



Impact of Research Innovation On the Academic Performance of Office Technology and Management Students in Ogun State Polytechnics

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ABSTRACT

In modern day education, students are not supposed to be confined only within the learning in a classroom context. They are expected to explore the vast horizon of knowledge made available today through ICT facilities. This paper work explores the impact of research innovation facilities on the academic performance of office technology and management students in Ogun state polytechnics at the undergraduate level. The study found that the impact of ICT facilities on the academic performance of the students was a bit negligible. The findings also revealed that majority of the students are in the dark about potential roles of ICT facilities in their academic life. Moreover it has been found in the research that the ICT facilities access provided to the students are not utilized to enhance academic performance but it is rather a source of recreation. The paper also suggests steps that if taken would ensure better use of ICT facilities by the students and would in the long run develop a healthy and fruitful relationship between ICT facilities and academic performance.

Keyword: ICT facilities, Students Academics Performance, Performance, OTM Education, polytechnics.

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1. INTRODUCTION

Information and communication and technology (ICT) is an extended term for information technology (IT) which stresses the role of unified communication (Murray 2011), and the integration of telecommunications (telephones lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio visual systems, which enable users to access , store, transmit, and manipulate information. However, Information and Communication Technology (ICT) according to Murray (2011) has no universal definition as “the concepts, methods and applications involved in information and communication technology (ICT) are constantly evolving on an almost daily basis.” The broadness of ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form, e.g personal computers, digital television, email, robots.

During the last two decades the higher institutions have invested heavily in information and communication technology (ICT) and it has had a major impact in the university context, in organization and in learning methods. One puzzling question is the effective impact of these technologies on students’ achievements and on the returns of education. Many academics researchers have tried to answer this question at the theoretical and empirical levels. They have faced two main difficulties. On one hand, students’ performance is hard to observe and there is still confusion about its definition.



On the other hand, ICT is evolving technologies and their effects are difficult to isolate from their environment. (Ben Youssef, 2008). The very expression information and communication technology (ICT) has lots of ideas in it. It is not just using gadgets. The focus is on what is being transacted through this medium. It is not limited to the computers or the internet; it ranges from the use of fm radio to the use of satellite for communication. It includes both the form and essence of communication; it has the potential to make learning more experimental. Moreover the large amount of data, visuals available on any topic can be brought to the classroom from all over the world. That is why ICT has been considered an emerging area with lots of potential for making educational process more meaningful. Information and communication technology (ICT) facilities are essential tools in enhancing effective teaching and learning. They arouse, sustain student's interest and curiosity to learn, they increase motivation, they increase the attention span of students, they make lessons practical an real and they improve the quality of teaching and learning processes, Jane (2013), stated that information and communication technology (ICT) facilities is a skill which is essential in the world we live in, i.e. The students need to use the latest technology to offer them an effective education in the twenty first century.

Also, Andrea (2013), a printer and digital publisher indicates that the effective use of information and communication technology (ICT) facilities in OTM education across the curriculum will significantly increase the level of students' engagements particularly with struggling learners. Information and communication technology (ICT) can contribute to universal access to education, equity in education, the delivery of quality learning and teaching, teachers' professional development and more efficient education management governance and administration (UNESCO, 2016). According to numerous authors (Oladele, 2001; Tuncan, 2012; Bakhoun, 2002), the factors militating against educational institutions from equipping themselves with information and communication technology (ICT) facilities are lack of required tools, inoperative software, insufficient or absence of technology infrastructures such as internet connections, marginal, inadequate and obsolete communication networks; fluctuating electric power supplies, ailing road systems, etc.

With the help of organization and political leaders, higher institutions have made determined progress in the area of information and communication technology (ICT). Although, technology has jump-started the engine of the information era, it is now incumbent in all Nigeria Polytechnics to take part in constructing the information society such no student is barred from access to the knowledge available on the internet, so that students might share the benefits of a better future, market globalization and internationalization. Hence, the world which appears physically large has been made small by information and communication technology (ICT) and reference to it as 'global village'. In the light of above, this research intends to investigate the impact of information and communication technology (ICT) facilities on the academic performance of Office Technology and Management education students.

