ASSESSMENT OF AGRICULTURAL RESEARCHERS' UTILIZATION OF E-LEARNING AND E-REPORTING OF RESEARCH FINDINGS IN SELECTED INSTITUTIONS IN IMO STATE, NIGERIA.

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CERTIFICATION

This is to certify that this work, entitled **Assessment of Agricultural Researchers' Utilization of E-learning and E-reporting of Research Findings in Selected Institutions in Imo State, Nigeria,** was carried out by Madueke, Cheta Odinaka (20124760318) in partial fulfillment of the requirements for the award of Master of Science (M.Sc) degree in Agricultural Extension, Federal University of Technology Owerri, Imo State, Nigeria.

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DEDICATION

All glory to Almighty God as I dedicate this work to everyone who tirelessly seek to improve the existing knowledge and practice of agricultural extension through technological advancement.

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ABSTRACT

The study was designed to assess researchers' utilization of e-learning and e-reporting of research findings in selected institutions in Imo State, Nigeria. Some specific objectives were to identify the e-learning and e-reporting technologies available for use by agricultural researchers; determine the mastery level of skills in the application of e-learning and e-reporting technologies possessed by the respondents; assess the level of utilization of these technologies by agricultural researchers; and to identify factors/ challenges affecting the effective utilization of e-learning and e-reporting technologies by the agricultural researchers in the selected institutions in Imo State. Data were collected using structured and validated questionnaire from 150 agricultural researchers selected through proportionate, purposive and simple random sampling techniques. Descriptive and inferential statistical tools such as mean, frequency score, percentages, Ordinary Least Square (OLS), Z-Test, and Analysis of Variance (ANOVA) were used to analyze the data. Results showed that the level of utilization of e-learning and e-reporting technologies by agricultural researchers was low with a grand mean of 1.83; agricultural researchers in Imo State tertiary institutions considered the following factors, viz: irregular power supply, non-availability of fund, poor maintenance culture, poor network connection, lack of regular training, etc. to be serious challenges that affect the effective utilization of e-learning and e-reporting technologies in their institutions. The hypothetical analyses showed that there was a significant relationship between the socio-economic characteristics of the agricultural researchers and their level of utilization of the e-learning and e-reporting technologies in selected institutions in Imo State; agricultural researchers in selected institutions in Imo State do not differ significantly in their utilization of e-learning and e-reporting technologies. The study recommended that agricultural extension should develop techniques or improvise means to curtail the stream of challenges that would affect the effective utilization of these technologies as revealed from the study.

Keywords: Agriculture, Electronics, Utilization, E-learning, E-reporting, Tertiary institution, Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Agriculture is one of the major and most certain paths to economic growth and sustainability in Nigeria (Nwachukwu and Kanu, 2011). It encompasses all aspect of human activities - being the art, act, a cultural necessity and science of production of goods through cultivation of land and management of plants and animals which create an activity web-chain that satisfies social and economic needs. Since agriculture is the mainstay of mankind, wise nations all over the globe give it a priority attention by developing and exploiting the sector for the upkeep of their teeming populations through the earning of revenue for development purposes, as well as employment for the stemming down of crimes, corruption and other forms of indiscipline which work against all factors of life, and most of all economic production. While many nations in the world are working hard and reaping their harvests in this direction, Nigeria happens to belong among the few that have greatly retarded from their past glorious heights in agriculture, down to a near zero scale of agricultural production. This neglect according to Eugene (2010) is because of irresponsible and ill-purposeful leadership which has equally affected utilization of agricultural researches.

Baraje (2014) noted that agriculture is the art and science of growing plants and other crops and the raising of animals for food, other human needs, or economic gains. He described agriculture as both an art and a science (needs skill and founded on scientifically verified facts) and thus includes specialized disciplines. It includes crop/ plant growing, animal/ livestock production, fisheries, agro-forestry, processing, storage, marketing, transportation, etc. Its ultimate purpose is for food production, other human needs such as clothing, medicines, tools, artistic display and dwelling, or for economic gain or profit. In spite of the vast arable land, conducive climate and different agricultural

programs, the hope of Nigeria attaining self-sufficiency in food production has not been realized (Idachaba, 2006).

However, the challenges of meeting the growing food needs of sub-Saharan Africa cannot be successfully overcome without harnessing the abundant knowledge and capacity in Universities (Nwachukwu and Kanu, 2011). They also opined that Universities were the only institutions that can generate ideas and knowledge capable of overcoming extreme hunger, global warming and the challenges of economic meltdown through research. In other words, Universities can contribute significantly to food security and poverty eradication in Africa. For the Universities to achieve that, they must be able to operate at the global level and benefit from all the advantages that globalization offers (Nwachukwu and Kanu, 2011). Most Nigerian tertiary institutions today are already having computer study as part of their academic programs, most of them are still theoretical in nature to impact meaningfully on the society. The Nigeria University Commission recently established a virtual learning website but its impact is yet to be seen and it was too early to be assessed (Gbenga, 2006). In fact, ICT has had more impact on administrative services such as admission, registration, fee payment and purchasing than on the fundamentals of classroom teaching and learning. But even if ICT has not revolutionized the classroom yet through e-learning and e-reporting, it is changing the learning experience of students by relaxing time and space constraints as well as providing easier access to information online (journals and e-books; students portals; etc.), an achievement that should not be downplayed (Gambari and Okoli, 2007). Nwachukwu and Kanu (2011) also opined that higher food productivity could be accomplished through the establishment of an effective extension work in the rural areas. Ekong (2003) asserted that higher food productivity would be achieved through the education of farmers on new farming techniques, research findings and linking them with the sources of credits and inputs by a formidable extension service. Nwachukwu (2013) was of the opinion that extension is the “activity that disseminates research findings and

advice to farmers on agricultural practices and improves farmers' analytical capability and communication so as to help them in their decision making related to farming."

Agricultural extension is a general term meaning the application of scientific research and new knowledge to agricultural practices through farmer education. The field of 'extension' now encompasses a wider range of communication and learning activities organized for the rural and urban clientele by educators from different disciplines, including agriculture, agricultural marketing, health, and business studies (Ogunbameru, 2001). Extension practitioners can be found throughout the world, usually working for government agencies. They are represented by several professional organizations, networks and extension publications. Therefore, research and extension go hand in hand in achieving the agricultural development. Extension cannot be singled out from the pair, neither can research. The link between the two must be strong to ensure sustainable development in the agricultural sector. The considerable amount of knowledge and research information resulting from the activities of agricultural research facilities as well as the need to narrow the gap between what research findings suggest to be possible and feasible and what obtains, as noted by Nwachukwu (2003) require that extension eminently employs the act of communication towards realizing its objectives. This it does by ensuring that agricultural information flows from the producers (lecturers in different disciplines of agriculture) to consumers and from facilitators to the end-users. That is, ensuring that agricultural information and technologies get to the end users in the appropriate form and language, using the appropriate channels and media. After all, the full potentials of any agricultural research product is realized only when it is brought to the knowledge of the ultimate users (Nwachukwu, 2003).

The success of extension, therefore, depends on how effectively communication tools and channels are integrated and used by the change agent in disseminating agricultural research information to farmers, who ultimately make use of them. Technology has reorganized and left significant impact on how we live, how we interact, and how we learn since the last two decade. Research literature throughout the past decade has shown

that technology can enhance literacy development, impact language acquisition, provide greater access to information, supporting learning, motivate students and enhance their self-esteem (Hiemstra and Sisco, 1990; Hiemstra, 1994). Advancement in technology has given rise to the efficient use of electronic media in achieving an effective learning situation. Agba (2001) also referred to electronic media as any form of production or distribution of information to a mass audience using electronics as opposed to hardcopy forms. The primary electronic media sources familiar to the general public are video recordings, audio-recordings, multimedia presentations, slide presentations, CD-ROM and online content. Agba (2001) further stated that electronic media refers to media that use electronics or electro-mechanical energy for the end user (audience) to access the content. This is in contrast to static media (mainly print media), which today are most often created electronically, but do not require electronics to be accessed by the end user in the printed form.

The development of Information and Communication Technology has paved way for improvement in the way we learn and ease of imparting knowledge. The traditional chalk and black board system has gradually given way to sophisticated e-learning technology. The use of electronics as a medium for the transfer of knowledge to learners is referred to as 'e-learning' (Bernard, Undated). In the same vein, the use of electronics in reporting of research carried out in the field for view and understanding by the end users could also be referred to as e-reporting. A report or account is any informational work (usually of writing, speech, or electronic) made with the specific intention of relaying information or recounting certain events in a widely presentable form (Alexander, 2006). Alexander (2006) asserted in a general view that e-reporting technology was advantageous in terms of time, money and energy conservation.

Nigeria, a developing nation of the world has great potentials as the necessary materials needed to actualize full utilization of e-learning and e-reporting packages are readily available and relatively cheap to afford (Tope, 2015). Therefore, the worth of

agricultural researchers in Nigeria could be embellished through the active utilization of globally accepted educational technologies in their institutions of learning.

1.2 Statement of the Problem

Today, university lecturers all over the world can conduct research, teach and accomplish other academic tasks by using computers connected to the Internet to search and retrieve needed information from electronic catalogues, e-journals and large databases of digitized scholarly information (Marcum and George, 2003). Electronic forms of scholarly publications abound and are on the increase. Tenopir and king (2001) noted that "nearly two-thirds of all scientific journals are available both electronically and in print. Lecturers use varied forms of scholarly electronic publications in formal and informal settings to communicate with one another in the same discipline as well as with others beyond their disciplines and institution (Teferra, 2003). Consequent upon the change from paper to electronic format, lecturers are expected to develop new skills required to exploit information in electronic resources, but not much with regard to known skills in the application of these technologies is known to be possessed by agricultural researchers in the State.

E-learning technologies offer learners control over content, learning sequence, pace of learning, time, and often media, allowing them to tailor their experiences to meet their personal learning objectives. Innovations in e-learning technologies point toward a revolution in education, allowing learning to be individualized (adaptive learning), enhancing learners' interactions with others (collaborative learning), and transforming the role of the teacher. The integration of e-learning into education can catalyze the shift toward applying adult learning theory, where educators will no longer serve mainly as the distributors of content, but will become more involved as facilitators of learning and assessors of competency (Olojo, Adewunmi and Ajisola, 2012). According to O'Neill, Gurmakand and O'Donoghue (2004), the effectiveness of e-learning has been demonstrated primarily by studies of higher education, government, corporate, and

military environments. E-learners have demonstrated increased retention rates and better utilization of content, resulting in better achievement of knowledge, skills, and attitudes. Multimedia e-learning offers learners the flexibility to select from a large menu of media options to accommodate their diverse learning styles. It was with due regard to these advantages of educational technologies that the Nigerian Universities Commission established a virtual learning website but its impact and level of utilization was yet to be assessed (Gbenga, 2006), especially in a setting like Imo State.

The e-learning techniques mostly adopted by most of the Nigerian institution are in form of prepared lectures on a CD-ROM that can be played as at when the need arises. This has limited advantage because of the number of students per computer system in which most of the facilities are not interactive enough as compared with when the lecture is received in real time over the internet. The intranet facilities adopted in most schools are not well maintained because of its high cost of running especially in the absence of adequate power supply. Mostly, the students take the challenges upon themselves to go to the public internet cafes where there exist diverse attentions because of people with diverse interest on the net at the same time. The bandwidth shared on various systems at the cafes is very low. Hence, a multimedia interactive lecture will not be obtainable because of low bandwidth. The population of students is enormous and the facilities are inadequate. Despite all the hindrances/threat faced by e-learning in Nigerian institutions, institutions such as Federal School of Surveying, Oyo; University of Ibadan; Obafemi Awolowo University (OAU) Ile-Ife; University of Jos; University of Lagos; and recently the University of Uyo among others have the facilities for e-learning. This statistics is very low as a result of the remoteness in the location of some of these institutions in term of Information and Communication Technology (ICT).

Though, most of the institutions of higher learning in Nigeria have started building their ICT centres but the focus is mainly to put up an internet facility alone without considering other components that make up an e-learning centre (Olaniyi, 2006). This therefore results in limited access to current readable database on agricultural information

as agricultural research information service centres remain the custodian of CD-ROM database, multi-media knowledge base, in-house database, regional database, national and in-house publications (Omotayo, 2011). This situation is inadequate as it centralizes agricultural information access which does not support the much solicited client-focused, commercialized, private and pluralistic extension delivery. Despite these established facilities in Nigerian institutions of learning, not much seems to be known, neither is it in record as to which of the technologies are perceived to be available and accessible to agricultural researchers and as such, the extent to which the technologies are utilized by them.

In a bid to avoid gender bias in the mainstream of utilizing e-learning and e-reporting technologies, these technologies have been developed without restrictions to gender dynamics. According to Mattern (2009), reutilization of e-learning technologies or platforms smothers any sort of gender bias, thereby making the technology a gender-neutral tool with no outstanding technological appeal. In the light of this, not much is known with regard to the gender dynamics of mainstreaming these technologies among selected institutions in Imo state. A gap thus exists since no known study in the past has addressed these stated issues especially in a setting like Imo State which this study sort to achieve by addressing the following research questions which include:

1. What are the socio-economic characteristics of the agricultural researchers in the selected institutions in Imo State?
2. How many of the e-learning and e-reporting technologies are perceived to be available by agricultural researchers in selected institutions in Imo State?
3. What is the level of awareness of these technologies to the agricultural researchers in selected institutions in Imo State?
4. What is the mastery skill level in the application of these technologies possessed by agricultural researchers in selected institutions in Imo State?
5. How accessible are these technologies to agricultural researchers in selected institutions in Imo State?

6. What is the level of utilization of these technologies by agricultural researchers in selected institutions in Imo State?
7. What factors affect the effective utilization of these technologies as perceived by agricultural researchers in selected institutions in Imo State?

1.3 Objectives of the Study

The broad objective of the study was to assess the utilization of e-learning and e-reporting of research findings by agricultural researchers in selected institutions in Imo State, Nigeria. It was in a bid to address the existing knowledge gap that this study sort to achieve the following specific objectives, which were to:

i. discuss the socio-economic characteristics of the agricultural researchers in selected institutions in Imo State,
ii. identify the e-learning and e-reporting technologies available for use by agricultural researchers in selected institutions in Imo State,
iii. ascertain the level of awareness of the agricultural researchers on the use of e-learning and e-reporting technologies in selected institutions in Imo State,
iv. determine the mastery level of skills by respondents in the application of e-learning and e-reporting technologies,
v. ascertain the extent of accessibility of agricultural researchers in the selected institutions to utilize e-learning and e-reporting technologies,
vi. assess the level of utilization of e-learning and e-reporting technologies by agricultural researchers in selected institutions in Imo State, and
vii. identify the factors/ challenges affecting the effective utilization of e-learning and e-reporting technologies by the agricultural researchers in selected institutions in Imo State.

1.4 Hypotheses of the Study

The following hypotheses were tested:

a) There is no significant relationship between the socio-economic characteristics of the agricultural researchers and their level of utilization of e-learning and e-reporting technologies.

b) The male agricultural researchers do not differ significantly from their female counterparts in their level of utilization of e-learning and e-reporting technologies.

c) There is no significant difference in the level of utilization of these technologies by the agricultural researchers among the selected institutions in Imo State.

1.5 Significance of the Study

The objectives as well as the aims of both agricultural extension and education – gaining an ability, a skill, some knowledge, a new attitude, can swiftly be realized through the full application of electronic media in the diffusion of useful information as it broadens the horizon of the learning situation. The results of this study will reveal the phase at which agricultural researchers harness lucrative technologies available to them to better the diffusion of new knowledge obtained from research for use by end users of such information and other researchers as well. This research will serve as an eye-opener to agricultural researchers in the field making progresses, but having the reverse impact in the diffusion of discoveries obtained in the field and institutions of study. This is because information which is dispersed electronically is better appreciated, understood, stored and notwithstanding, adopted.

The results of this study will create an idea of a spontaneous structural reform of the conventional educational design in the minds of agricultural researchers with the prospect of increasing the access to research results as well as their indigenous knowledge systems to users of agricultural information through electronic media and associated technology. It will also serve as an alert for private investors/ businessmen to invest maximally in the procurement of associated electronic media materials, making them optimally available

and cheap enough to encourage its full utilization as done in other sectors/ fields of the State.

With the use of virtual library spreading across all corners of professionalism, proficiency in the production and use of the electronic media will enable agricultural researchers, extension service and practitioners to tap into the virtual library technology for documenting information on agricultural innovations, research findings, Indigenous Knowledge Systems, cultural practices as well as meeting other database management needs. The study will reveal to the understanding of many researchers that personal information as well as documents can be safely stored on a cloud storage database and easily downloaded whenever needed without any part of it being corrupted. As a matter of fact, this study will reveal a pack full of vital information that will serve as a template for more development in the field of agricultural research.

