old, experienced, less experienced teachers and teachers in single sex and mixed schools that offers strategies for planning, training needs and staff development programme on ICT use.
2. Government and other stakeholders (Parents Teachers Association, Old Students' Association), should provide more computers, laptops, computer aided instruction (CAI) software, computer laboratory equipment to schools to enhance teachers lesson delivery at basic education level in South South Nigeria.

3. Teacher training institutions should train teachers on ICT skills and competencies required for classroom teaching at basic education level in South South Nigeria.
4. Teachers in basic education level in South South Nigeria should attend seminars, conferences and computer literacy workshops on regular basis to keep them abreast of ICT based instruction.

Contributions to Knowledge

This study contributed to knowledge in the following ways:

1. The study has provided information regarding the practice on ICT use in teaching at Basic Education level in South South Nigeria.
2. The study demonstrated that the ICT tools enhanced teachers' effective lesson delivery at Basic Education level in South South Nigeria.
3. The study established the extent of teachers use of multimedia instructional tools of ICT that are more dynamic and captivating to the teaching at Basic Education level.
4. The study has established perception of teacher's skill in adoption and use of information communication technology in public secondary schools in South South Nigeria.
5. The study also established perception of teacher's skills, practice of information and communication technology in teaching – learning at basic education level in South South Nigeria.

Suggestions for Further Study

Evaluation of teachers use of information and communication technology in teaching at basic education level in South South Nigeria have been investigated in this study; however, there is need for further research in the following areas;

1. Evaluation of lecturers' use of information and communication technology in teaching at tertiary level in South East Nigeria.
2. Assessment of teachers' skill in adoption and use of information and communication technology in public secondary schools, South West Nigeria.
3. Perception of teacher's skills, practice of information and communication technology in teaching- learning at basic education level in North Central Nigeria.
4. Evaluation of teachers' competencies in the use of information and communication technology in teaching- learning in basic education level in North East Nigeria.
5. Evaluation of teachers' needed competencies for instructional use of information and communication technology in secondary schools in North West Nigeria.

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APPENDIX 1

Table 1 (a) list of Local Government Area with number of schools and population of teachers in public secondary schools in Delta State.

S/N	Local Government Area	Number of schools	Number of Teachers
1	Aniocha North	17	364
2	Aniocha South	17	447
3	Bomadi	8	68
4	Burutu	15	173
5	Ethiope East	24	482
6	Ethiope West	12	333
7	Ika North East	18	852
8	Ika South	17	863
9	Isoko North	18	403
10	Isoko South	18	316
11.	Ndokwa East	16	112
12	Ndokwa West	21	316
13	Okpe	11	326
14	Oshimili North	9	336
15	Oshimili South	8	574
16	Patani	8	412
17	Sapele	16	479
18	Udu	8	552
19	Ugheli North	34	1125
20	Ugheli South	20	641
21	Ukwuani	12	317
22	Uvwie	11	791
23	Warri North	8	184
24	Warri South	12	1186
25	Warri South West	4	102
	Total	362	11754

Source: Ministry of Basic and Secondary Education, Asaba.

Table 1 (b): List of Local Government Areas with number of schools and population of Teachers in public secondary schools in Edo State.

S/N	LOCAL GOVT AREA	NUMBER OF SCHOOLS	NUMBER OF TEACHERS
1	Akoko Edo	20	250
2	Egor	35	688
3	Esan Central	19	172
4	Esan North East	30	230
5	Esan South East	26	216
6	Esan West	34	322
7	Etsako Central	16	71
8	Etsako East	17	113
9	Etsako West	25	237
10	Igueben	30	84
11	Ikpoba-okha	35	725
12	Oredo	37	725
13	Orihionmwon	46	378
14	Ovia North East	26	593
15	Ovia South West	16	62
16	Owan East	39	251
17	Owan West	20	256
18	Uhunmwode	46	254
	Total	517	5663

Source: Ministry of Education Benin City

Table 1 (c): List of Local Government Areas with number of schools and population of Teachers in public secondary schools in Rivers State.

S/N	LOCAL GOVT AREA	NUMBER OF SCHOOLS	NUMBER OF TEACHERS
1	Abua-odual	16	191
2	Andoni	15	188
3	Akuku-Toru	11	173
4	Ahoada-East	17	210
5	Ahoada West	18	212
6	Asari-Toru	16	199
7	Bonny	9	163
8	Degema	17	201
9	Eleme	11	181
10	Emohua	24	191
11	Etche	24	195
12	Gokana	17	189
13	Ikwerre	18	200
14	Khana	27	181
15	Obia-Akpor	21	171
16	Ogba-Egbema-Ndoni	20	172
17	Ogu-Bolo	8	156
18	Okrika	11	164
19	Omumma	8	149
20	Opobo-Nkoro	8	157
21	Oyigbo	9	154
22	Port Harcourt	20	216
23	Tai	15	193
	Total	360	4200

Source: Rivers State Ministry of Education, Port Harcourt.

Table 2: List of Sampled Local Government Areas, Schools and Teachers

S/N	L.G.A	No. of schools	No. of Teachers	25% of sampled schools	20% of sampled Teachers
1	Oshimili South	8	574	2	115
2	Ughelli North	34	1125	8	225
3	Warri South	12	1186	3	237
4	Oredo	37	725	9	145
5	Ovia North East	26	593	7	119
6	Etsako West	25	273	6	55
7	Ahoada West	18	212	5	42
8	Okrika	11	164	3	33
9	Port - Harcourt	20	216	5	43
	Total	191	5068	48	1014

APPENDIX 2

EVALUATION OF TEACHERS' USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING AT BASIC EDUCATION LEVEL QUESTIONNAIRE (ETUICTTBELQ)

Department of Guidance and
Counselling,
Delta State University,
Abraka.