Conceptual Framework

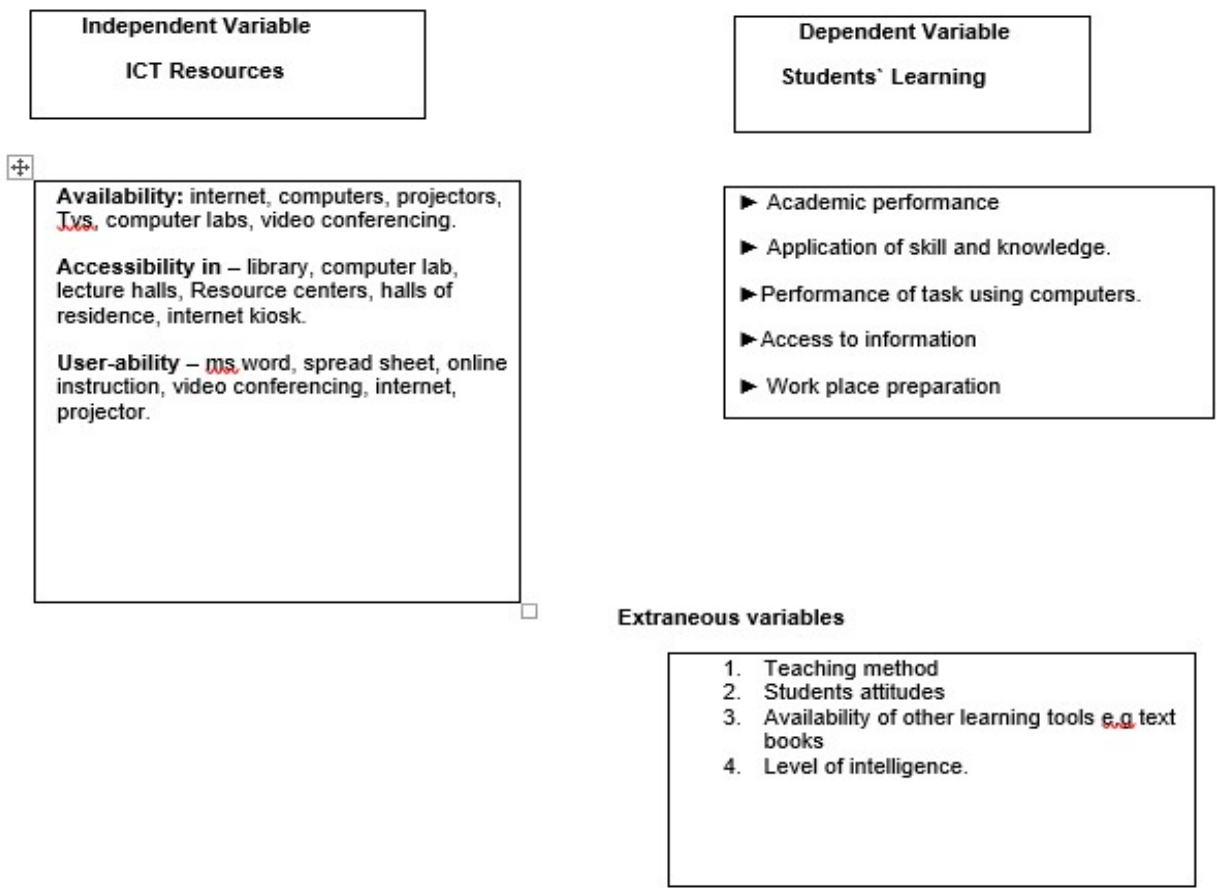


Fig. 1: Conceptual framework showing relationship between ICT and learning source:
 Adapted from spiro et al., 1992.

The presence and use of the ICT resources by the students and lecturers provides an avenue of interaction. These interactions provide feedback which acts as reinforce towards the learning process. Multimedia application like games, drills animation and other graphical application provides practices that take the form of questions (stimulus) and answers (response) frames which exposes the students to the subject in gradual steps consequently generating more interest in the subject matter which in the long run affects their academic performance and gives them the desire to try and use these acquired knowledge in a different setting.



2. ICT facilities in Office Technology and Management Education

ICT facilities have been discovered by educational technologists to facilitate learning as they are designed to virtually appeal to level of learners and learning tools. ICT facilities are devices and facilities used in learning situations to supplement the written or spoken works in transmission of knowledge, attitudes, ideas; concepts and values.

2.1 Fax machine

Fax (short for facsimile), sometimes called telefax is the telephonic transmission of scanned printed material, normally to a telephone number connected to an output device. The original document is scanned with a fax machine, which processes the content (text or images) as a single fixed graphic image, converting it into a bitmap, and then transmitting it through the telephone system in the form of audio-frequency tones. The receiving fax machine interprets tones and reconstructs image, printing a paper copy. Early systems used direct conversion of image darkness to audio tone in a continuous or analog manner. Since the 1980s, most machines modulate the transmitted audio frequencies using a digital representation of the page which is compressed to quickly transmit areas which are all-white or all-black.