Finally, the recommendations of the study will enable institutions, agricultural researchers, extension organizations, administrators, educators, supervisors, policy makers, training programme planners, and extension practitioners identify challenges to the effective utilization of e-learning and e-reporting technology.

CHAPTER TWO

LITERATURE REVIEW

This chapter focused on the review of literature related to the topic under study. Researches on the attitude and willingness of researchers towards the use of e-learning and e-reporting technologies are numerous. The purpose of this review is to summarize related studies conducted outside and within Nigeria that have relevance to the present study. The various studies have been reviewed under the following sub headings:

1. Concept of Agricultural Research
2. Concept and Definition of Media
3. Concept of Electronic Media
4. Concept of Learning and E-Learning
5. Roadblocks in the Use of E-learning Technology
6. Concept of Utilization
7. Concept of Reporting and E-Reporting
8. Theoretical and Conceptual Framework

2.1 Concept of Agricultural Research

Since the middle of the 18th century, attempts were made to apply scientific knowledge to improvement of agriculture. By the middle of the 19th century, organised agriculture was taking place in the Agricultural Chemistry Association of Scotland and the Agricultural Experimental Station, Mockern, Saxony. This was due to the generally belief that investment in agricultural research will result in beneficial returns (Asopa and Beye, 1997).

The definition of the mission of agricultural research has varied over the years. In the 1960'sAldrich (1966) included it "to apply to all possible sources of scientific discovery to the solution of the technical and practical problems of agriculture; to engage in basic research where the lack of fundamental knowledge may impede progress; to solve the

specific problems with which agriculture is faced." In essence the mission of agricultural research was to increase yields and stability in the yields over the years. Research aimed at better varieties, plant nutrition, and water use as well as agricultural research and sustainable utilization of resources for the benefit of humanity and the environment.

Agricultural research seems to be the oldest form of organized research in the world. Agricultural research can be broadly defined as any research activity aimed at improving productivity and quality of crops by their genetic improvement, better plant protection, irrigation, storage methods, farm mechanization, efficiency marketing, and a better management of resources (Loebenstein & Thottappilly, 2007).

2.1.1 Aim of agricultural research

The global mission of agricultural research is to feed the ever-increasing population from 6.4 billion (2005) to an expected 9.4 billion in 2030. Generally, it can be said that this overall mission of agricultural research is to increase the efficiency of agricultural production and quality, enabling a decent income and living to the farmer, taking into account the ecological and social constraints.

An example of the mission of agricultural research in an industrial nation is that from the United States of America (http://www.cprl.ars.usda.gov):

a) Protecting crops and livestock from pest and diseases.
b) Improving the quality and safety of agricultural products.
c) Determine the best nutrition for people from infancy to old age.
d) Sustaining soil and other natural resources.
e) Ensuring profitability for farmers and processors.
f) Keeping cost down for consumers.

Table 2.1 List of national agricultural research institutes in Nigeria

s/n	NAME OF RESEARCH INSTITUTE	YEAR	FORMAL MANDATE
1	**Lake Chad Research Institute** P.M.B 1293, Gamboru Road Maiduguri, Borno State	1960	Genetic improvement and development of production technologies for wheat, millet, and barley; the improvement of the productivity of the entire farming system in the North Eastern Zone
2	**Institute for Agricultural Research** P.M.B 1044 Ahmadu Bello University. Samaru Zaria	1924	Genetic improvement and development of production and utilization technologies for sorghum, maize, cowpea, groundnut, Cotton, sunflower, and the improvement of the productivity of the entire crop-based farming system in the North West Zone of Nigeria
3	**Institute of Agricultural Research and Training** P.M.B 5029, Ibadan, Nigeria	1956	Soil and water management research, genetic improvement of kernel and jute, and improvement of the productivity of the entire farming system of the South West Zone
4	**National Cereal Research Institute** P.M.B 8 Badeggi, Bida Niger State	1975	1975 Genetic improvement and production of rice, soybean, benniseed, sugarcane and improvement of productivity of entire farming system of the Central Zone
5	**National Root Crop Research Institute** P.M.B 7006, Umudike, Umuahia, Abia State	1976	Genetic improvement of cassava, yam, cocoyam, Irish potato, sweet potato, and ginger and overall research in improvement of farming system of the South East Zone
6	**National Horticultural Research Institute** P.M.B 5432 Idi-Ishin, Ibadan	1975	Research into genetic improvement, production, processing and utilization of fruits and vegetables, as well as ornamental plants
7	**Nigerian Store Product Research Institute** P.M.B 1489km 3 Asa Dam Road, Ilorin Kwara State	1977	Research into improvement of major food and industrial crops and studies on stored product pest and diseases, pesticides formulation and residue analysis
8	**Rubber Research Institute of Nigeria** P.M.B 1049 Iyanomo Benin City	1961	Research into genetic improvement, production and processing of rubber and other lather producing plants
9	**Cocoa Research Institute of Nigeria** P.M.B 5244 Idi-Ayunre Ibadan	1964	Genetic improvement, production and local utilization research on cocoa, cashew, kola, coffee and tea
10	**Nigerian Institute for Oil Palm Research** P.M.B 1030 Benin City	1939	Research into genetic improvement , production and processing of oil, coconut, date, raphia and ornamental palms
11	**National Animal Production Research Institute** P.M.B 1096 Shika, Zaria	1977	Research on food animal species and forages
12	**National Veterinary Research Institute** P.M.B 01 Vom	1924	Research into all aspects of animal diseases, their treatment and control, as well as development and production of animal vaccines and sera
13	**National Institute for Freshwater Fisheries** Research, P.M.B 6006 New Bussa	1968	Research into all freshwater fisheries, and long term effects of man-made lakes on ecology and environment throughout the country
14	**Nigerian Institute for Oceanography and Marine** Research P.M.B 12729 Victoria Island Lagos	1975	Research into the resources and physical characteristics of Nigerian territorial waters and the high seas beyond; genetic improvement, production and processing of brackish water and marine fisheries
15	**National Agricultural Extension, Research and** Liaison Services, Ahmadu Bello University Zaria	1975	Research into technology transfer and adoption studies; overall planning and development of extension liaison activities nationally; collation and evaluation of agricultural information

Source: nigeriamasterweb.com (2010).

All agricultural research institutions have their origin and were developed in tertiary institutions of learning with agricultural lecturers as the major drivers.

2.2 Concept and Definition of Media

The use of many channels, 'the media' (plural of medium) in mass communication marked what Guteberg called the beginning of modern communication. It was when man finally made a machine he interposed in the communication process to see and listen for him (Uchem, 1991).

McQuail (2000) opined that media are the collective communication outlets or tools that are used to store and deliver information or data. It is either associated with communication media, or the specialized communication businesses such as: print media and the press, photography, advertising, cinema, broadcasting (radio and television), and/or publishing (Caron and Caronia, 2007). Okwu and Obinne (2009) in Okoroma (2015) regarded the media as the devices employed by anyone involved in a mass communication across distance or time. Nwosu (2005) conceives the media from the role they perform which include functions of informing, entertaining and educating the people in a given society about the happenings around and outside their environment. According to him it is used to communicate from a single source to a large (mass) number of persons. Nwachukwu (2003) reviewed communication media as pathways over which message travel in reaching their destinations. They affect the messages transmitted either positively or negatively since the 'medium' is the message" according to MCLhan. Thus, the message contents are relatively less important than the ways they are received. Communication media have audio-visual capabilities in transmitting information or signals from the source to the receiver in terms of audio, visual or audiovisual forms.

From the foregoing, mass communication media can be classified under devices and message content. The device classification emphasizes the type of tool utilized in transmitting the message while the classification by content highlights the form taken by

the messages or in which they are packaged. It is on this basis that the mass media are broadly classified into electronic media and print media.

Sparklife (n.d.), and Biagi (2004) opined that there were three main types of media namely: print media, broadcast media, and the Internet. The print media had long been known and utilized unlike the electronic media which utilization in extension has been constrained by the problem of logistics and dearth of manpower. Though, the problem of logistics can easily be addressed by supplying or providing the necessary tools, that of manpower seems rather more primary and difficult to meet, such as witnessed in many public extension agencies and institutions where equipment in the media department are usually under-utilized or not used at all; where media practitioners outside the field of agriculture are patronized. Taking a cue from the trickle-down effect of the growth model development in rural sociology. The effective use of electronic media can be instilled as part of the necessary skill that improves the quality of extension work through its active and gainful utilization in the training of change agents and other agricultural personnel in institutions of learning.

2.2.1 Concept of Electronic Media

University research is targeted at a mass audience of several cadres of live. However, mass communication must operate with the aid of an intermediate transmitter of information (Bittner 1989; Okwu and Obinne, 2009) cited in Okoroma (2015). The transmitter referred here comprises the medium through which message contents are relayed to the intended audience. Hence, the concept of communication media will provide key knowledge for understanding and predicting outcomes of communication process. Before exploring electronic media, this section shall highlight the meaning of communication media. According to Bussiness dictionary (2010), electronic media refers to any broadcast or storage media that takes advantage of electronic technology. They may include television, radio, Internet, fax, CD-ROMs, DVD, and any other medium that

requires electricity or digital encoding of information. The term 'electronic media' is often used in contrast with print media.

Electronic media are media that use electronics or electromechanical energy for the end user (audience) to access the content which is in contrast with static media. Static media (mainly print media) are often created electronically are said to be electronic media when they require electronics to be accessed by the end user in soft copy form. In other words, any equipment used in the electronic communication process (e.g. television, radio, telephone, desktop computer, game console, handheld device) may also be considered electronic media (Biagi, 2004). Odiaka (2011) cited in Okoroma (2015), affirmed by reviewing electronic media as

a) Any medium that records information (magnetic disk/tape, optical disks (CD/DVD), flash memory, etc.
b) Technology for broadcasting information – radio, television.
c) Technology for communicating through voice and sound or images-macrophone, camera, loudspeaker telephone to cellular phones.
d) Personal hardware (PC, Servers, Mainframes, Networked storage).
e) The internet.

2.3 Concept of Learning and E-Learning

The concept of learning can be better understood when viewed in the light of the opinions of behaviourists, connectivists and humanists. The behaviourists were led by Thorndike, Pavlov, Watson, Guthrie, Hull, Tolman and Skinner. They believe that learning is a permanent change in behaviour as a result of experience (Thorndike, et. al., 1928). He opined that learning is a permanent change in behaviour as a result of experience, and the behaviour includes both of the external and internal actions of the individual which are observed and remain unobserved by the outside world. It also includes the different ways in which people understand or experience or conceptualize the world around them. The

key point and the focus of behaviourists is gaining knowledge or ability through the use of experience (Ramsden, 1992).

The humanist school has been led by Maslow and Rogers who believe that learning is a personal act of individual to utilize his/her full potential. It is a process of self-actualization to its highest level. Maslow (1970) explained the concept of self-actualization as the maximum use and exploitation of talents, capacities, potentialities, etc. He recognized a set of characteristics of self-actualizing people. They have tolerance for ambiguity, acceptance of self and others, and peak experiences that lead to personal transformation through new insights and experiences.

Patterson (1973) stated that the aim of education is to develop and nurture self-actualizing persons. Brockett and Hiemstra (1991); Rogers (1995); Maslow (1970); Patterson (1973) say that it is a necessary condition for the success of learning process that the instructional activities should be based on learners needs. Learning does not take place without the fulfillment of the basic needs such as food, security, self-respect, self-esteem and intellectual curiosity. We recognize there are various levels of perceived needs ranging from felt needs or wants where the highest internal control is possible, and prescribed or externally mandated requirements where little internal control is possible. The human beings are not machines and cannot function in ignoring the basic needs of the individual.

According to social and situational school of psychology, learning is an interaction of the individual in social contexts. Social norms and practices have lasting impacts on the learning process of the individual. It is a relationship between people and environment. Bandura, Lave and Wenger, Salomon practiced and promoted this view. The basic purpose of learning is to prepare the individual for full participation in communal practices and utilize them for their development. The basic responsibility of the educator is to establish an environment in which the students share the ideas in communal settings.

They learn and practice the role which they are going to play in future life. This learning role is played in the educational institutions.

The functions of a university as an institution of higher learning are: teaching, learning research and community service. Hence, the National Policy on Education in Arubaye (2003) stated that “the objectives of territory educational institutional in Nigeria are teaching, research and development, and generation and dissemination of knowledge”. The research function is central to the other functions of institutions of higher learning. To achieve these functions, academics/scholars in universities perform three main responsibilities: educate the next generation of professionals, mangers and leaders: make formal knowledge available to society at large, thereby stimulating the development of new products and services, necessitating discussion on public issues, and improving understanding of our culture: and develop new knowledge (Ogbomo, 2010).

2.3.1 Laws and Principles of Learning

Educational psychologists and pedagogues have identified several principles of learning, also referred to as laws of learning, which seem generally applicable to the learning process. These principles have been discovered, tested, and used in practical situations. They provide additional insight into what makes people learn most effectively (Malik and Hukam, 2010). Edward Thorndike developed the first three "Laws of learning:" readiness, exercise, and effect. Thorndike et. al. (1928) set down his basic three laws in the early part of the twentieth century, five additional principles have been added since then viz: primacy, recency, intensity, freedom and requirement.

The majority of these principles are widely applied in aerospace instruction, and some in many other fields, as outlined below:

1. **Law of Readiness**: A person learns best when he has the necessary background, a good attitude, and is ready to learn. He does not learn much if he sees no reason for learning. Getting a student ready to learn is usually the teacher’s job. A clear objective

and a good reason for learning sometimes help to motivate students to learn even when they start off not caring. A student who is usually ready to learn meets the instructor halfway. Sometimes the instructor can do little to create a readiness to learn. Outside responsibilities, overcrowded schedules, health, finances, or family affairs can take away a student's desire to learn.

2. Law of Exercise: Those things most often repeated are the best learned. This is the basis for practice and drill. The mind rarely retains, evaluates, and applies new concepts or practices after only one exposure. A student learns by applying what he has been taught. Every time he practices, his learning continues. There are many types of repetitions. These include student recall, review and summary, manual drill and physical applications. All of these serve to create learning habits.

3. Law of Effect: This law is based on the feelings of the learner. Learning is stronger when joined with a pleasing or satisfying feeling. It is weakened when linked with an unpleasant feeling. An experience that produces feelings of defeat, anger, frustration, futility, or confusion in a student is unpleasant for him. This will decrease his learning capabilities. Therefore, instructors should be cautious about using punishment in the classroom. Every learning experience does not have to be entirely successful, nor does the student have to master each lesson completely. However, every learning experience should contain elements that leave the student with some good feelings. A student's chance of success is definitely increased if the learning experience is a pleasant one.

4. Law of Primacy: Primacy is being first, which often creates a strong impression. This means that the instructor must be right the first time. Everyone knows from experience how hard it is to break a bad habit. "Unteaching" wrong first impressions is harder than teaching them right the first time. The student's first experience should be positive, functional, and lay the foundation for all that is to follow. What the student learns must be procedurally correct and applied the very first time. The instructor must

present subject matter in a logical order, step by step, making sure the students have already learned the preceding step. If the task is learned in isolation, is not initially applied to the overall performance, or if it must be relearned, the process can be confusing and time consuming. Preparing and following a lesson plan facilitates delivery of the subject matter correctly the first time.

5. Law of Recency: Other things being equal, the things learned last will be best remembered. The opposite is also true. The longer the student is away from a new fact or understanding, the harder it is to remember. For example, it is fairly easy to recall a telephone number dialed a few minutes ago, but it is usually impossible to recall a new number dialed last week. The instructor must recognize the law of recency when planning a good summary. He should repeat, restate, or reemphasize the training objectives. He also repeats important information the students need to remember.

6. Law of Intensity: The more intense the material taught, the more likely it will be retained. A sharp, clear, vivid, dramatic, or exciting learning experience teaches more than a routine or boring experience. The principle of intensity implies that a student will learn more from the real thing than from a substitute. For example, a student can get more understanding and appreciation of a movie by watching it than by reading the script. Likewise, a student is likely to gain greater understanding of tasks by performing them rather than merely reading about them. The more immediate and dramatic the learning is to a real situation, the more impressive the learning is upon the student. Real world applications that integrate procedures and tasks that students are capable of learning will make a vivid impression on them (Malik and Hukam, 2010).

In contrast to practical instruction, the classroom imposes limitations on the amount of realism that can be brought into teaching. The instructor needs to use imagination in approaching reality as closely as possible. Classroom instruction can benefit from a wide variety of instructional aids, to improve realism, motivate learning, and challenge students. Instructors should emphasize important points of instruction with gestures,

showmanship, and voice. Demonstrations, skits, and role playing do much to increase the learning experience of students. Examples, analogies, and personal experiences also make learning come to life. Instructors should make full use of the senses (hearing, sight, touch, taste, smell, balance, rhythm, depth perception, and others).