Dear Respondent,

This research is being undertaken in the Department of Guidance and Counseling in Faculty of Education, Delta State University, Abraka. The study is being undertaken for a Doctorate Degree Programme. The purpose of the research is to Evaluate Teachers use of Information and Communication Technology in Teaching at Basic Education Level in South South Nigeria (Delta, Edo and Rivers States). Your participation and co-operation are very crucial to the success of this study.

It will be highly appreciated if you could respond honesty to all items in the questionnaire. The information given will be treated with utmost confidentiality.

Thank you.

Enwefa C.
(Post-Graduate Research Student)

Instruction

Please read each of the items below very carefully and indicate your response by making a tick good (√) in the appropriate box provided. Kindly tick ONLY ONE BOX that most represents your opinion in each of questions/statements. Respond to every question/Statement in all the sections.

SECTION A

Respondents' Biodata

Please tick good (√)

1. Name of School:.....
2. Location of School: urban [] Rural []
3. Sex: Male [] Female []
4. Academic Qualification:
 - i. BA/B.Sc [] ii B.Ed []
 - iii. B.Sc [] iv. B.A (Ed) []
 - v. PGDE [] vi. M.Ed []
 - vii. M.Sc [] viii. M.Sc (Ed) []
 - ix Ph.D (Ed) [] x. H.N.D []
 - xi. N.C.E [] xii. O.N.D []

Years of Teaching experience:

0 – 9 years [] 10 years and above []

Age: i. 21 – 35 years []

ii. 36 - 49 years []

iii. 50 years and above []

Training: Pre-Service [] In-service []

SECTION B:

Evaluation of Teachers use of Information and Communication Technology in Teaching at Basic Education Level (ETUICCTBEL).

Please kindly signify your sincere response by ticking good (√) in the appropriate column against the items that best represent your opinion. Thank you.

Note that there are five (5) alternatives responses to each of the following statements, namely: V.O for Very Often (5 points), O for Often (4 points), ST for Some Time (3 points), VL for Very Little (2 points) and NT for Not at All (1 point).

		5 VERY OFTEN	4 OFTEN	3 SOME TIME	2 VERY LITTLE	1 NOT AT ALL
	Personal ICT Competencies					
1	I can, use ICT tool resource for my classes					
2	I can create effective ICT students resources for my classes					
3	I can access ICT resources from a number of education specific sources outside my school					
4	I ensure resources in my classroom are relevant to learning activities					
5	I share ICT resources that I have created with other teachers within my school					

6	I support other teachers within my schools to ensure ICT resources are relevant to learning activities.					
7	I ensure that all ICT resources in my school are easily accessible by staff and students.					
8	I actively promote the use of ICT resources within my schools for teaching-learning.					
9	I promote the use of ICT resources beyond my school.					
	ICT as a Mind tool					
10	I encourage students to use ICT in clarifying thoughts for the purposes of evaluation.					
11	I support students to use ICT to demonstrate their, understanding of concepts.					
12	I encourage students to use ICT to process information for problem solving.					
13	I support students to use ICT to improve digital literacy skills.					
14	Use of ICT to map a student's preferred learning style by identifying areas for improvement.					
15	Use ICT as instructional software to consolidate learning.					
16	Use ICT as the advance features of search engines to research a topic.					
17	Use of graphic organizers to visualize teachers/students thinking processes.					
18	Use ICT for instant messaging in communicating to the school.					
	Social Aspect of ICT use in Education					
19	Use ICT to give information to other teachers about students' performance to support transitions between classes.					
20	Use ICT to access students' records for the purpose of reflecting on their previous year's performance.					
21	Use ICT for reporting to parents					
22	Use ICT to capture evidence of student performance.					
23	Use ICT for student task, such as online test / assignment.					
24	Use ICT to analyses assessment data report finding to inform curriculum planning.					
25	Use ICT to give feedback to students on their performance.					

	Adopt ICT in teaching					
26	Use of ICT influences my classroom combinations of students grouping for learning such as small groups in class.					
27	Use of ICT influences my classroom organization by providing a range of different activities within a lesson.					
28	Use of ICT influences my classroom organization by catering for different learning styles.					
29	Use of ICT influence my classroom organization by providing personalized learning opportunities.					
	Cooperative ICT in Education					
30	I undertake ICT professional learning to gain ICT skills that can be applied in my classroom in practical ways.					
31	I ensure I keep up to date on new technologies for teaching-learning.					
32	I undertake ICT professional learning that strengthens pedagogy practice within my schools.					
33	I undertake ICT professional learning to gain skills that enable integration of ICT into planned learning activities.					
	Embedding learning about ICT					
34	I provide a safe ICT environment					
35	I initiate discussion with teachers on the use of ICT in schools					
36	I support students access to ICT anytime/ anywhere safe for learning.					
37	I promote the importance of safe practice in the use of ICT to my schools community.					
38	I use ICT to support students to t improve their ability in processing large quantities					
39	Use ICT to ensure that student manage their files to secure their content for efficient retrieval.					
40	I work to ensure that all teachers / students in my school are aware of the policies required for safe use of ICT.					

Appendix 3

Content Validity Estimates of loaded items in Five Factors Structure ETUICCTBEL

Factors	No of items	Explained variance %
1	10	50.91
2	11	16.40
3	8	8.44
4	7	5.49
5	4	4.17
Total	40	85.41
	Explained cumulative Variance %	85.41%
	unexplained Variance	14.59%