Although businesses usually maintain some kind of fax capability, the technology has faced increasing competition from internet-based alternatives. In some countries because electronic signatures on contracts are not yet recognized by law, while faxed contracts with copies of signatures are, fax machines enjoy continuing support in business. In Japan faxes are still used extensively for cultural and graphic reasons and are available for sending to both domestic and international recipients from over 81% of all convenience stores nationwide. Convenience-store fax machines commonly print the slightly re-sized content of the sent fax in the electronic confirmation-slip, in A4 paper size.

2.2 Typewriter

The typewriter is the most widely used ICT facility in OTM education. It is to relocate the much lower handwriting method of communication and the wide choice models available gives work better appearance either manual or electric. A typewriter is a mechanical or electromechanical machine for writing in characters similar to those produced by printer's movable type by means of keyboard-operated types striking a ribbon to transfer ink or carbon impressions onto paper. Typically one character is printed on each key press. The machine prints characters by making ink impressions of type of elements similar to the sorts used in movable type letter press printing.

Although many modern typewriters have one of several similar designs, their invention was incremental, developed by numerous inventors working independently or in competition with each other over a series of decades. As with the automobile, telephone, and telegraph, a number of people contributed insights and inventions that eventually resulted in evermore commercially successful instruments. Historians have estimated that some of typewriter was invented 52 times as thinkers tried to come up with a workable design.

3.2 Computer

This ICT facility is an electronic device that receives instruction/ data as input, translates the data or instruction into the high or low level language and brings it out in the language the users understand. It is an automatic machine that accepts data or information, stores, processes and presents it as output to the user. A computer is a general-purpose device that can be programmed to carry out a set of arithmetic or logical operations automatically. Since a sequence of operations can be readily changed, the computer can solve more than one kind of problem. Conventionally, a computer consists of at least one processing element, typically a central processing unit (CPU) and some form of memory, the processing element carries out arithmetic and logic operations, and a sequencing and control unit can change the order of operations in response to stored information. Peripheral devices allow information to be retrieved from an external source, and the result of operations saved and retrieved.



Mechanical analog computers started appearing in the first century and were later used in the medieval era of astronomical calculations. In World War II, mechanical analog computers were used for specialized military applications such as calculating torpedo aiming. During this time the first electronic digital computers were developed. Originally they were the size of a large room, consuming as much power as several hundred modern personal computers (PCs).

Modern computers based on integrated circuits are millions to billions of times more capable than the early machines, and occupy a fraction of the space. Computers are small enough to fit into mobile devices, and mobile computers can be powered by small batteries. Personal computers in their various forms are icons of the information age and are what most people consider as “computers.” However, the embedded computers found in many devices from mp3 players to fighter aircraft and from electronic toys to industrial robots are the most numerous.

2.4 Photocopying Machine

Photocopies are standard ICT facilities in most offices today. Copiers produce an exact copy either in black and white or color copies which are more expensive to procure than the black and white output type. A photocopy machine is a machine that makes paper copies of documents and other visual images quickly and cheaply. Most current photocopiers use a technology called xerography, a dry process that uses electrostatic charges on a light sensitive photoreceptor to first attract and then transfer toner particles (a powder) onto paper in the form of an image. Heat, pressure or a combination of both is then used to fuse the toner onto the paper. (Copiers can also use other technologies such as ink jet, but xerography is standard for office copying)

Xerography office photocopying was introduced by Xerox in 1959, and it gradually replaced copies made by Verifax, Photostat, carbon paper, mimeograph machines, and other duplicating machines. Photocopying is widely used in business, education, and government. There have been many predictions that photocopiers will eventually become obsolete as information workers continue to increase their digital creation and distribution, and rely less on distributing actual pieces of paper.

2.5 Dictating machine

This is an electronic machine which records speech so that the typist can play back and transcribe on the typewriter. A dictation machine is a sound recording device most commonly used to record speech for later playback or to be typed into print. It includes digital voice recorders and tape recorders. Dictation machine became possible in the 1990s, as falling computer memory prices made possible pocket-sized digital voice recorders that stored sound on computer memory chips without moving parts. Many early 21st-century digital cameras and smart phones have this capability built in. In the 1990s, improvements in voice recognition technology began to allow computer to transcribe recorded audio dictation into text form a task that previously required human secretaries and transcribers. As of 2014 the technology is not robust enough to replace human transcription in most cases. Despite the advances in technology, analog media are still widely used in flexibility, performance, and robustness.