7. Freedom: The principle of freedom states that things freely learned are best learned. Conversely, the further a student is coerced, the more difficult is for him to learn, assimilate and implement what is learned. Compulsion and coercion are antithetical to personal growth. The greater the freedom enjoyed by individuals within a society, the greater the intellectual and moral advancement enjoyed by society as a whole. Since learning is an active process, students must have freedom: freedom of choice, freedom of action, freedom to bear the results of action—these are the three great freedoms that constitute personal responsibility. If no freedom is granted, students may have little interest in learning.

8. Requirement: The law of requirement states that "we must have something to obtain or do something." It can be an ability, skill, instrument or anything that may help us to learn or gain something. A starting point or root is needed; for example, if you want to draw a person, you need to have the materials with which to draw, and you must know how to draw a point, a line, a figure and so on until you reach your goal, which is to draw a person.

2.3.2 History of E-Learning

The origin or etymology of e-learning is contested, with the e- part not necessarily meaning electronic as per e-mail or e-commerce. Coined between 1997 and 1999, e-learning became first attached to either a distance learning service or it was used for the first time at the Computer Based Training (CBT) systems seminar. Since then the term has been used extensively to describe the use of online, personalized, interactive, or virtual education (Web archive, Undated).

Bernard Luskin (Undated), an educational technology pioneer, advocated that the "e" of e-learning should be interpreted to mean "exciting, energetic, enthusiastic, emotional, extended, excellent, and educational" in addition to "electronic." Eric (Undated) suggested that the "e" should refer to "everything, everyone, engaging, easy". These broad interpretations focus on new applications and developments, as well as learning theory and media psychology.

Moore et. al. (2011) found "significant variation in the understanding and usage of terms used in this field" and pointed to "implications for the referencing, sharing and collaboration of results" (Moore, Dickson-Deane, and Galyen, 2011). In usage, e-learning is an extremely significant (but incomplete) subset of educational technology. As such, various aspects of e-learning are discussed in the article *"The Internet and Higher Education."*

2.3.2.1 Concept of E-Learning

E-learning according to Moore, Dickson-Deane & Galyen (2011) can be defined as a learning process created by interaction with digitally delivered content, network-based services and tutoring support. According to Olojo, Adewunmi and Ajisola (2012), e-learning is any technologically mediated learning using computers whether from a distance or in face to face classroom setting (computer assisted learning), it is a shift from traditional International Journal of Academic Research in Business and Social Sciences. E-learning is the use of Internet technologies to enhance knowledge and performance. E-learning is also called Web-based learning, online learning, distributed learning, computer-assisted instruction, or Internet-based learning. Historically, there have been two common e-learning modes: distance learning and computer assisted instruction (Bourner and Flowers, 1997).

E-learning (eLearning) is the use of electronic educational technology in teaching and learning (Moore, Dickson-Deane & Galyen, 2011). Information and communication technology (ICT) in education, EdTech, learning technology, Multimedia Learning,

Technology-Enhanced Learning (TEL), Computer-Based Instruction (CBI), Computer Managed Instruction (CMI), Computer-Based Training (CBT), Computer-Assisted Instruction Or Computer-Aided Instruction (CAI), Internet-Based Training (IBT), Flexible Learning, Web-Based Training (WBT), Online Education, Online Learning. Virtual Education, Virtual Learning Environments (VLE; which are also called learning platforms), m-learning, and digital education (Moore, Dickson-Deane & Galyen, 2011). In usage, all of these terms appear in articles and reviews; the term "e-learning" is used frequently, but is variously and imprecisely defined and applied (Moore et. al., 2011).

Some other forms of e-learning could be seen as distance learning which uses information technologies to deliver instruction to learners who are at remote locations from a central site. Computer assisted instruction (also called computer-based learning and computer based training) uses computers to aid in the delivery of stand-alone multimedia packages for learning and teaching (Olojo, Adewunmi and Ajisola, 2012). Virtual learning implies the abilities of people to use information technology and the Internet to learn, improve their learning skills and strengthen their capabilities in the information society. Logan (2001) includes the following technologies as virtual learning devices: inter-, intra- and extranets, audio or video conferencing, television, video, satellites, DVD, and mobile phones to name but a few. It is expected that the use of virtual learning would improve the ability of universities to contribute to international research output and to find solutions to local problems. E-learning involves the use of World Wide Web, e-mails, and search engines for teaching and learning. E-learning could be used for distance or face-to-face learning (Olibie, 2006).

Multimedia learning is also a form of e-learning as well as distance learning. Multimedia uses two or more media, such as text, graphics, animation, audio, or video, to produce engaging content that learners access via computer. Blended learning, a fairly new term in education but a concept familiar to most educators, is an approach that combines e-learning technology with traditional instructor-led training, where, for example, a lecture or demonstration is supplemented by an online tutorial (Singh & Priola, 2001). Faculty,

administrators, and learners find that multimedia e-learning enhances both teaching and learning. These advantages can be categorized as targeting either learning delivery or learning enhancement. Multimedia e-learning offers learners the flexibility to select from a large menu of media options to accommodate their diverse learning styles.

Web-Based Training (WBT) is one of the e-learning technologies of which Horton (2000) defined as "any purposeful, considered application of Web technologies to the task of educating a fellow human being". Just by browsing the web pages, people can obtain information. However, the difference between web browsing and web-based training is that it is "purposeful, considered" (Horton, 2000). Despite the many advantages of e-learning, it has some limitations and these include the fact that the learner needs self-discipline to devote the required time and effort to learning. Also most teachers in Africa are yet to possess the knowledge and skills for planning and designing e-learning content.

These alternative terms are all linguistically more restrictive than "educational technology" in that they refer to the use of modern tools such as computers, digital technology, electronic media, networked digital devices, and associated software and "courseware" with learning scenarios, worksheets, and interactive exercises that facilitate learning. However, these alternative names individually emphasize a particular digitization approach, component or delivery method. Accordingly, each conflates to the broad domain of educational technology. For example, m-learning emphasizes mobility, but is otherwise indistinguishable in principle from educational technology. Therefore, to have an indept understanding of e-learning, the concept of educational technology must be looked into (O'Neill, Gurmakand O'Donoghue, 2004).

2.3.2.2 Components of E-Learning

According to Bourner and Flowers (1997), creating e-learning material involves several components: once content is developed, it must be managed, delivered, and standardized. Content comprises all instructional material, which can range in complexity from discrete

items to larger instructional modules. A digital learning object is defined as any grouping of digital materials structured in a meaningful way and tied to an educational objective (Olojo, Adewunmi and Ajisola, 2012). Learning objects represent discrete, self-contained units of instructional material assembled and reassembled around specific learning objectives, which are used to build larger educational materials such as lessons, modules, or complete courses to meet the requirements of a specified curriculum. Examples include: tutorials, case-based learning, hypermedia, simulations, and game based learning modules.

Content creators use instructional design and pedagogical principles to produce learning objects and instructional materials. Content management includes all the administrative functions (e.g., storing, indexing, cataloging) needed to make e-learning content available to learners. Examples include portals, repositories, digital libraries, learning-management systems, search engines, and e-Portfolios.

2.3.2.3 Synchronous and Asynchronous Delivery of Content

Synchronous delivery refers to real-time, instructor-led e-learning, where all learners receive information simultaneously and communicate directly with other learners. Examples include teleconferencing (audio, video, or both), Internet chat forums, and instant messaging. While in asynchronous delivery, the transmission and receipt of information do not occur simultaneously (Bourner and Flowers, 1997). The learners are responsible for facing their own self instruction and learning. The instructor and learners communicate using e-mail or feedback technologies, but not in real time. A variety of methods can be used for asynchronous delivery, including email, online bulletin boards, newsgroups, and Weblogs. In addition to establishing, managing, and delivering content, a fourth component is part of the e-learning equation. It is becoming increasingly clear that standards are needed for the creation of new e-learning material. Such standards promote compatibility and usability of products across many computer systems, facilitating the widespread use of e-learning materials.

2.3.2.4 Advantages of E-learning

Advantages of e-learning includes increased accessibility to information, ease in updating content, personalized instruction, ease of distribution, standardization of content, and accountability. Accessibility refers to the user's ability to find what is needed, when it is needed. Improved access to educational materials is crucial, as learning is often an unplanned experience. Updating electronic content is easier than updating printed material: e-learning technologies allow educators to revise their content simply and quickly (Olojo, Adewunmi and Ajisola, 2012).

Learners have control over the content, learning sequence, pace of learning, time, and, often, media, which allows them to tailor their experience to meet personal learning objectives. Internet technologies permit the widespread distribution of digital content to many users simultaneously anytime and anywhere. An additional strength of e-learning is that it standardizes course content and delivery; unlike, for instance, a lecture given to separate sections of the same course.

According to Bourner and Flowers (1997), automated tracking and reporting of learners' activities lessen faculty administrative burden. Moreover, e-learning can be designed to include outcomes assessment to determine whether learning has occurred. Advantages in learning enhancement are a less well recognized but potentially more revolutionary aspect of e-learning than are those related to learning delivery. E-learning technologies offer educators a new paradigm based on adult learning theory, which states that adults learn by relating new learning to past experiences, by linking learning to specific needs, and by practically applying learning, resulting in more effective and efficient learning experiences.

Learning enhancement permits greater learner interactivity and promotes learners' efficiency, motivation, cognitive effectiveness, and flexibility of learning style. Learning is a deeply personal experience: we learn because we want to learn. By enabling learners to be more active participants, a well-designed e-learning experience can motivate them

to become more engaged with the content. Interactive learning shifts the focus from a passive, teacher-centered model to one that is active and learner centered, offering a stronger learning stimulus (Bourner and Flowers, 1997).

Interactivity helps to maintain the learner's interest and provides a means for individual practice and reinforcement. Evidence suggests that e-learning is more efficient because learners gain knowledge, skills, and attitudes faster than through traditional instructor-led methods. This efficiency is likely to translate into improved motivation and performance.

E-learners have demonstrated increased retention rates and better utilization of content, resulting in better achievement of knowledge, skills, and attitudes. Multimedia e-learning offers learners the flexibility to select from a large menu of media options to accommodate their diverse learning styles.

O'Neill, Gurmakand O'Donoghue (2004) summarized the benefits of e-learning to include the following:

a) E-learning is important for education because it can improve the quality of the learning experience, and extend the reach of every lecturer and tutor.
b) E-learning can help remove barriers to achievement, by providing new and creative ways of motivating and engaging pupils and learners of all abilities, enabling and inspiring everyone to attain their educational potential.
c) E-learning can support learning by offering differentiated learning, particularly for those who need support in literacy, numeracy and ICT.
d) E-learning offers a wide range of tools to enable teachers and learners to be innovative, creative and resourceful in all learning activities. Teachers and learners can easily customize digital learning resources to suit pace and level, appropriate to any learning style and ability.
e) E-learning creates on-line communities of practice. The Internet can bring learners, teachers, specialist communities, experts, practitioners and interest groups together to share ideas and good practice.

f) E-learning can provide an individualized learning experience for all learners, including those who are disadvantaged, disabled, exceptionally gifted, have special curriculum or learning needs or who are remote or away from their usual place of learning.
g) E-learning can facilitate wider participation and fairer access to further and higher education by creating the opportunity to start learning and to choose courses and support according to the learners' needs.
h) E-learning provides personalized learning support through information, advice, and guidance services. It can help learners find the course they need, with a seamless transition to the next stage of their learning, including online application or enrolment and an electronic portfolio of their learning to take with them.
i) E-learning provides virtual learning worlds where learners can take part in active and creative learning with others through simulations, role-play, remote control of real world tools and devices, online master classes, or collaboration with other education providers.

2.3.3 Techniques Utilized to improve E-learning Course Design

1. Micro-games online: it is a proven fact that people learn more if they are engaged with the subject. Participating in a game, even if there is no winner, will allow students and employees to interact directly with the lesson, and will enable them to get more out of the experience (Mei, 2010).

2. Lesson-based Podcasts: one of the most beneficial micro-eLearning techniques used today is the educational podcast. Recording a small amount of information that can be discoursed far and wide can give learners the chance to gather important data and knowledge from the comfort of their own homes or offices (or even on-the-go) (Pasterfield, 2014).

3. Multimedia presentations (slide shows): online slide shows are becoming increasingly popular due to the fact that they appeal to virtually every type of learner. Whether an

employee or student is able to more effectively absorb information through auditory, visual, or interactive methods, a slide show can cater to their needs (Pappas, 2014).

4. Simulations that teach a skill set: you can also use simulations, either online or in group settings that teach a particular skill set. This not only enables the learners to build upon a specific skill or knowledge of a task, but gives them the opportunity to try it in a real life or virtual setting (Mei, 2010).

5. Instructional videos: instructional videos can be created in a number of ways, and can be used in a variety of educational environments (such as Youtube). This particular micro-eLearning technique is ideal in situations that call for the demonstration of a specific skill or task (Laskaris, 2014).

6. Online assessment and quizzes: micro-eLearning techniques can also come in the form of assessment or quizzes online. These quick virtual exams can give instructors the opportunity to gauge the level of skill and understanding of each of their learners, and can even offer learners the chance to determine how they are progressing along the way. They can also prove to be a good source of motivation, which always leads to enhanced performance both in and out of the office (Pasterfield, 2014).

7. Educational blog posts: even something as simple and straightforward as a blog post can serve as a micro-eLearning activity. Learners can visit the blog whenever they choose and gather the required information, making it an ideal way to get the information across when and where the learners need it. Blog posts can serve as a method by which you inform potential learners about the lessons being offered, or keep current employees or students up to date on the latest news or knowledge (Laskaris, 2014).

8. Learner-Centric Design: a learner-centered design begins with the question, “What must the learner be able to DO upon completion of the training, and what challenges will they face along the way?” Activities are then created that place the learner in realistic situations so that they can more easily relate to the content. Using a realistic context also helps with recall; studies have also shown that the more similar the practice environment is to the performance environment, the greater the learner’s ability to recall and apply knowledge (Pappas, 2014).

9. Intrinsic Feedback: e-learning often uses extrinsic feedback such as "That's correct!" or "No, the correct answer is ..." Intrinsic feedback on the other hand mimics real-life, it shows learners how they are performing based on real-world measures such as sales won, or customer satisfaction. This increases motivation, and by encouraging students to learn from their mistakes, is more memorable than simply telling learners the correct answer (Pappas, 2014).

10. Delayed Feedback: good tutors will alter the timing of their feedback rather than provide immediate feedback for each response, encouraging learners to reflect on their choices. An effective tactic with delayed feedback is to pose a follow-up question asking learners to justify why they have chosen a previous response. According to an e-learning researcher Will Thalheimer, research suggests that, on average, delayed feedback is better than immediate feedback by about 10 to 25% (Pappas, 2014).

11. Case Studies and Branching Scenarios: case-based e-learning challenges learners to gather information from various sources in order to make meaningful decisions. Information can be structured in any format such as text, graphics, hyperlinks, audio, or video (Pappas, 2014).

12. Motivation: if learners are motivated, they will find a way to learn. In addition to the techniques listed above, motivation can be enhanced by:

a) Exaggerating the consequences of closing or not closing the performance gap.
b) Linking the training to outcomes that the learner cares about ("what’s in it for me").
c) Introducing content using stories or drama.
d) Including elements of risk in the training exercises.

2.3.4 Educational Technology

Technology means the systematic application of scientific or other organized knowledge to practical task. Therefore, educational technology is based on theoretical knowledge from different disciplines (communication, psychology, sociology, philosophy, artificial intelligence, computer science, etc.) plus experiential knowledge from educational

practice (Natalie Descryver). Educational technology is the use of technology to improve education. Educational technology is sometimes also known as instructional technology or learning technology (Anderson, 2003).

Educational technology could also been seen as the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources (Alessi& Trollop, 2001). A definition centered on its process: "A complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems, and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning" (Anderson, 2003). "One definition of Educational Technology is that it is a systematic, interactive process for designing instruction or training used to improve performance" (Encyclopedia of Educational Technology)

2.3.4.1 Goals of Educational Technology

a) Educational technology research always had an ambitious agenda. Sometimes it only aims at increased efficiency or effectiveness of current practise, but frequently it aims at pedagogical change. While it can be considered as a design science it also addresses fundamental issues of learning, teaching and social organization and therefore makes use of the full range of modern social science and life sciences methodology.
b) "Technology provides us with powerful tools to try out different designs, so that instead of theories of education, we may begin to develop a science of education. But it cannot be an analytic science like physics or psychology; rather it must be a design science more like aeronautics or artificial intelligence. For example, in aeronautics the goal is to elucidate how different designs contribute to lift, drag maneuverability, etc. Similarly, a design science of education must determine how different designs of learning environments contribute to learning, cooperation, motivation, etc." (Collins, 1992).

c) Technology is therefore both a tool and a catalyst; it can become a medium through which change can happen.
d) Educational technologists would not therefore consider the computer as just another piece of equipment. If educational technology is concerned with thinking carefully about teaching and learning, then a computer has a contribution to make irrespective of its use as a means of implementation, for the design of computer-based learning environments gives us a new perspective on the nature of teaching and learning and indeed on general educational objectives (Collins, 1992).

2.3.4.2 Importance of Technology on Education

1. Technology allows for distance learning: perhaps the greatest impact of technology in the field of learning is its ability to help several people learn simultaneously from different locations. Learners are not required to gather at a predetermined time or place in order to learn and receive instructions and information. All one needs is a computer connected to a modem (or with a CD drive); these tools can literally deliver a 'classroom' in the homes and offices of people.

2. Technology allows for group Learning: there are naysayers who argue that distance learning of this sort cannot help students receive the support of traditional group-based learning. For proving this theory wrong, technology has helped provide distance learners with online communities, live chat rooms and bulletin boards. All these allow students to collaborate and communicate even though they are isolated in their own space. According to eLearning info-graphics(2013), Students can work and collaborate with people in other locations. Distance learners can join online communities.

3. Technology allows for individual pacing: multimedia tools, on-line and CD-ROM based training have helped eliminate the need for an instructor-based lesson plans. Students who grasp concepts faster proceed and move along, without being held back by ones who need more time and help for learning. In other words it could be said to be learner controlled (Asiabaka, 2012).

4. Technology helps lower training costs and increases productivity: another benefit of using technology to reach many students in shorter time is lowering training costs. Corporate and academic Institutions can reduce their costs of delivering lessons to students on a per-student basis. Moreover, technology produces quantifiable results and allows students to put into practice this information quickly and with better results. Through the use of technology, students can considerably save time and increase their productivity. Both these points justify the higher costs of advanced technological tools.

According to (eLearning info-graphics, 2013), technology in the field of education can be a powerful and a very import tool in education in the following ways:

a) ***Future Oriented:*** The future is all about technology and multi-screening. Education can't lag behind.

b) ***Learning Becomes Interesting:*** It engages and challenges students with brand new and interactive methods. With VigiLearn, lectures are digitised into formats that are easily accessible to students. These are in the form of videos and presentation slides. The VigiLearn can be used across several devices – mobile, desktop, tablets etc., and allows for off-line access to lectures and study materials (Tope, 2015).

c) ***Improves Skills:*** digital learning, communication, collaboration, building teams, mobile learning, listening, planning, valuing diversity, problem solving, self-direction, global awareness, social, presentations, etc.

d) ***Reduces Weight:*** Instead of carrying lots of books, students just carry a laptop, a tablet or a mouse which contain all their books and projects. According to Tope (2015), e-Learning breaks the space barrier, as students no longer have to sit in overcrowded lecture halls. It also provides quick access to data anywhere because students now have easy access to the Internet from their Vigitabs.

2.3.4.3 Roadblocks in the Use of E-learning Technology

Naturally, for education technology to have a positive impact on students, it should be designed and prepared well; Tools used for disseminating information must be developed with students in mind; There are also factors like lack of computer/technology literacy to be considered; Schools and businesses must bear in mind that education technology is simply a tool and its success depends largely on the amount of planning that goes into it. Using education technology can be a right choice as long as all such factors are considered.

Further challenges/setbacks to the effective implementation of the e-learning module by both public and private universities as pointed out by (Tope, 2015) are majorly:

a) Funds. e-learning is capital intensive at the off take but the savings start coming in once the infrastructure is in place and everything is running smoothly.Asiabaka (2012) went further to explain in details when he said that "the cheapest computer (a clone) is about five hundred US dollars".
b) Furthermore, lack of infrastructure such as Internet bandwidth is also an issue.
c) IT illiteracy is a fundamental setback to the effective utilization of these technologies.
d) Source of power supply might also pose a serious threat as technical equipment needs a stable source of power to function optimally.
e) Lack of regular training in the utilization of these technologies is as good as the non-availability of such technology due to the high requirement of specialists operation.

2.4 Concept of Utilization

According to Logan & Graham (1998), utilization refers to the actual systematic implementation of a scientifically sound, research-based innovation in any setting with an accompanying process to access the outcome(s) of the observed change. Laird & Farid

(2004) further stated that technology transfer and utilization is a process that has a profound impact on the survival of a firm, particularly in today's high technology market where technological changes are rapid and often dramatic. The market place both locally and internationally is replete with business failures resulting from the inability of firms to maintain a competitive edge in technology utilization and/or transfer.

For effective understanding of educational concepts, the application and effective use of resources has been identified as a better approach. The resources or technology if well utilized, increase the achievement level of the students and also engender positive changes. A resource is anything which can be used to achieve the goals and objectives of an organization. Teaching and learning resources according to Awolola (2000) are those human and materials inputs necessary for achieving the objectives of concepts to be taught. It is the sum total of everything used directly or indirectly for the purpose of educational training to facilitate or encourage the acquisition of knowledge competence, skill and know-how (Akinsola, 2000). In the teaching and learning context, resources or teaching aids or materials as they may be called can be classified into five categories (Adobe, 1998). They are:

I. People: teachers, students, etc.
II. Materials: textbooks, skeleton, etc.
III. Technology, tools and equipment: chalkboard, computers, slide projectors, etc.
IV. Settings: school building, library.
V. Activities: games, field trips.

According to Okeke & Okoye (2013), the Federal Ministry of Education (FME) in 2001 revealed that teaching in higher institutions is mainly based on lecture methods, thus limiting the use of instructional materials to mainly chalk and chalkboard. Academic lectures and students acknowledge the fact that those instructional materials that can be used to provide students with practical experiences in learning courses are rarely used during classes.

2.4.1 Reason for Effective Resource Utilization

The extent of acquisition of knowledge, skills and attitudes relevant to life altogether depends on the quality of teaching/learning activities that teachers provide for learners to interact with and the quality of the interaction; factors largely dependent on the nature and the quality of resources at the teacher's disposal. Such resources, if well used, increase the achievement level of the students and also engender positive changes. No wonder Biggs (1994) stated that students can change their approaches to learning according to demands of each situation; the extent to which the changes is affected by each student's disposition and the events in the class. These events include the resources provided by the lecturer and how they are effectively selected during instruction delivery. Adequate and appropriately used resources by a physics teacher enable physics students to:

i) Develop positive attitude and healthy self concept because successes in carrying out the activities make students believe they can do it.
ii) Enjoy and appreciate their subjects of study.
iii) Develop understanding and judgment.
iv) Develop functional knowledge and manipulative skills.

2.4.2 How to Effectively Utilize Resources

Designing a teaching and learning process on the principle of linking and undertaken activity to abstract concepts is the cornerstone of effective resource utilization. Okeke (2008) declared that variability in the choice of lecturer's methodologies/materials is advocated during the design so as to accommodate varied interest of academic learners, knowing fully well that the most important resource in the classroom is the learner. The designing principle agrees with Asiabaka (2002) which involves;

a) Analyzing the students
b) Selecting the objectives
c) Selecting the materials
d) Utilizing the materials

e) Requiring students participation

f) Evaluating the students so as to get feedback.

2.5 Concept of Reporting and E-Reporting

A report or account is any informational work (usually of writing, speech, television, or film) made with the specific intention of relaying information or recounting certain events in a widely presentable form (Alexander, 2006).

Written reports are documents which present focused, salient content to a specific audience. Reports are often used to display the result of an experiment, investigation, or inquiry. The audience may be public or private, an individual or the public in general. Reports are used in government, business, education, science, and other fields (Link and Hill, 1970).Reports use features such as graphics, images, voice, or specialized vocabulary in order to persuade that specific audience to undertake an action.

One of the most common formats for presenting reports as opined by Blicq (2003) is IMRAD: Introduction, Methods, Results and Discussion. This structure is standard for the genre because it mirrors the traditional publication of scientific research and summons the ethos and credibility of that discipline. Reports are not required to follow this pattern, and may use alternative patterns like the problem-solution format. According to Glasman-deal (2009) and George (2012), original research articles are typically structured in this basic order:

a) ***Introduction*** - Why was the study undertaken? What was the research question, the tested hypothesis or the purpose of the research?
b) ***Methods*** - When, where, and how was the study done? What materials were used or who was included in the study groups (patients, etc.)?
c) ***Results*** - What answer was found to the research question; what did the study find? Was the tested hypothesis true? ***and***

d) ***Discussion*** - What might the answer imply and why does it matter? How does it fit in with what other researchers have found? What are the perspectives for future research?

IMRAD is an acronym for introduction, methods, results, and discussion. The IMRAD structure is the most prominent norm for the structure of a scientific journal article of the original research type (Luciana & Mauricio, 2004). A few variations can occur, as follows:

e) Many journals have a convention of omitting the "Introduction" heading, based on the idea that the reader who begins reading an article does not need to be told that the beginning of the text is the introduction. This print-era proscription is fading since the advent of the Web era, when having an explicit "Introduction" heading helps with navigation via document maps and collapsible/expandable TOC trees. (The same considerations are true regarding the presence or proscription of an explicit "Abstract" heading).

f) In some journals, the "Methods" heading may vary, being "Methods and materials", "Materials and methods", or similar phrases. Some journals mandate that exactly the same wording for this heading be used for all articles without exception; other journals reasonably accept whatever each submitted manuscript contains, as long as it is one of these sensible variants (Luciana & Mauricio, 2004).

g) The "Discussion" section may subsume any "Summary", "Conclusion", or "Conclusions" section, in which case there may or may not be any explicit "Summary", "Conclusion", or "Conclusions" subheading; or the "Summary"/"Conclusion"/"Conclusions" section may be a separate section, using an explicit heading on the same heading hierarchy level as the "Discussion" heading. Which of these variants to use as the default is a matter of each journal's chosen style, as is the question of whether the default style must be forced onto every article or whether sensible inter-article flexibility will be allowed.

Additional elements often used to persuade readers include: headings to indicate topics, to more complex formats including charts, tables, figures, pictures, tables of contents, abstracts, and nouns summaries, appendices, footnotes, hyperlinks, and references (Lannon, 2007).

Some examples of reports according to Luciana & Mauricio (2004) are:

i. Scientific Reports,
ii. Recommendation Reports,
iii. White Papers,
iv. Annual Reports,
v. Auditor's Reports,
vi. Workplace Reports,
vii. Census Reports,
viii. Trip Reports,
ix. Progress Reports,
x. Investigative Reports,
xi. Budget Reports,
xii. Policy Reports,
xiii. Demographic Reports,
xiv. Credit Reports,
xv. Appraisal Reports,
xvi. Inspection Reports,
xvii. Military Reports,
xviii. Bound Reports, etc.

Reports are very important in all their various forms along with the usual evidences like in a crimes scene people usually leave behind evidences. They fill a vast array of critical needs for many of society's important organizations, most importantly in the educational and research institutions. Police reports are extremely important to society for a number

of reasons. They help to prosecute criminals while also helping the innocent become free. Reports are a very useful method for keeping track of important information. The information contained in reports can be used to make very important decisions that affect our lives daily (United States Immigration Commission, 1933). E-reporting is term that is sweeping off the conventional paperwork that has been. It is simply the use of electronic media in the documentation process and in accessing reports which have been fully adopted in journalism.

2.5.1 Advantages and Disadvantages of E-Reporting

According to Alexander (2006), the Internet has literally made the world a very small place, as people from remote corners of the world can connect and work with other people in far off places at ease just by logging on to the net. One of the best uses of the Internet is to make available the e-reporting facility, where work and its related documents, filing taxes, invoices etc. are done electronically. E-Reporting has made the traditional paperwork and its complexity a thing of the past.

E-Reporting has made it possible to transmit invoices, statements, remittance advice, purchase orders to the company's customers and suppliers by using emails and faxes. Some companies also use it; to make periodic reports to the government regarding the way they handle hazardous waste generated by their company etc. Different companies use different E-Reporting techniques as per the needs of their business. However, the general view is that E-Reporting is advantageous, time, money and energy conserving (Alexander, 2006).

The advantages of e-reporting include the following:

a) Conserves time, money and storage necessary as compared to traditional paper based filing systems.
b) Huge savings in postage, stationery, easier to maintain and reduction in staff required to do the work.

c) Its not specific software or hardware dependent, all that is needed is a computer and access to the Internet.
d) Latest information and error corrections are just a mouse click away.
e) In areas like filing tax returns, users get confirmations that the tax forms have been submitted, as well as inform them if the file is not submitted due to transmission errors etc.
f) It is fast and easier than the laborious manual paper based process.
g) Far more organized than paper based reporting systems, as it is easier to store all files neatly and retrieve them if needed.
h) Easier to get instructions and clear doubts.

The disadvantages of E-reporting include the following:

a) Takes up time to procure and implement electronic signatures.
b) Some claims have been made that the cost of using E-Reporting is higher.
c) Some e-reporting systems need specific software that is costly and not readily available.
d) People lack the knowledge and skills required to use E-Reporting facilities.
e) Channel management problems may occur, impeding work.
f) Sometimes error correction has to be done using paper forms, wasting precious time and energy.

2.5.2 Instruments and Techniques Utilized in E-reporting

According to O'Brien, Battais, Mariampolski, Kalehoff, Laybourne, Medeiros, and Foreman (2012), some electronic instruments used in e-reporting include video cameras, photo cameras, Dictaphones, automatic transcribers, computers. The word transcription was defined by the Merriam-Webster Online Dictionary as "the act or process of making a written, printed, or typed copy of words that have been spoken" – has been in common use since the 17th Century (first known use was in 1598). It probably originated from the Latin word *transcribere* (trans- 'across' + scribere 'write'). Modern transcription

software allows transcribers to transcribe interviews into a word processor without having to switch back and forth and control audio play with a set of keyboard hotkeys or feet pedal (Isaac, 2015).

Audio and video recording of interviews are now commonly used in research and widely accepted by respondents. Video-recording presents the most obvious problems. First, it is far more likely that a respondent may be identified from a video than from an audio recording. Second, it is also more likely that requests will be made by clients, advertising agencies etc. to see a video recording, and/or to have a copy of this, than in the case of an audio recording (O'Brien et. al., 2012). According to O'Brien et. al. (2012), recording research interviews is a great way to capture qualitative data in thesis or dissertation research and ensures descriptive validity. While taking notes and writing down your observations is important, it's likely you're going to miss out on some details. An audio recording of an interview also allows you to refer back to the interview and take a fresh look at the interview data.

Audio quality is so important. When transcribing interviews, the accuracy of the transcribed transcript is dependent on the quality of the recording. Poorly recorded interviews tend to have more errors and are usually incomplete due to inaudibility (O'Brien et. al., 2012). When video records are seen as an unproblematic replica of events it is likely to be treated as data from the moment it is recorded. It may be understood as an information source that needs to be counted and coded and to be transformed into data. Within a paradigm of video as distorting such video would usually only become data once it has been validated through interview data (Jewitt, 2012). Others caution that video recordings are a re-presentation of events and only become data when operated on within an emergent and analytic program and the 'opinions and biases of initial viewings give way to more empirically demonstrable accounts' (Jewitt, 2012).

From this perspective video is an emergent kind of data that needs to be 'layered and saturated with interpretation' (Jewitt, 2012). Jewitt (2012) noted that 'The power of video

is not in what they make easily clear, but in what they challenge and disrupt in the initial assumptions of an analysis. They are a starting point for understanding the reflexive, patterned ways interactions develop'. Jewitt (2012) explores an important distinction within this debate between what is visible and what can be seen in research video data: what she calls the production of 'vis-ability'. She points to the need to remember that video reduces social processes to an audio visual, two dimensional reproduction, it does not record a social situation rather it records the 'visual impression of a situation' by capturing what is visible as a perceptual act not what is seen and understood by the participants in a situation. Video recordings fix visible and audible phenomenon but a viewer may lack the background knowledge needed to understand it (Jewitt, 2012).

Several skills and techniques are adapted for effective use. Which include: Typing skill for manual transcribing, aperture settings and shutter speed, lens settings (Rennie, 1996), video streaming or live streaming, video making, picture organization, animation, time lapsing, electronic mailing, social media chatting, audio recording, video mixing, manipulation of mobile phone applications, PowerPoint and its relative Microsoft office applications.

2.6 Theoretical and Conceptual Framework

This study was based on the theoretical concept that explains the characteristics that influences the utilization of new ideas through a routine of continuous and successful practices. It assumes that the will to effectively utilize electronic media in learning situations and the reporting of research results revolves around the Unified Theory of Acceptance and Use of Technology (UTAUT)

The theory provide a set of inter-related construct, and propositions that represent a justification on the utilization of electronic media in learning situations as well as reporting by specifying relations among variables. They explain a set of coordinated occurrences.