2.6 Internet

This is an ICT tool which comprises of sets of computer networks that communicate using the internet protocol. The internet is a global system of interconnected computer networks that use the standard internet protocol suite (TCP/IP) to link several billion devices World Wide. It is a network of networks that consists of millions of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless and optical networking technologies. Through these, an extensive range of information resources and services can be accessed, such as the inter-linked hypertext documents and application of the World Wide Web (WWW) and the infrastructure to support email, telephony, and peer-to-peer networks for file sharing.



The origins of the internet date back to research commissioned by the United States government in the 1960s to build robust, fault-tolerant communication via computer networks. This work, combined with that of the national physical laboratory in the UK for the government of United Kingdom and France in the United Kingdom and France, led to the primary precursor network, the ARPANET, in the United States.

2.7 Telephone

Telephone is an electronic device used for-way talking with other people. A telephone is a telecommunications device that permits two or more users to conduct a conversation when they are too far apart to be directly. Also, a telephone converts sound, typically and most efficiently the human voice, into electronic signals suitable for transmission via cables or other transmission media over long distances, and replays such signals simultaneously in audible form to its user.

In 1876, Scottish Emigrant Alexander Graham Bell was the first to be granted a United States patent for a device that produced clearly intelligible replication of the human voices. This instrument was further developed by many others. The telephone was the first device in history that enabled people to talk directly with each other across large distances. It rapidly became indispensable to businesses, government, and households and today it is the most widely used small appliances. The essential elements of a telephone are a microphone (transmitter) to speak into and an earphone (receiver) which reproduces the voice in a distant location. In addition, most telephones contain a ringer which produces a sound to announce an incoming telephone call, and a dial used to enter a telephone number when initiating a call to another telephone. Until approximately the 1970s most telephones used a rotary dial, which was superseded by the modern DTMF push-button dial, first introduced to the public by at&t in 1963, the receiver and transmitter are usually built into a handset which is held up to the ear and mouth during conversation. The dial may be located either on the handset, or on a base unit to which the handset is connected. The transmitter converts the sound waves to electrical signals which are sent through the telephone network to the receiving phone, the receiving telephone converts the signals into audible sound in the receiver, or sometimes a loudspeaker.

3. ENVIRONMENT AND LEARNING

Teaching and learning today with the use of ICT facilities is much more complex than those years. Consequently, to become a successful teacher today, there is need to review teaching as a dynamic, open and cyclical process whereby the teachers as the agent of change tries to initiate change in learner. Today, teachers cannot afford to be rigid neither underestimated the importance of students participation has been practiced in the traditional method teaching. Environment is the immediate surroundings of man while learning is relatively permanent in behavior due to experience. Therefore series of research on use of ICT facilities have been carried out to know the degree at which environment influence students` academic achievement. A case study of climate controlled and non-climate controlled institution in which construction cost for all institution on maintenance of ICT facilities included in the study were similar, it was discovered that students in the climate controlled institution were more comfortable and were also superior in standardized achievement test than students in non-climate controlled institutions.

Lecture room constitutes the basic environment to institution anywhere in the world. Among other functions, they offer printed tools which include textbook, journals, seminars, paper, chart, photograph, etc. Through which man acquires knowledge, skills and get enlightened. Non printed material includes electronic media. These are simply carrying technology which can be used for information. E.g radio, television; they are divided into blog and small media. The media include the complex and expensive and examples of each are slides transparencies, radio and program test.



4. THE BENEFITS/IMPORTANCE OF ICTS FACILITIES IN OFFICE TECHNOLOGY AND MANAGEMENT EDUCATION

Facilities refer to any technique employing tools and procedure not dependent solely on printed tools or words. In a study conducted by Okon and Jacob (2002) on the use of ICT facilities by academics in selected institution in Nigeria they found that 61.30% of the respondents professed to use of ICT facilities in their teaching and research works, which showed that the extent of ICT facilities usage was high. However, the findings indicated that the use of ICT facilities by academic by more on statistic analysis than on teaching. This implies that even though, ICT utilization was found to have existed in institutions, it has been of more benefit to other areas especially research than in teaching \learning situation in the classroom.