2.6.1 The Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), propounded by Venkatesh, Morris, Davis & Davis (2003) and its successor The Unified Theory of Acceptance and Use of Technology II (UTAUT2), propounded by Venkatesh, Thong & Xu (2012).

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a sociological theory that was designed by synthesizing prior technology-acceptance research. The four key constructs that influence teachers' intention to use a technology and/or technology use were Performance expectancy (the degree to which teachers are aware that using a technology will provide benefits in teaching), Effort expectancy (the degree of ease associated with teachers' use of technology), Social influence (the extent to which teachers perceive that school leader, colleagues, students, etc. believe they should use technology), and Facilitating conditions (which refer to teachers' perceptions of resources and support available to use technology). In UTAUT2, the original model was elaborated with three other key constructs Hedonic motivation (fun or pleasure derived from using technology), Price value (cognitive trade-off between perceived benefits of using technology and the costs for using them), and Habit (the extent to which teachers believe technology use is automatic) (Venkatesh, Thong & Xu, 2012).

The theories directly relates to this study as the seven key constructs will actively influence the attitude of agricultural researchers towards the utilization of e-learning and e-reporting technologies in the selected institutions in Imo State.

2.6.2 Conceptual Framework

The conceptual framework dwells on the utilization of e-learning and e-reporting technologies by agricultural researchers and it is influenced by several factors. Agricultural researchers utilization of e-learning and e-reporting technologies is influenced by their socioeconomic characteristics such as sex, marital status, age,

educational level, membership of professional organizations, household size, income level, working experience and the institution of operation; level of awareness and mastery of skill in the use of the technologies. The model noted that several dysfunctional factors (intervening variables) affecting the effective utilization of e-learning and e-reporting technologies such as poor power supply, poor ICT facilities, IT illiteracy, fear of failure, fund, etc. can impinge the influence of the independent variables on the dependent variables.

The conceptualization assumes that the relationship between the dependent variable – agricultural researchers utilization of e-learning and e-reporting technologies and the independent variables – the socioeconomic characteristics, level of awareness and mastery of skill in the use of the technologies is strong, while that of the intervening variable is weak.

The relationship within the variables is expressed below:

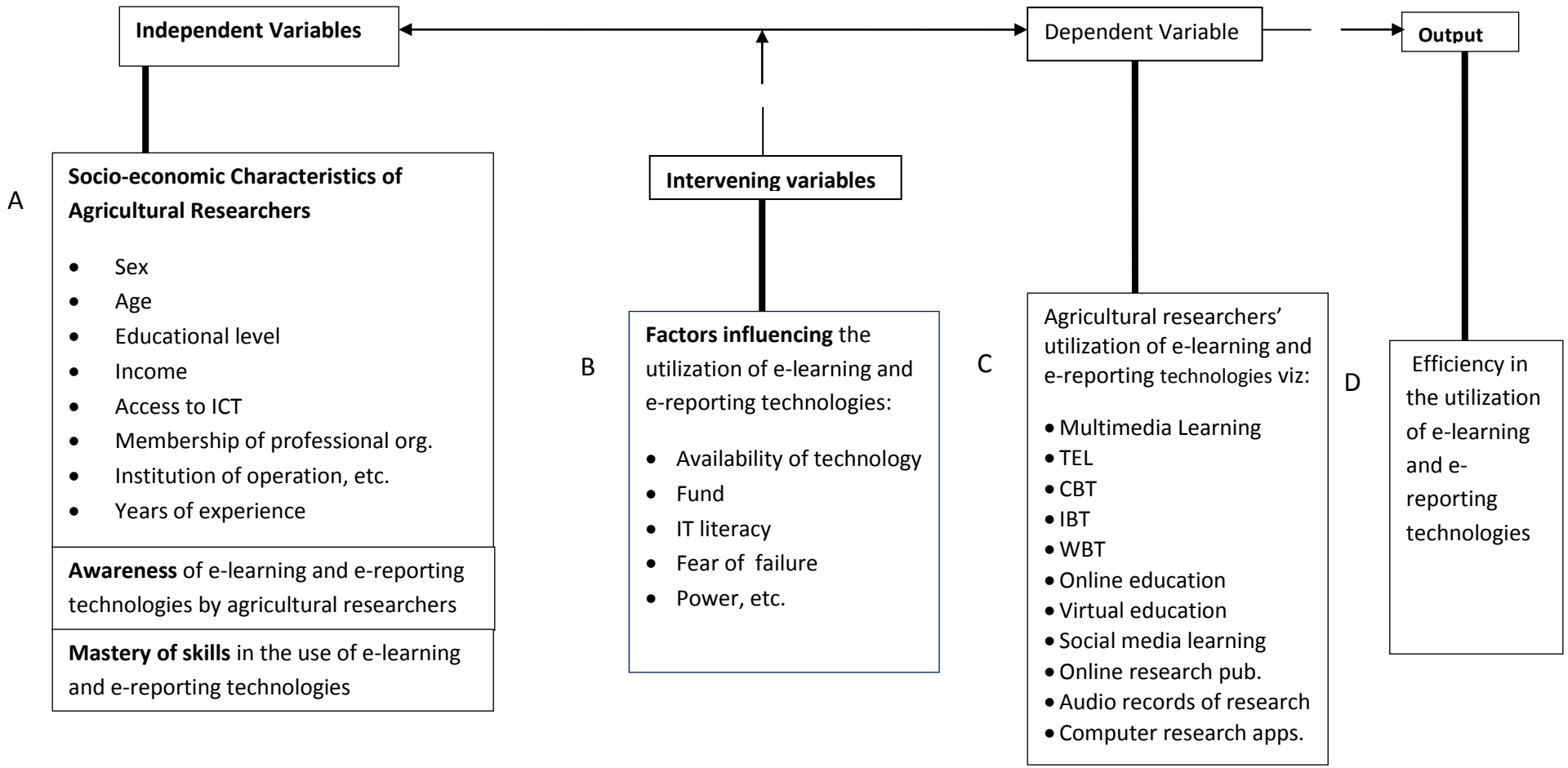

Fig. 2.1: A schema illustrating the assessment of agricultural researchers' utilization of e-learning and e-reporting technologies in selected institutions in Imo State.

Source: Adapted from Admiraal et. al., (2013).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Description of the Study Area

This study was carried out in Imo State, Nigeria. Imo state often referred to as the Eastern heartland is bordered on the East by Abia State, the River Niger and Delta State on the west, Anambra State to the north and Rivers State to the south. Imo State lies within latitudes 4°45'N and 7°15'N, and longitude 6°50'E and 7°25'E with an estimated land area of about 5,530km^2 (Okoroma, 2015). Imo State has an estimated population of about 4.8 million people and an annual growth rate of 3.35% (Okoroma, 2015).

Imo State which lies within the rainforest zone of Nigeria is home to large forest vegetation containing woods and tree crops like Mahogany, Iroko, Obeche, Palm trees, Oil bean trees, fruit trees, among other tree crops that complement farmers' income sources. Imo State belongs to the Benin formation of the coastal plain sands which is of tertiary age, deep, porous, fertile and highly leached. Drained by Imo river, Otamiri river, Nworie river, Njaba and Urashi rivers; the annual rainfall of Imo State varies from 1990mm-2200mm, with about 20°C annual temperature and 75% relative humidity (www.imostate.gov.ng), which requires in the wake of climate change that information on effective conservation practices are made accessible in a variety of ways and forms to all classes of farmers to enable them exploit the resources available for greater productivity.

The people are predominantly Igbos and Christians. The major economic activities of the people include: farming, trading, agro-processing, among other livelihood activities. Cassava, yam, cocoyam, maize, rice, leafy vegetables, cashew, melon, mango, palm oil, etc., constitute the major crops grown by the people. Endowed with vast mineral and natural resources like crude oil, natural gas, lead, zinc, aluminum, fine sand and salt from her rivers, lignite, limestone, etc. (www.imostate.gov.ng). Imo State is undoubtedly an investor's place. It is divided into three political/ agricultural zones viz - Owerri, Orlu and Okigwe political/ agricultural zones and has 27 Local Government Areas. It is a developed state with seven government established tertiary institutions of learning that offer courses

on agriculture, namely: Federal University of technology, Owerri (FUTO); Federal Polytechnic, Nekede; Imo State University, Owerri (IMSU); Imo State Polytechnic, Umuagwo; Alvan Ikoku Federal College of Education Owerri; Open University Imo State; Federal College of Land Resources, Owerri.

3.2 Sample and Sampling

The population of the study consisted of all agricultural researchers (lecturers in every discipline of agriculture) in tertiary institutions of learning in the State. Four (4) tertiary institutions were purposively selected from the seven tertiary institutions in the State with regards to the high number of agricultural researchers, working experiences and tertiary institution ranking on the internet. A rounded off proportion of fifty percent (50%) was cut across the total number of agricultural researchers in each of the four selected tertiary institution which yielded a total of a hundred and fifty (150) respondents that formed the sample for the study who were selected randomly from the institutions. The table below shows how the sample was established:

Table 3.1 Distribution of the Sample

DEPARTMENT	FUTO		IMSU		IMOPOLY		ALVAN	
	F	50%	f	50%	f	50%	f	50%
Agric Economics	28	14	10	5	-	-	-	-
Agric Extension	18	9	8	4	25	12	-	-
Animal Science	26	13	10	4	30	15	-	-
Crop Science	32	15	9	5	-	-	-	-
Fishery	10	5	-	-	10	5	-	-
Forestry	11	5	-	-	-	-	-	-
Soil Science	18	9	9	4	19	10	-	-
General Agric	-	-	-	-	-	-	33	16
Total	**143**	**70**	**46**	**22**	**84**	**42**	**33**	**16**

Source: Dean's office in the Schools of Agriculture FUTO, IMSU, IMOPOLY; Dean's office in the School of Agriculture and Vocational Studies Alvan-Ikoku, 2015.

The sample frame for the study was obtained from the Dean's offices in the Schools of Agriculture FUTO; IMSU; IMOPOLY; and Dean's office in the School of Agriculture and

Vocational Studies Alvan-Ikokun, which was a total of three hundred and six (306) agricultural researchers.

The proportion formula $nh_i = Nh_i\left(\frac{n}{N}\right)$ was used to establish the sample size,

where:

nh_i = expected sample size for h_i (selected institutions),

Nh_i = population of h_i (selected institutions),

n = sample size (150)

N = total population (306).

$$FUTO(nh_1) = 143\left(\frac{150}{306}\right) \cong 70$$

$$IMSU(nh_2) = 46\left(\frac{150}{306}\right) \cong 22$$

$$IMOPOLY(nh_3) = 84\left(\frac{150}{306}\right) \cong 42$$

$$ALVAN - IKOKU(nh_4) = 33\left(\frac{150}{306}\right) \cong 16$$

$$Sample\ size(n) = nh_1 + nh_2 + nh_3 + nh_4$$

$$70 + 22 + 42 + 16 = 150$$

3.3 Method of Data Collection

Primary and secondary sources were utilized for data collection. The primary data were obtained from field survey using a structured and standardized questionnaire relevant data for the study. The questionnaire contained questions addressing the objectives and hypotheses of the study. On the other hand, the secondary data were collected from literature reviewed from textbooks, newsletters, internet materials, records of proceedings, journals, training guides and annual reports of relevant government agencies, ministries and departments. Data collection lasted for three months during which the researcher himself collected the data and was assisted by three research assistants who were properly trained on the objectives of the study and were kept under close supervision.

3.4 Standardization of Research Instrument

In order to minimize errors, the research instrument was standardized. According to Fisher and Milfront (2009), if researcher instruments are not properly standardized, it will affect its reliability, internal validity and result in biased findings. Thus, the research instrument was pretested. The following procedures were adopted to determine validity and reliability of the test items in the data gathering instrument and ensure a standardized measuring scale.

3.4.1 Estimating Validity

To ensure that the research instrument measured what it was designed to measure, the questionnaire was validated. The Jury method of content validity was employed to address how well the items developed to operationalize a construct provide an adequate and representative sample of all the items that might measure the construct of interest (Kimberlin & Winterstein, 2008). Content validity in this context therefore sought to determine the relevance and suitability of the items included in the research instrument.

The rational judgment procedure was employed in establishing the validity of the instrument. In employing the rational judgment, experts in the field of agricultural extension from the Federal University of Technology, Owerri were requested to critically and independently review the items or questions. The questions were judged for their relevance, importance and adequacy in eliciting the needed information. Those statements/ items/ questions for which there was agreement concerning their relevance and importance to the objective of the study were thus adopted for the study, while some were re-constructed to elicit the required responses.

3.4.2 Estimating Reliability

The ability of the research instrument to give consistent results was established by administering the instruments twice, to a group of respondents with similar attributes within a reasonable time interval (test- re-test method). Thus, the questionnaire was administered to 20 agricultural researchers who did not constitute part of the study sample.

A month later, the same questionnaire was re-administered to the 20 agricultural researchers. Since the two scores were collected at an ordinal level, the instrument's reliability was thus established using Spearman's rho to determine the coefficient of correlation between the two responses. The results of the exercise revealed positive relationships between the two responses with correlation coefficients which were all significant at 5% level , indicating that the research instrument was reliable.

3.5 Measurement of Variables

The variables investigated in this study include the following:

Objective one - to determine the socioeconomic characteristics of the agricultural researchers. The variables measured under this objective include: sex, marital status, age, educational level, membership of professional organizations, household size, income level, access to infrastructure and ICT facilities, working experience and the institution of operation. These variables were measured as follows:

I. Sex – the respondents indicated whether they were males or females, and their responses were expressed in a dummy scale, male = 1, otherwise 0.
II. Marital Status – the respondents indicated whether they are single, married, widowed or separated. The responses were recorded and coded thus: single = 1, married = 2, separated = 3 and widowed = 4.
III. Age – the respondents indicated their actual ages in figures and chronologically in years.
IV. Educational level – the respondents indicated their level of educational attainment, thus: First degree = 1, Masters' degree= 2, PhD = 3.
V. Membership of Professional Organizations – the respondents indicated whether they were members of a professional organization or not.
VI. Household size – the respondents indicated the number of people living with them under one roof and feeding from the same pot. Their responses was grouped and used for analysis and description.

VII. Income level – they indicated their average monthly income in figures and chronologically from list of ranged income in naira.

VIII. Working experience – the respondents indicated the number of years they have spent working with their current institution.

IX. Institution of operation– the respondents indicated the institution where they carry out their routine services.

Objective two –identify the e-learning and e-reporting technologies available for use by agricultural researchers in Imo State. The respondents, provided with a list of e-learning and e-reporting technologies indicated whether each technology was available = 1, or not = 0.

Objective three–ascertain the level of awareness of the agricultural researchers on the use of e-learning and e-reporting technologies. The respondents indicated their responses on a dummy scale of aware = 1, or not = 0.

Objective four - determine the level of mastery of the skills by the agricultural researchers in Imo State in their application of e-learning and e-reporting technologies. The respondents indicated their agreement with the scaling statements given on a three point Likert-type scale of Highly Mastered = 3, Moderately Mastered = 2, Not Mastered = 1.

Objective five – ascertain the accessibility of agricultural researchers in Imo State to utilize e-learning and e-reporting technologies. To achieve this, the respondents indicated their responses on a four (4) point Likert scale from a list of e-learning and e-reporting technologies which were accessible to them. Their responses were measured on the scale of Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1.

Objective six – assess the use of e-learning and e-reporting technologies by agricultural researchers. The respondents, provided with a list of e-learning and e-reporting technologies indicated whether each technology was used =1 by them or not = 0.

Objective seven - assess the level of utilization of these technologies by agricultural researchers. Respondents indicated their responses on a 4-point Likert Scale of Not utilized= 1; Slightly utilized =2; Moderately utilized = 3; Highly utilized = 4.

Objective eight– analyze factors that demean the effective utilization of the technologies by the respondents. Respondents indicated their agreement on a three (3) point Likert-type scale of Not serious= 1; Serious= 2; Very serious= 3.

3.6 Method of Data Analysis

Descriptive and inferential statistical tools were used to analyze data collected for the study. The descriptive statistical tools such as mean, frequency table and percentages were used to analyze the data in objective one through to objective eight.

Objective two, the percentages of each technology listed was obtained from the dummy responses as to their availability or not.

Objective three, the percentages of each technology listed was obtained from the dummy responses as to the respondent's awareness of the technologies or not.

Objective four, the mean computation was achieved with the formula: $\bar{X} = \frac{\sum fx}{N}$

Where:

$\bar{X}$ = the value by which the level in the mastery of skill by the agricultural researchers in the application e- learning and e-reporting technologies are to be judged.

f = frequency

$\sum$x = Sum of the various mastery skill coefficients obtained.

N = Sample size

$$Grand\ mean = \frac{Sum\ of\ means}{no.of\ items}$$

$$Standard\ Deviation = \sqrt{\frac{\sum f\,(X - \bar{X})^2}{N}}$$

A discriminating index was arrived at by dividing the sum of the value of the rating scales by the number of scales, thus: (NM+MM+HM)/3 = (1+2+3)/3 = 2.0(Discriminating index).

All items with $\bar{X}$ < 2.0 were considered as 'Not mastered' while those items with $\bar{X}$ > 2.0 were considered as 'Mastered'.

Objective five, the mean computation was achieved and a discriminating index was arrived at by dividing the sum of the value of the rating scales by the number of scales, thus: (SD+D+A+SA)/4 = (1+2+3+4)/4 = 2.5 (Discriminating index).

All items with $\bar{X}$ < 2.5 were considered as 'not accessible' while those with $\bar{X}$ > 2.5 were considered as 'accessible'.

Objective six, the percentages of each technology listed was obtained from the dummy responses as to their use or not.

Objective seven the mean computation was achieved and a discriminating index was arrived at by dividing the sum of the value of the rating scales by the number of scales, thus: (NU+SU+MU+HU)/4 = (1+2+3+4)/4 = 2.5(Discriminating index).

All items with $\bar{X}$ < 2.5 were considered as 'Not utilized' while those with $\bar{X}$ > 2.5 were considered as 'utilized'.

Objective eight, the mean computation was achieved and a discriminating index was arrived at by dividing the sum of the value of the rating scales by the number of scales, thus: (NS+S+VS)/3 = (1+2+3)/3 = 2.0(Discriminating index).

All items with $\bar{X}$ < 2.0 were considered as 'Not serious' while those items with $\bar{X}$ > 2.0 were considered as 'Serious'.

The hypothesized relationships were established as follows:

Hypothesis 1

The significant relationship between the socio-economic characteristics of the agricultural researchers and their level of utilization of e-learning and e-reporting technologies was established using Ordinary Least Square (OLS) multiple regression. This test is represented mathematically:

$Y = f(X_1, X_2, \ldots X_8, e)$. Where

Y = sum of the level of utilization of e-learning and e-reporting technologies which was measured on a four (4) point scale of Not utilized, Slightly utilized, Moderately utilized and Highly utilized.

X_1 = Sex (male = 1, female = 0).

X_2 = Marital status (single = 1, married = 2, separated = 3 and widowed = 4).

X_3 = Age (years).

X_4 = Educational attainment of respondents (first degree = 1, Masters' degree= 2, PhD = 3).

X_5 = Membership of Professional Organizations (member = 1, non-member = 0).

X_6 = Household size (persons).

X_7 = Income level (naira).

X_8 = Working experience (years).

e = error term.

Hypothesis 2:

The significant difference between the male and female counterparts in their level of utilization of the e-learning and e-reporting technologies was tested using the Z-test.

The Z-ratio is expressed mathematically:

$$Z = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Source: (Pedhazur, 1999).

Where

Z = the value by which the statistical mean difference of the level of utilization of e-learning and e-reporting technologies between the male and female respondents would be judged.

$\bar{X}_1$ = Mean score of the level of utilization of e-learning and e-reporting technologies by the Male respondents in the selected institutions in Imo State.

$\bar{X}_2$ = Mean score of the level of utilization of e-learning and e-reporting technologies by the Female respondents in the selected institutions in Imo State.

σ_1 = Variance of the level of utilization of e-learning and e-reporting technologies by the Male respondents in the selected institutions in Imo State.

σ_2 = Variance of the level of utilization of e-learning and e-reporting technologies by the Female respondents in the selected institutions in Imo State.

n_1 = Number of opinion on the level of utilization by the Male respondents.

n_2 = Number of opinion on the level of utilization by the Female respondents.

Hypothesis 3:

The significant difference in the level of utilization of these technologies by agricultural researchers among the selected institutions in Imo State was analyzed using Analysis of Variance (ANOVA).

The ANOVA is mathematically expressed thus:

$$F = \frac{MSSB}{MSSW} = \frac{SSB(n-K)}{SSW(K-1)}$$

$$SSB = \sum nj\,[(\bar{X} - \bar{X})]^2$$

$$SSW = \sum_{i=1}^{Nj} \sum_{j=1}^{k} \left(\bar{X}_{ij} - \bar{X}_j\right)^2$$

Source: Pedhazur (1999).

Where:

F = the value by which the statistical mean will be judged.

SSB = Sum of squared deviations between the mean perception of the respondents' level of utilization of the technologies among the four selected tertiary institutions in Imo State.

SSW = Sum of squared deviations within the mean perception of the respondents' level of utilization of the technologies among the four selected tertiary institutions of Imo State.

X = grand mean of the level of utilization of the technologies by respondents among the four selected tertiary institutions of Imo State.

X_{ij}= nth level of the level of utilization of the technologies by the respondents from institution j.

n_j = sample size of respondents from institution j.

n = number of observations from the four selected institutions.

k = number of tertiary institutions in the state.

CHAPTER FOUR

RESULTS AND DISCUSSION

Results and the respective discussions will be presented under the following headings:

1. Socio-economic characteristics.
2. Availability of e-learning and e-reporting technologies.
3. Awareness of e-learning and e-reporting technologies.
4. Mastery of skills in the application of e-learning and e-reporting technologies.
5. Accessibility to e-learning and e-reporting technologies.
6. Level of utilization of e-learning and e-reporting technologies.
7. Challenges affecting the effective use of e-learning and e-reporting technologies.
8. Relationships between variables and test of hypotheses.

4.1 Socio-economic Characteristics

The Socio-economic variables of the respondents examined included sex, marital status, age, educational level, membership of professional organizations, household size, income level, access to infrastructure and ICT facilities, working experience and the institution of operation.

4.1.1 Sex

Table 4.1 Distribution of agricultural researchers by sex

Sex	Frequency (f)	Percentage (%)
Male	91	60.7
Female	59	39.3
Total	150	100

Source: Field survey data, 2015

Table 4.1 shows that a majority (60.7%) of the agricultural researchers where male, while 39.3 percent were female. The study agreed with Ogbomo (2010) which showed that male

researchers dominate research works than their female counterparts. Yet the female counterpart being aptly represented implies that agricultural research is not a gender restrictive exercise.

4.1.2 Marital Status

Table 4.2 Distribution of agricultural researchers by marital status

Marital Status	Frequency (f)	Percentage (%)
Single	50	33.3
Married	92	61.3
Separated	1	0.7
Widowed	7	4.7
Total	150	100

Source: Field survey data, 2015

The result of Table 4.2 shows that majority (61.3%) of the agricultural researchers was married, 33.3 percent were single, 4.7 percent were widowed, and 0.7 percent was separated. This implies that most agricultural researchers in Imo State are mature, married and living with their spouses. It can therefore be inferred that the researchers are matured and responsible enough since marriage is expected to confer on one a sense of responsibility and maturity. The researchers are therefore likely to embrace technologies meant to better their profession such e-learning and e-reporting technologies.

4.1.3 Age

Table 4.3 Distribution of agricultural researchers by age

Age	Frequency (f)	Percentage (%)	Mean (years)
21-30	23	15.3	
31-40	56	37.4	
41-50	47	31.3	42
51-60	21	14	
61-70	3	2	
Total	150	100	

Source: Field survey data, 2015

Table 4.3 shows the distribution of agricultural researchers by age of which the majority (37.4%) fell within the age range of 31 – 40 years, 31.3 percent fell within the age range of 41 – 50 years, 15.3 percent, 14 percent and 2 percent fell within the age ranges of 21-30 years, 51 – 60 years, and 61 – 70 years respectively. The mean age of the distribution was 42 years, which implies that agricultural researchers in Imo State are in their active and productive age. Thus, the researchers would therefore be expected to show a positive disposition in willingness to utilize e-learning and e-reporting technologies in Imo State institutions of learning.

4.1.4 Educational Status

Table 4.4 Distribution of agricultural researchers by educational status

Educational level	Frequency (f)	Percentage (%)
First degree	13	8.6
Masters degree or MPhil	88	58.7
PhD	49	32.7
Total	150	100

Source: Field survey data, 2015

The distribution of agricultural researchers by educational status is presented in Table 4.4. It thus shows that 58.7 percent of Imo State agricultural researchers had a Masters' degree, 32.7 percent had a PhD, and 8.6 had first degrees. A total of 91.34 percent of the agricultural researchers attaining at least two degrees in the field of agriculture reveals a high competence and credibility rating of tertiary institutions in Imo State. It also reveals that the quality of research carried out by these institutions is expected to be formidable since the sample is highly literate. Thus it is expected that agricultural researchers would be more exposed to educational technologies such as e-learning and e-reporting technologies.

4.1.5 Professional Organizational Membership

Table 4.5 Distribution of agricultural researchers by membership of professional organization

Professional Org.	Frequency (f)	Percentage (%)
Member	126	84
Non-member	24	16
Total	150	100

Source: Field survey data, 2015

The distribution of agricultural researchers by membership of professional organization in Table 4.5 shows that 16 percent of the agricultural researchers in tertiary institutions in Imo State were non-members to any professional organization, whereas, the majority (84%) were members of professional organizations. This implies that most agricultural researchers take responsibility by belonging to professional organizations which could purposely motivate and encourage them to adopt new technologies such as e-learning and e-reporting technologies in achieving organizational goals and development. It is therefore pertinent to encourage agricultural researchers to join in the membership of professional organizations.

4.1.6 Household Size

Table 4.6 Distribution of agricultural researchers by household size

Household size (persons)	Frequency (f)	Percentage (%)	Mean (persons)
1 – 3	51	34	
4 – 6	68	45.3	5
7 – 9	21	14	
10 and above	10	6.7	
Total	150	100	

Source: Field survey data, 2015

The result in Table 4.6 shows that 45.3 percent of agricultural researchers had a household size of 4 – 6 persons, 34 percent had a household size of 1 -3 persons, 14 percent had a household size of 7 – 9 persons, and 6.7 percent had a household size of 10 – 12 persons. The mean household size of agricultural researchers was 5 persons, and thus revealed that agricultural researchers in tertiary institutions in Imo State maintain a moderate household size. Since every member of the household is a potential source of information, information regarding e-learning and e-reporting technologies could spread through the house and increase the researcher's awareness level on the technologies.

4.1.7 Monthly Income

Table 4.7 Distribution of agricultural researchers by monthly income

Monthly income (Naira)	Frequency (f)	Percentage (%)	Mean (Naira)
1,000 - 50,000	7	4.7	
51,000 – 100,000	38	25.3	
101,000 – 150,000	44	29.3	140,050
151,000 – 200,000	29	19.3	
201,000 – 250,000	25	16.7	
>250,000	7	4.7	
Total	150	100	

Source: Field survey data, 2015

The distribution of agricultural researchers by monthly income in Table 4.7 shows that 29.3 percent of the agricultural researchers in Imo State lived within the monthly income range of 101,000 – 150,000 naira; 25.3 percent lived within the monthly income range of 51, 000 – 100,000 naira; 19.3 percent lived within the monthly income range of 151,000 – 200,000 naira; 16.7 percent lived within the monthly income range of 201,000 – 250,000 naira; 4.7 percent each lived within the monthly income ranges of 1,000 – 50,000 and above 250,000 naira. The average monthly income was 140,050 naira. Thus agricultural researchers in Imo State live within a comfortable standard and are likely to be motivated for optimal performance. Therefore, it could be said that they possess a capacity to easily adopt new technologies such as e-learning and e-reporting which would likely help them in their profession.

4.1.8 Work Experience

Table 4.8 Distribution of agricultural researchers by working experience

Working experience (years)	Frequency (f)	Percentage (%)	Mean (years)
1 – 10	88	58.7	
11 – 20	41	27.3	13
21 – 30	17	11.3	
31 – 40	3	2	
41 – 50	1	0.7	
Total	150	100	

Source: Field survey data, 2015

The result of working experience gained by agricultural researchers in tertiary institutions in Imo State as presented in Table 4.8 revealed that majority (58.7%) of the agricultural researchers in Imo State had working experiences within the range of 1 – 10 years, 27.3 percent had working experiences within the range of 11 – 20 years, 11.3 percent had working experiences within the range of 21 – 30 years, 2 percent had working experiences within the range of 31 – 40 years, and 0.7 percent had working experiences within the range of 41 – 50 years. The average working experience of agricultural researchers within selected institutions in Imo State was 13 years. Since the average working experience of agricultural researchers in Imo State institutions is beyond 10 years, it is safe to posit that agricultural researchers in tertiary institutions in Imo State are experienced in terms of working years on-the-job. It can be inferred that researchers are more likely to be in tune with innovations that would enhance their job performance such as e-learning and e-reporting.

4.2 Availability of E-learning and E-reporting Technologies in Selected Institutions in Imo State

Table 4.9 Distribution of agricultural researchers by the availability of e-learning and e-reporting technologies

s/n	E-learning and E-reporting technologies	Not available (f)	%	Available (f)	%
1	Multimedia Learning	100	66.7	50	33.3
2	Technology-Enhanced Learning (TEL)	91	60.7	59	39.3
3	Computer-Based Trainings (CBT)	44	29.3	106	70.7
4	Internet-Based Training (IBT)	57	38	93	62
5	Flexible Learning	75	50	75	50
6	Web-Based Training (WBT)	109	72.7	41	27.3
7	Online Education	103	68.7	47	31.3
8	Virtual Education	93	62	57	38
9	Social Media Learning	75	50	75	50
10	Audio Records of Research Findings	99	66	51	44
11	Video Records of Research Findings	101	67.3	49	32.7
12	Online Publications of Research Findings	53	35.3	97	64.7
13	Computer Research Applications	14	9.3	136	90.7

Source: Field survey data, 2015

The result of Table 4.9 shows that majority of the agricultural researchers in the State were of the opinion that Computer Based Trainings (70.7%), Internet Based Trainings (62%), Online Publications (64.7%), and Computer Research Applications (90.7%) were available in the institutions; while Multi-media Learning (66.7%), Technology-Enhanced Learning (60.7%), Web-Based Trainings (72.7%), Online Education (68.7%), Virtual Education (62%), Audio Records of Research Findings (66%) and video records of research findings (67.3%) were not available in the institutions of learning. There was a 50 percent tie in percentage count of availability and non-availability on both Social Media Learning and Flexible Learning in their institutions. This is therefore clear that most institutions in the State have more of the e-learning and e-reporting

technologies. However, some respondents of the study revealed that the enlisted technologies in Table 4.9 may be documented in the prospectus of the various institutions as available but are not perceived as available by the agricultural researchers because of their restricted or cutoff access to utilize them in improving the effect of their educational mandate.

4.3 Awareness Level of these Technologies by Agricultural Researchers in Tertiary Institutions in Imo State

Table 4.10 Distribution of agricultural researchers by their level of awareness of these technologies

s/n	E-learning and E-reporting technologies	Not aware f(%)	Aware f(%)
1	Multimedia Learning	50(33.33)	100(66.7)
2	Technology-Enhanced Learning (TEL)	48(32)	102(68)
3	All Computer-Based Trainings (CBT)	23(15.33)	127(84.7)
4	Internet-Based Training (IBT)	19(12.67)	131(87.3)
5	Flexible Learning	67(44.67)	83(55.3)
6	Web-Based Training (WBT)	70(46.67)	80(53.3)
7	Online Education	52(34.67)	98(65.3)
8	Virtual Education	56(37.33)	94(62.7)
9	Social Media Learning/ E-mailing	21(14)	129(86)
10	Audio Recording of Research Findings	59(39.33)	91(60.7)
11	Video Recordings of Research Findings	48(32)	102(68)
12	Publishing of Research Findings	22(14.67)	128(85.3)
13	Computer Research Applications	17(11.33)	133(88.7)

Source: Field survey data, 2015

Table 4.10 shows the distribution of agricultural researchers by their awareness of e-learning and e-reporting technologies. The table reveals that the technology with the least percentage count of awareness was Web-Based Training (WBT) 53.3% percent, ranging to the highest percentage count in computer research applications (88.7%). The result therefore shows that agricultural researchers in the state are aware of e-learning and e-reporting technologies as the awareness margin of each listed technology on Table 4.10 had the higher percentage counts.

The level of awareness of e-learning and e-reporting technologies displayed by agricultural researchers in Imo State might have resulted from a number of factors, namely: their high rate of exposure to various technologies in their institutions of learning; institutionalized obligations in their institutions of learning, especially when obtaining graduate degrees'; and according to Venkatesh, et. al. (2003), quest for innovations to better their profession; etc.

Thus the awareness of e-learning and e-reporting technologies by agricultural researchers might have an influence on their use of these technologies in their institutions.