ICT provide a variety of tools to support and facilities teacher's professional competence, transform teaching and helps teachers to be efficient and effective, thereby increasing their interests in teaching. The use of ICTS facilities can assist in the organization and structure of the course materials, thereby promoting, rethinking and revision of curriculum strategies. ICTS increase teachers, emphasis on individualized instruction, and as such enable them to spend more time with individual student. This help student to carry out more independent work and give teacher more time to focus on teaching higher level concept in the classroom. ICT'S thereby aiding in the provision of interesting and creative presentation of content. Thus it engenders a multimedia presence in the classroom (Yusuf 2005)

ICT facilities has potential to accelerate, enrich and deepen teachers` skills; motivate and engage students in learning; helps to relate school experience to work practices; contributes to radical changes in school and strengthens teaching. (Yusuf, 2011) it has been found useful to all categories of university lecturers including the physically challenged ones in their classroom teaching/learning situations. Studies have confirmed that lack of computer skills exists among faculties at tertiary institutions in Nigeria. As such, they are unable to incorporate the benefits of computer technology in their teaching and research. Less than 12 percent of the Nigerian academic curricula have digital content. This technology deficient therefore translate into major handicap in effort to bridge Nigerian digital divide (Aniebonam, 2008)

ICT facilities provide teachers with increased opportunities to collaborate and network with colleagues, thereby increasing communication and exchange of linkages among themselves. They are concrete objects employed in the teaching and learning processes because they perform some specific functions – they arouse, sustain student's interest and curiosity to learn, they increase motivation, they the attention span of students, they make lesson practical and real, they improve the quality of teaching and learning. They provide opportunities for the repetition of learning and activities even when the teacher is no longer present. (Yusuf,2005). This only underscores the importance of this extended study – that promotes the effective use of ICTS to enhance learning and develop education systems. It is important to continue research that describes how ICTS are used in order to facilitate the application of best educational practices, according to the principles proposed by UNESCO (2004):

- ▶ Good practice in undergraduate education,
- ▶ Encourages contact between students and faculty
- ▶ Develops reciprocity and cooperation among students,
- ▶ Encourages active learning
- ▶ Gives prompt feedback
- ▶ Emphasizes time on task
- ▶ Communicates high expectations, and
- ▶ Respect diverse talents and ways of learning



4.1 Accessibility of ICT facilities and Students Learning

Effective integration of ICT in schools would call for a whole institution to be networks to ensure access to multimedia and learning – rich resources via the school’s intranet and internet wherever students and teachers are, in or out of school. The computer labs and classroom computers need to be sufficient in subjects across the school. A wide range of peripheral and remote working devices, including video-conferencing, is provided and integrated into the effective integrated into the curriculum. Despite the above desired situation, most institutions face barriers to effective integration of ICT in the teaching and learning process; limited infrastructure in terms of satisfactory physical conditions of laboratories and the subsequent accessibility of the resources (ICT) to the learners (Singh, 1993).

Many commercial and academic developers of educational multimedia has tremendous potential to enhance the vividness with which information can be presented and ease with which it can be accessed, the main barriers to learning are not generally that appropriate information is difficult to access or badly presented. The problem has more to do with that information (Schank R.C. and Kass A., 1996).

Accessibility and use of ICT allows students to investigate more thoroughly the real world. They can more readily access information sources outside the classroom and can use tools to analyze and interpret such information. Information may be accessed through online systems or through data logging systems (Reil,1998). The technologies allow them to receive feedback, refine their understanding, build new knowledge and transfer from school to non-school settings allow them to receive feedback, refine their understanding, Build new knowledge and transfer from school to non-school settings (Committee on Developments in the science of learning, 2000). In the past this has been difficult to provide in schools due to logistical constraints and the amount of material to be covered all of which can now be addressed with ICT. What can be learned is broadened and deepened.

Barriers, associated with ICT integration that fall within the physical realm are beyond the direct control of the teacher. These barriers centers around accessibility and infrastructure and include decisions about purchasing, locations of wiring drops, and decisions regarding the placement of computers in centralized labs verses placement of computers pods in classrooms. Placing computers in centralized labs may provide students with equitable and efficient exposure to technology but severely limit the technology’s accessibility for classroom instruction (loveless, 2004). Labs deny teachers the flexibility of deciding when technology should be incorporated into instruction and may send the message to students that computers are not central to learning or the activities in their classrooms. In addition, physical limitations of the classroom including size and location of desk, often limit choices of room arrangement and do not provide the space that is necessary to add pods of computers to used as technology centers

The researchers agrees with the developers of Makerere University ICT policy 2002, that overall, government and training institutions seems to recognize the importance of introducing ICT in education and training. Much as students and staff need training on a continuous basis with modern requisite skills to fully exploit the ICT environment in their different functions (Makerere University policy, 2002), awareness skills only may not be sufficient enough but rather continuous accessibility to ICT resources would do much better. Continuous access to computers helps teachers feel more secured in their ICT use during lessons and gives them the courage to experiment more and thus helps them integrate ICT into lessons effectively. Whereas the above studies looked at the accessibility of ICT facilities in institution of learning, key information in regards to access by the frequency of access points like library, laboratory, and halls of residence were not explored and the frequency of access by the student and staff was never looked at.