4.4 Mastery of Skills by Agricultural Researchers

Table 4.11 Distribution of agricultural researchers by mastery of skills in the application of these technologies

s/n	Skills	Not Mastered f(%)	Moderately Mastered f(%)	Highly Mastered f(%)	Mean	SD
1	Typing skill for manual transcription	31(20.7)	80(53.3)	39(26)	2.05	0.48
2	Audio quality settings for automatic transcription	90(60)	46(30.7)	14(9.3)	1.49	0.45
3	Aperture and shutter speed setting of cameras	93(62)	48(32)	9(6)	1.44	0.42
4	lens settings of cameras	84(56)	51(34)	15(10)	1.54	0.47
5	Video streaming or live streaming	100(66.7)	29(19.3)	21(14)	1.47	0.51
6	Video making, mixing and Time lapsing	108(72)	30(20)	12(8)	1.36	0.45
7	Picture organization/ editing	57(38)	73(48.7)	20(13.3)	1.75	0.48
8	Animation	91(60.7)	44(29.3)	15(10)	1.49	0.48
9	Electronic mailing	38(25.3)	67(44.7)	45(30)	2.05	0.52
10	Social media chatting	21(14)	51(34)	78(52)	2.38	0.51
11	Audio recording	46(30.7)	63(42)	41(27.3)	1.97	0.54
12	Manipulation of mobile phone applications	31(20.7)	75(50)	44(29.3)	2.09	0.50
13	PowerPoint manipulation and its relative Microsoft office applications	46(30.7)	52(34.7)	52(34.7)	2.04	0.57

Source: Field survey data, 2015

Grand mean = 1.78

The distribution of agricultural researchers by mastery of skills in the application of e-learning and e-reporting technologies as shown in Table 4.11 was represented in a three point Likert-type measuring scale. Agricultural researchers in Imo State have mastery in five skill sets out of thirteen which include: Typing ($\bar{X} = 2.05$), Electronic mailing ($\bar{X} = 2.05$), Social media chats ($\bar{X} = 2.38$), Manipulation of mobile phone apps ($\bar{X} = 2.09$), and the use of Microsoft Office applications ($\bar{X} = 2.04$). On the other hand, skill sets with mean scores below the discriminating index of 2.0 were not mastered, which include: Audio quality settings for automatic transcription ($\bar{X} = 1.49$), Aperture and shutter

settings of cameras ($\bar{X} = 1.44$), Lens settings of cameras ($\bar{X} = 1.54$), Video streaming or live streaming ($\bar{X} = 1.47$), Video making, mixing and Time lapsing ($\bar{X} = 1.36$), Picture organization ($\bar{X} = 1.75$), Animation ($\bar{X} = 1.49$), and Audio recording ($\bar{X} = 1.97$).

A grand mean of $\bar{X} = 1.78$ was arrived at from the results of the table which was below the discriminating index of the distribution. This implied that a skill gap in the use of ICT gadgets and electronic which has a direct application to e-learning and e-reporting technologies. This was in consonance with the findings of Egomo, Enyi, and Tah (2012) which revealed a skill gap in information technology application. It is important to close this gap in the mastery of skills for the effective application of these technologies if the researchers' worth is to be appreciated.

4.5 Accessibility of these Technologies by Agricultural Researchers in Imo State Institutions

Table 4.12 Distribution of agricultural researchers by their accessibility to these technologies

s/n	E-learning and E-reporting technologies	Strongly disagree f(%)	Disagree f(%)	Agree f(%)	Strongly agree f(%)	Mean	SD
1	Multimedia Learning	34(22.7)	46(30.7)	62(41.3)	8(5.3)	2.29	0.62
2	Technology-Enhanced Learning (TEL)	20(13.3)	41(27.3)	75(50)	14(9.3)	2.55	0.59
3	Computer-Based Trainings (CBT)	13(8.7)	36(24)	73(48.7)	28(18.7)	2.77	0.6
4	Internet-Based Training (IBT)	34(22.7)	65(43.3)	44(29.3)	7(4.7)	2.16	0.58
5	Flexible Learning	46(30.7)	60(40)	20(13.3)	24(8)	2.14	0.73
6	Web-Based Training (WBT)	44(29.3)	75(50)	21(14)	10(6.7)	1.98	0.59
7	Online Education	40(26.7)	57(38)	45(30)	8(5.3)	2.14	0.61
8	Virtual Education	38(25.3)	64(42.7)	32(21.3)	16(10.7)	2.17	0.66
9	Social Media Learning/ E-mailing	30(20)	42(28)	52(34.7)	26(17.3)	2.5	0.71
10	Audio Records of Research Findings	31(20.7)	71(47.3)	41(27.3)	7(4.7)	2.16	0.57
11	Video Records of Research Findings	21(14)	68(45.3)	51(34)	10(6.7)	2.33	0.57
12	Online Publication of Research Findings	10(6.7)	39(26)	60(40)	41(27.3)	2.88	0.62
13	Computer Research Applications	8(5.3)	17(11.3)	58(38.7)	67(44.7)	3.22	0.6

Source: Field survey data, 2015

Grand mean = 2.41

Abels, Liebscher and Denman (1996) noted that in order to use the facility, faculty must perceive the facility to be accessible. The result of Table 4.12 shows the distribution of access to e-learning and e-reporting technologies by agricultural researchers in Imo State tertiary institutions on a four point Likert-type measuring scale.

The result of the table reveals that agricultural researchers in Imo State tertiary institutions had access to five e-learning and e-reporting platforms which had mean scores above or equal to the discriminating index ($\bar{X} = 2.5$), they include: Computer Research Applications with a mean score of 3.22, Online Publication of Research Findings with a mean score of 2.88, Computer Based Trainings (CBT) with a mean score of 2.77, Technology –Enhanced Learning (TEL) with a mean score of 2.55, and Social Media learning/ Electronic Mailing with a mean score of 2.50. On the other hand, Video records of research findings with a mean score of 2.33, Multi-media learning with a mean score of 2.29, Virtual education with a mean score of 2.17, both Internet-Based Training (IBT) and Audio records of research findings with mean scores of 2.16 each, Online education with a mean score of 2.14, Flexible Learning with a mean score 2.14, and Web-Based Training (WBT) with the least mean score of 1.98 were not accessible to agricultural researchers in their institutions in Imo State.

A grand mean of $\bar{X} = 2.41$ was arrived at from the results of the table, which is below the discriminating index of the distribution. It reveals that the agricultural researchers have limited or low access to these technologies in selected institutions in Imo State which complements the findings of Ureigho, Oroke and Ekruyota (2006) that reveals a low access to these technologies in tertiary institutions by researchers. Therefore, strategies should be put in place with an objective of improving the effectiveness of agricultural researchers in the State by making these technologies easily accessible to them.

4.7 The level of utilization of e-learning and e-reporting technologies by agricultural researchers in the selected institutions in Imo State

Table 4.13 Distribution of agricultural researchers by their level of utilization of e-learning and e-reporting technologies

s/n	E-learning and E-reporting Technologies	Not utilized f(%)	Slightly Utilized f(%)	Moderately utilized f(%)	Highly utilized f(%)	Mean	SD
1	Multimedia Learning	80 (53.3)	20(13.3)	35(23.3)	15(10)	1.90	1.07
2	Technology-Enhanced Learning (TEL)	101 (67.3)	10(6.7)	20(13.3)	19(12.7)	1.71	1.10
3	Computer-Based Trainings (CBT)	44 (29.33)	50(33.3)	40(26.7)	16(10.7)	2.19	0.97
4	Internet-Based Training (IBT)	65 (43.3)	60(40)	10(6.7)	15(10)	1.83	0.93
5	Flexible Learning	75 (50)	40(26.7)	25(16.7)	10(6.7)	1.80	0.94
6	Web-Based Training (WBT)	121 (80.7)	9(6)	15(10)	5(3.3)	1.36	0.79
7	Online Education	116 (77.3)	33(22)	1(0.7)	0(0)	1.23	0.44
8	Virtual Education	99 (66)	41(27.3)	8(5.3)	2(1.3)	1.42	0.66
9	Social Media Learning/ E-mails	55 (36.7)	32(21.3)	37(24.7)	26(17.3)	2.23	1.12
10	Audio Records of Research Findings	99 (66)	25(16.7)	20(13.3)	6(4)	1.55	0.87
11	Video Records of Research Findings	110 (73.3)	20(13.3)	15(10)	5(3.3)	1.43	0.81
12	Online Publication of Research Findings	60 (40)	17(11.3)	50(33.3)	23(15.3)	2.24	1.13
13	Computer Research Applications	20 (13.3)	20(13.3)	50(33.3)	60(40)	3.00	1.03

Source: Field survey data, 2015
Grand mean = 1.84

The result in Table 4.13 shows the distribution of agricultural researchers with respect to their level of utilization of e-learning and e-reporting technologies in tertiary institutions in Imo State. The table revealed that one technology out of the thirteen enlisted technologies was considered to be utilized with a mean score that was greater than the discriminating index of 2.5, while the rest of the technologies were considered as not utilized.

Computer research application with a mean score of 3.0 was considered to be utilized, while the rest of the technologies like the Online education ($\bar{X} = 1.23$) and Virtual

education ($\bar{X} = 1.46$) with the least standard deviations of 0.44 and 0.66 respectively, depicting the closeness of responses to their mean scores were not utilized. Multimedia learning ($\bar{X} = 1.9$), Technology enhanced learning ($\bar{X} = 1.71$), Internet-based training ($\bar{X} = 1.83$), Flexible learning ($\bar{X} = 1.8$), Web-based trainings ($\bar{X} = 1.36$), Audio and video records of research findings ($\bar{X} = 1.55$) and ($\bar{X} = 1.43$) had mean scores below 2.0 which were all considered to be not utilized. The rest of the technologies with mean scores above 2.0 but less the discriminating index included: Computer-based trainings ($\bar{X} = 2.19$), Social media learning/ Emailing ($\bar{X} = 2.23$), and Online publication of research findings ($\bar{X} = 2.24$).

The table revealed that majority of the respondents do not use these technologies, yet all the mean scores were above 1.0 implying a somewhat level of utilization by the remaining respondents of the study. The grand mean of the distribution $\bar{X} = 1.84$, reveals an extent in the level of utilization of these technologies which is very low and also agrees with the findings of Ureigho, Oroke and Ekruyota (2006) that reveals a low utilization of these technologies in tertiary institutions by researchers. Thus this implies that constructive measures should be put in place to encourage the utilization of these advantageous technological platforms in our institutions of learning.

4.8 Challenges Affecting the Effective Utilization of these Technologies among Imo tate Tertiary Institutions

Table 4.14 Distribution of agricultural researchers by the challenges affecting the effective utilization of these technologies

s/n	Factors that Affects the Technologies' Effectiveness	Not Serious f(%)	Serious f(%)	Very Serious f(%)	Mean	SD	Rank
1	Irregular power supply	17(11.3)	19(12.7)	114(76)	2.65	0.48	1st
2	Non-availability of fund	22(14.7)	37(24.7)	91(60.7)	2.46	0.52	2nd
3	Inadequate ICT (e-learning and e-reporting) facilities	35(23.3)	49(32.7)	66(44)	2.21	0.56	6th
4	Lack of regular training	21(14)	70(46.7)	59(39.3)	2.25	0.48	5th
5	Unfavourable Institutional policy	40(26.7)	59(39.3)	51(34)	2.07	0.55	7th
6	Personal phobia for electronics	80(53.3)	42(28)	28(18.7)	1.65	0.55	10th
7	IT illiteracy	56(37.3)	56(37.3)	38(25.3)	1.88	0.56	9th
8	Inadequate time for technology preparation	43(28.7)	64(42.7)	43(28.7)	2.00	0.54	8th
9	Poor maintenance culture	17(11.3)	55(36.7)	78(52)	2.41	0.48	3rd
10	Poor network Connection	26(17.3)	41(27.3)	83(55.3)	2.38	0.54	4th
11	Fear of failure	90(60)	28(18.7)	32(21.3)	1.61	0.57	11th

Source: Field survey data, 2015

Grand mean = 2.14

The result in Table 4.14 shows the distribution of agricultural researchers with respect to perceptible challenges that affects the effective utilization of e-learning and e-reporting technologies in tertiary institutions in Imo State. The perceptive challenges were ranked from first to eleventh with respect to the mean scores, of which the first to the eighth rank were considered serious challenges being equal to and above the discriminating index ($\bar{X} = 2.0$) of the distribution. Whereas the ninth, tenth and eleventh ranks of challenges were considered not serious by the agricultural researchers. Irregular power supply ranked as first with a mean score of 2.65, non-availability of fund ranked second with a

mean score of 2.46, poor maintenance culture ranked third with a mean score of 2.41, poor Network connection ranked forth with a mean score of 2.38, Lack of regular training ranked fifth with a mean score of 2.25, Inadequate ICT (e-learning and e-reporting) facilities ranked sixth with a mean score of 2.21, unfavorable institutional policy ranked seventh with a mean score of 2.07, inadequate time for technology preparation ranked eight with a mean score of 2.0, Information Technology (IT) Illiteracy ranked ninth with a mean score of 1.88, personal phobia for electronics ranked tenth with a mean score of 1.65, and fear of failure ranked eleventh with the least mean score of 1.61.

The grand mean of $\bar{X} = 2.14$ was arrived at from the results of the table which was above the discriminating index of 2.0. This implies that on a general account, the agricultural researchers in selected institutions in Imo State considers the above listed factors to be serious challenges that affect the effective utilization of e-learning and e-reporting technologies in their institutions. This was also in consonance with the findings of Egomo, Enyi, and Tah (2012). Therefore, these factors should not be taken lightly, but countered strategically for the purpose of ease in the utilization of e-learning and e-reporting technologies.

4.9 Hypothesis 1

Table 4.15 Multiple regression result of the relationship between the socio–economic characteristics of agricultural researchers and their level of utilization of e-learning and e-reporting technologies

Explanatory Variables	Linear Function	Double-log Function	Semi-log Function	Exponential Function
Constants	29.888	22.442	16.111	21.312
R^2	0.560	0.498	0.466	0.492
No of Observation	150	150	150	150
F-value	25.968	14.115	15.11	31.00
Sex (X_1)	0.000(2.193)*	0.001 (0.182)	0.049(0.624)	0.000(2.010)*
Marital Status (X_2)	0.049(2.176)*	0.004(3.448)**	0.808(4.220)**	0.670(3.124)**
Age (X_3)	0.808(-3.226)**	0.000(2.020)*	0.240(2.910)*	0.865(4.210)**
Education Level (X_4)	0.240(2.216)*	0.030(2.187)*	0.205(2.160)*	0.004(2.136)*
Membership of Social Org (X_5)	0.205(3.289)**	0.240(1.468)	0.040(3.192)*	0.065(2.448)*
Household size (X_6)	0.040(-2.115)*	0.002(3.098)**	0.008(2.120)*	0.068(3.148)**
Monthly income (X_7)	0.008(2.112)*	0.210(3.400)**	0.029(4.060)**	0.002(2.810)*
Working experience (X_8)	0.644(3.311)**	0.808(1.284)	0.615(2.300)*	0.600(1.850)

Source: Field survey data, 2015

* t – ratio significant at 5% probability level

** t – ratio significant at 1% probability level

Figures in parenthesis are t-values

To determine the relationship between the socio-economic characteristics of agricultural researchers and their level of utilization of e-learning and e-reporting technologies in Imo

State institutions (hypothesis 1), a multiple regression analysis was performed. Four functional forms of the model, linear, semi-log, double-log and exponential functions were tried and are presented in Table 4.15. The results show that the linear functional form of the ordinary least square multiple regression analysis gave the lead equation having produced the highness number of statistically significant variables, highest value of coefficient of multiple determination (R^2) and conformed to the priori expectations. The R^2 value was 0.560, implying that about 56 percent of the variation in the level of utilization of e-learning and e-reporting technologies by agricultural researchers in selected institutions in Imo State were accounted for by the socio-economic characteristics investigated in the study.

The coefficients of membership of social organization (t = 3.289), and working experience (t = 3.311) were both positive and significant at 1%probability level, expressing them as very important factors influencing agricultural researchers' utilization of e-learning and e-reporting technologies in selected institutions in Imo State. This implies that increasing the levels of these variables will lead to a proportional increase in the utilization of e-learning and e-reporting technologies. This agrees with the findings of Ball and Levy (2009) that experience had a significant effect on instructors' intention to use emerging educational technology; another very important factor was the coefficient of age (t = -3.226) which was negative and significant at 1% probability level implying an inverse relationship between the variables. That is a decrease in the variable of age will cause an inverse but proportionate decrease in the level of utilization of the technologies by agricultural researchers which also agrees with the findings of Ball and Levy (2009).

The coefficients of sex (t = 2.193), marital status (t =2.176), educational level (t = 2.216), and monthly income (t = 2.112) were also both positive and significant but at 5% probability level, implying they were important factors that also influence agricultural researchers' utilization of e-learning and e-reporting technologies in selected institutions in Imo State. This disagreed with the findings of Onasanya, Shehu, Oduwaiye and Shehu (2010) that sex and academic qualifications of lecturers do not affect lecturers' attitude towards the use ICT facilities/equipment in tertiary institutions.