4.2 Impact of ICT Facilities/Resources and Students' Learning

Many studies also indicate that the impact of ICT facilities on learning will increase over time as teachers and students become more experienced in continued practice on using computers (Swedish national association for school improvement, 2008). Dewey (1989) argues that information that is accessed but never put to use during that process, may be difficult to retrieve and use when need arises in the real world. Equal attention must be paid to ensuring that the technology is actually being used by the target learners and in ways that truly serve their needs. (Salomon, 1994).

For teachers and their students, the availability of modern computers, peripherals, networking and resources within an increasingly diverse range of technologies is an essential part of learning and teaching in the 21st century. ICT facilities constitute an input in the student learning process that should help produce better learning output. The impact of ICT facilities can enhance learning by making education less dependent on differing teacher quality and by making education available at home throughout the day (Mbwesa 2002). Furthermore, the availability and use of ICT facilities can help students exploit enormous possibilities of acquiring information for schooling purposes and can increase learning through communication (riel 1998).

According to the Swedish national agency for school improvement (2008), ICT facilities provide a positive impact on learning and student performance when it become and integrated element in the classroom and teaching. Bonnet (1997) argues that the availability of visual digital technology (such as animation, simulation and moving images) involves students and reinforces conceptual understanding. Ict use also encourages development from a teacher-focused or teacher-led model to a more student-focused model in which students work together, make their own decisions and take an active role in learning (Swedish national association for school improvement, 2008).

Davis (2000) asserts that the impact of ICT facilities is useful for students who suffer from learning disabilities since ICT facilities allows teachers to prepare suitable tasks for individual needs and each individual more effectively. However, authors like Cox (1999) believe that allowing certain students to use computers distracts them from focusing on task at hand. Central to the argument of impact are the issues of whether or not the teachers and students have ample and convenient access to computers and their accessories let alone the software that is necessitated in the context of their day-to-day research, collaboration, teaching and student evaluation (Fabry & Higgs, 1997). Furthermore, students and teachers should have confidence in these facilities, which is in turn reliant on the facilities' reliability or degree to which the teachers and students are sure that they will have access to them at all expected times and utilize them predictably to the betterment of their academy work, an issue on which consensus is enormous as is clear from ICT in education scholar like Russel (1997), Rose (1997), Mumtaz (2000) and Pelgrum (2001).

The lesson here is that computers are but a subset of the information communication technology facilities necessitated in schools and that even then, they have to be furnished with quality accessories, installed with appropriate software and linked to necessary networks to allow access to rich resources beyond the school rather than serve as a resource for minor typesetting and other word processing activities. Whilst the above studies attempted generally to explain how the impact of ICT affects learning, it does not look at how particular ICT tools clearly affects students learning.



5. CONCLUSION

This paper has sought to appraise the impact of research innovation facilities on student academic performance. In a world where technology is playing an even important role every day, it is essential to encourage and enhance the use of ICT facilities in the academic arena to stay up-to-date with the rest of the world as well as to avail of the opportunities that the modern world has to offer.

6. RECOMMENDATIONS

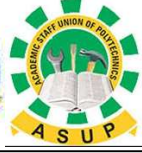
Based on the findings of this study, in order to improve on ICT facilities and learning, the following recommendations may be considered.

1. The Polytechnics should liberalize accessibility of internet and e-mail in the institution in form of establishment of ICT resources centers where all software can be accessed, students' packages and all versions of technology.
2. Training in ICT skills should not be limited to one software package; the polytechnics should go ahead to integrate the other programs and packages as recommended by UNESCO (2000) in order to embed ICT firmly into the teaching and learning process so that it is no longer considered a separate and discrete element.
3. Ogun State Polytechnics need to take an active initiative to introduce the students to ICT by highlighting ways through which it can be of great help in enhancing their academic performance.
4. The State Owned Polytechnics should invest more in computers and related technology as well as means of not only solving accessibility problem but improving on the presence of the facilities especially computers in the classroom and computer laboratory.



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