The coefficient of household size (t = -2.115) was negative and significant at 5% probability level implying an inverse relationship between the variables. That is a decrease in the variable of age will cause an inverse but proportionate decrease in the level of utilization of the technologies by agricultural researchers.

Based on this, the null hypothesis was rejected, implying that there is a significant relationship between the socio-economic characteristics of agricultural researchers and their utilization of e-learning and e-reporting technologies in selected institutions in Imo State.

4.10 Hypothesis 2

Table 4.16 Z-test of significant difference in the level of utilization of e-learning and e-reporting technologies by male and female agricultural researchers

Variables	N	Mean	Standard deviation	Z-cal	Z-tab	Decision
Male	91	36.211	6.732	2.85	1.96	The null hypothesis is rejected
Female	59	32.632	10.172			

Source: Field Survey Data, 2015

Result in Table 4.16 shows that the level of utilization of e-learning and e-reporting technologies by male and female agricultural researchers were 36.211 (S.D = 6.732) and 32.632 (S.D = 10.172), respectively. The test produced a Z-value of 2.85 which was significant when compared with the critical Z-value of 1.96 at 5% probability level of significance for a two tailed test. Since Z-calculated (Z-cal =2.85) was greater than Z-tabulated (Z-tab =1.96), the hypothesis which states that the male agricultural researchers do not differ significantly from their female counterparts in their level of utilization of e-learning and e-reporting technologies was rejected implying that male and female agricultural researchers show different disposition in their use of e-learning and e-reporting technologies. This disagrees with the findings of Onasanya, Shehu, Oduwaiye and Shehu (2010) that gender has no effect on lecturers' attitudes towards the use ICT facilities/equipment in tertiary institutions.

4.11 Hypothesis 3

Table 4.17 Analysis of Variance (ANOVA) on the level of utilization of e-learning and e-reporting technologies by agricultural researchers among the selected institutions in Imo State

	Sum of squares	DF	Mean squares	F-cal	F-tab	Sig.	Decision
Between groups	10.91	12	12.75	2.46	2.92	0.031	Null hypothesis is accepted
Within groups	12.21	137	12.11				
Total	**23.12**	**149**					

Source: Field Survey Data, 2015

Result in Table 4.17 shows that a test of Analysis of Variance was carried out to ascertain whether the agricultural researchers in the selected institutions in Imo State differed in their level of utilization of e-learning and e-reporting technologies. The test produced an F-value of 2.46 at $V_1 = 12$, $V_2 = 137$ degrees of freedom, which was less than the tabulated (F–tab = 2.92) and a significant value of 0.031 which was less than 0.05 significant benchmark. Hence, the hypothesis which states that agricultural researchers in the selected institutions in Imo State did not differ in their level of utilization of e-learning and e-reporting technologies was therefore accepted. This implies that agricultural researchers in the different institutions in Imo State possess the same and sole desire to strive for excellence and constant development in achieving their educational mandate of teaching and research (Arubaye, 2003).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The world is fast becoming a global village, as a result of developments in Information and Communication Technology (ICT). The challenge of integrating e-learning and e-reporting technologies into tertiary institutions is a very big task. Most institutions do not have the necessary facilities for instruction and research neither do the lecturers possess skills or will to utilize these technologies for effective classroom interactions. Hence, nothing could be more essential and appropriate to assessing agricultural researchers' utilization of these technologies, understanding what skill gap exist, and what must be done to make up for the gap, and finally equip them with these technologies for effectiveness in fulfilling their educational mandate.

The study was therefore carried out to assess agricultural researchers' utilization of e-learning and e-reporting of research findings among selected institutions in Imo State, Nigeria. The specific objectives of the study were to determine the socio-economic characteristics of the agricultural researchers in selected institutions in Imo State; identify the e-learning and e-reporting technologies available for use by agricultural researchers among selected institutions in Imo State; ascertain the level of awareness of the agricultural researchers on the usefulness of e-learning and e-reporting technologies among selected institutions in Imo State; determine the mastery level of the skills possessed by the respondents in the application of e-learning and e-reporting technologies; ascertain the extent of accessibility of agricultural researchers in the selected institutions to utilize e-learning and e-reporting technologies; assess the use of e-learning and e-reporting technologies by agricultural researchers in the selected institutions in Imo State; assess the level of utilization of e-learning and e-reporting technologies by agricultural researchers in the selected institutions in Imo State; identify the factors/ challenges affecting the effective

utilization of e-learning and e-reporting technologies by the agricultural researchers in Imo State.

Three hypotheses guided the study, namely: there is no significant relationship between the socio-economic characteristics of the agricultural researchers and their level of utilization of e-learning and e-reporting technologies; the male agricultural researchers do not differ significantly from their female counterparts in their level of utilization of e-learning and e-reporting technologies; there is no significant difference in the level of utilization of these technologies by the agricultural researchers among the selected institutions in Imo State.

Data for the study were collected with the use of structured and validated questionnaire from 150 agricultural researchers selected through proportionate, purposive, and simple random sampling techniques. Descriptive and inferential statistical tools such as mean, frequency score, percentages, Ordinary Least Square (OLS), Z-Test, and Analysis of Variance (ANOVA) were used to analyze the data.

Results of the socio-economic characteristics revealed that majority (60.7%) of the respondents were male agricultural researchers, while 39.3 percent were female. The average age of the respondents was 42 years; 61.3 percent of them were married, and a majority (91.4%) of them had at least two degrees. The average monthly income was ₦140,050. The average household size of the respondents was 5 persons and 84 percent belonged to professional organizations. They had on the average 13 years of working experience in the tertiary institutions, with a majority (46.7%) of them carrying out their work operations in the Federal University of Technology Owerri.

Literature revealed thirteen platforms through which e-learning and e-reporting technologies are utilized, which include: Multimedia learning, Technology-Enhanced Learning (TEL), Computer-Based Trainings (CBT), Internet-Based Trainings (IBT), Web-Based Trainings (IBT), Online education, Flexible learning, Virtual education, Social media learning/ electronic mailing, Online publication of research findings, Audio records of research findings, Video records of research findings, and Computer research applications. Four out of thirteen e-learning and e-reporting technologies had majority

responses with regard to their availability in selected institutions in the State, which included: Computer Based Trainings (70.7%), Internet Based Trainings (62%), Online Publications (64.7%), and Computer Research Applications (90.7%). Results also showed that agricultural researchers in the State were aware of these technologies. The calculated grand mean of $\bar{X}$ = 1.78 from 3-point scale on the mastery of skills of agricultural researchers implied existence of a skill gap in the application of the technologies. The calculated grand mean of $\bar{X}$ = 2.41 out of 4 points on the relative access of these technologies to agricultural researchers implied that the respondents have limited or restricted access to these technologies in their institutions. A grand mean of $\bar{X}$ = 1.84, reveals an extent in the level of utilization of these technologies which is very low implying constructive measures should be put in place to encourage the utilization of these advantageous technological platforms in our institutions of learning. Also, a calculated grand mean of $\bar{X}$ = 2.14 implied that on a general account, the agricultural researchers in Imo State tertiary institutions considers the listed factors in Table 4.16 to be serious challenges that affects the effective utilization of e-learning and e-reporting technologies in their institutions.

The hypothetical analyses showed that all the accounted socio-economic characteristics of the agricultural researcher had significant relationship with the level of utilization of e-learning and e-reporting technologies by agricultural researchers in Imo State viz - sex, marital status, age, educational level, membership of professional organizations, household size, income level, and working experience. The Z-test revealed that the male agricultural researchers differed significantly from their female counterparts with a calculated Z-value of 2.85; while the analysis with ANOVA revealed that the utilization of e-learning and e-reporting technologies by agricultural researchers in selected institutions in Imo State do not differ significantly as each researcher possesses the same and sole desire to strive for excellence and constant development in achieving their educational mandate of teaching and research.

5.2 Conclusion

Global trends in the application of e-learning and e-reporting technologies demonstrate that the power of these technologies can transform the several interconnected functions of universities. These technologies offer the potential to strengthen conventional education while rapidly transforming distance education. They not only expand the research and development opportunities of the institutions but also strengthen libraries with access to an unlimited body of digital information globally and bring considerable efficiency and effectiveness to university management.

E-learning and e-reporting technologies offer innumerable benefits in enhancing the quality and quantity of learning in tertiary institutions. Despite the prevalent nature of ICT in virtually every aspect of human endeavours, they have not been widely integrated into the teaching and learning process in schools. Their integration will not only revolutionize teaching in tertiary institutions, they will engender the development of students' innate scientific inquiry mind and their critical thinking abilities. There is need to sensitize and encourage agricultural researchers towards computer literacy because when this is done, the success of integration of computer education into school will be guaranteed.

5.3 Recommendation

Based on the findings of the study, the following recommendations were made:

1. With regard to the skill gap obtained from the results of the study, tertiary institutions should make systematic effort to provide agricultural researchers with trainings, workshops and conferences on the obtained benefits and how to use e-learning and e-reporting systems effectively thus, boost their awareness.
2. As a result of institutions being significantly indifferent in the utilization of these technologies, National Universities Commission, National Commission for Colleges of Education and National Board for Technical Education should provide the necessary e-learning and e-reporting technology facilities and equipment as well as incentives to tertiary institutions in order to facilitate the continuous utilization by agricultural

researchers with the sole aim of achieving sustainable development in the agricultural sector.

3. Also trips and tours should be organized for agricultural researchers in the study area with a purpose of acquainting them with these technologies as they are effectively utilized in some other institutions of education and the economy, thereby instilling the core relevance of e-learning and e-reporting technologies which is to facilitate the spread of useful information.
4. Agricultural extension which is known to bear a broad knowledge of all discipline in agriculture would find the use of these technological platforms to be advantageous to their course. Therefore, should develop techniques or improvise means to curtail the stream of challenges that would affect the effective utilization of these technologies as revealed from the study.
5. The tertiary education curriculum reviews should reflect more agricultural practical courses in e-learning and e-reporting technological platforms for pre-service and in-service agricultural researchers in order for the technical skills of application to be internalized in the future agricultural researchers.
6. Finally, educational institutions should take advantage of those who have experience with the use of these technological platforms and utilize them in assisting those who have no such previous experience.

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Appendix

FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI

DEPARTMENT OF AGRICULTURAL EXTENSION

QUESTIONNAIRE: ASSESSMENT OF AGRICULTURAL RESEARCHERS UTILIZATION OF E-LEARNING AND E-REPORTING OF RESEARCH RESULTS IN SELECTED INSTITUTIONS IN IMO STATE, NIGERIA.

Dear Sir/ Madam,

I am a M.Sc. student of the above mentioned university carrying out a research work on the topic above. It is with deference and of sheer credibility that you have been selected to elicit responses to this questionnaire. This study is strictly for academic purpose and as such your responses will be treated confidentially.

Your sincere response is needed to achieve the objective of the research work.

Thanks for your anticipated cooperation.

Signed ……

MADUEKE CHETA O.

NOTE: PLEASE MAKE RESPONSES BY TICKING APPROPRIATELY FOR CLARITY AND PROVIDE FIGURES WHERE NEEDED.

SECTION A: SOCIO-ECONOMIC CHARACTERISTICS

Name (optional): ……..

1. Sex: Male ☐ Female ☐
2. Marital Status: Single ☐ Married ☐ Separated ☐ Widowed ☐
3. Age (years): 21-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ 61-70 ☐

   How old are you? ……years

4. Educational level:

   First Degree ☐

   Masters' Degree or MPhil ☐

   PhD ☐

5. Membership of Professional Organizations:
   Do you belong to a professional organization? YES ☐ NO ☐
6. If yes, which set do you belong to?

   Executive member ☐

   Ordinary member ☐

7. Household size:……. Persons. 1-3 ☐ 4-6 ☐ 7-9 ☐ 10-12 ☐
8. Monthly Income (₦): 0 - 50,000 ☐ 51,000 - 100,000 ☐ 101,000 - 150,000 ☐

   151,000 - 200,000 ☐ 201,000 - 250,000 ☐ > 250,000 ☐

   What is your average monthly income (in naira):…….

9. Working experience in years: 1-10 11-20 21-30 31-40 41-50

   How many years have you spent on the job:……

10. Institution of operation:

    Federal University of technology, Owerri (FUTO) ☐

    Alvan Ikoku Federal College of Education Owerri ☐

    Imo State University, Owerri (IMSU) ☐

    Imo State Polytechnic, Umuagwo ☐

SECTION B: AVAILABILITY OF E-LEARNING AND E-REPORTING TECHNOLOGIES

11. Which of the following e-learning and e-reporting technologies are available in your Institution for use by you?

s/n	E-learning and E-reporting technologies	Not Available	Available
1	Multimedia Learning		
2	Technology-Enhanced Learning (TEL)		
3	Computer-Based Trainings (CBT)		
4	Internet-Based Training (IBT)		
5	Online Publication of Research Findings		
6	Web-Based Training (WBT)		
7	Online Education		
8	Virtual Education		
9	Social Media Learning		
10	Audio Recording of Research Findings		
11	Video Recordings of Research Findings		
12	Flexible Learning		
13	Computer Research Applications		

SECTION C: AWARENESS OF E-LEARNING AND E-REPORTING TECHNOLOGIES

12. Are you aware of the following e-learning and e-reporting technologies?

s/n	Technologies	Not Aware	Aware
1	Multimedia Learning		
2	Technology-Enhanced Learning (TEL)		
3	Computer-Based Trainings (CBT)		
4	Internet-Based Training (IBT)		
5	Online Publication of Research Findings		
6	Web-Based Training (WBT)		
7	Online Education		
8	Virtual Education		
9	Social Media Learning/ E-mailing		
10	Audio Recording of Research Findings		
11	Video Recordings of Research Findings		
12	Flexible Learning		
13	Computer Research Applications		

SECTION D: MASTERY SKILLS IN E-LEARNING AND E-REPORTING TECHNOLOGIES

13. What is your level of skill in the application of the following e-learning and e-reporting technologies?

s/n	Skills	Not Mastered	Moderately Mastered	Highly Mastered
1	Typing skill for manual transcription			
2	Audio quality check for automatic transcription			
3	Aperture and shutter speed setting of cameras			
4	lens settings of cameras			
5	Video streaming or live streaming			
6	Video making, mixing and Time lapsing			
7	Picture organization/ Photo editing			
8	Animation			
9	Electronic mailing			
10	Social media chatting			
11	Audio recording			
12	Manipulation of mobile phone applications			
13	PowerPoint manipulation and its relative Microsoft office applications			

SECTION E: ACCESSIBILITY OF E-LEARNING AND E-REPORTING TECHNOLOGIES

14. The following e-learning and e-reporting technologies are accessible for use by you in your Institution. Do you agree?

s/n	E-learning and E-reporting technologies	Strongly Disagree	Disagree	Agree	Strongly Agree
1	Multimedia Learning				
2	Technology-Enhanced Learning (TEL)				
3	Computer-Based Trainings (CBT)				
4	Internet-Based Training (IBT)				
5	Online Publication of Research Findings				
6	Web-Based Training (WBT)				
7	Online Education				
8	Virtual Education				
9	Social Media Learning/ E-mailing				
10	Audio Recording of Research Findings				
11	Video Recordings of Research Findings				
12	Flexible Learning				
13	Computer Research Applications				

SECTION F: USE OF E-LEARNING AND E-REPORTING TECHNOLOGIES

15. To what level or extent do you utilize the following e-learning and e-reporting technologies in your institution?

s/n	E-learning and E-reporting Technologies	Not utilized	Slightly Utilize	Moderately utilize	Highly utilize
1	Multimedia Learning				
2	Technology-Enhanced Learning (TEL)				
3	Computer-Based Trainings (CBT)				
4	Internet-Based Training (IBT)				
5	Flexible Learning				
6	Web-Based Training (WBT)				
7	Online Education				
8	Virtual Education				
9	Social Media Learning				
10	Audio Recording of Research Findings				
11	Video Recordings of Research Findings				
12	Publishing of Research Findings				
13	Computer Research Applications				

SECTION G: CHALLENGES TO EFFECTIVE APPLICATION OF E-LEARNING AND E-REPORTING TECHNOLOGIES

s/n	Factors that Affect the Effective utilization of the Technologies	Not Serious	Serious	Very Serious
1	Irregular Power Supply			
2	Non-availability of Fund			
3	Inadequate ICT (e-learning and e-reporting) facilities			
4	Lack of Regular Training			
5	Unfavourable Institutional Policy			
6	Personal phobia for electronics			
7	IT Illiteracy			
8	Inadequate Time for Technology Preparation			
9	Poor Maintenance Culture			
10	Poor Network Connection			
11	Fear of failure			