

# Educational Technology and Students Academic Performance in Health Training Institutions in Cross River State, Nigeria

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**ABSTRACT:** *The main purpose of this study was to investigate relevance of educational technology and student's academic performance in health training institutions in Cross River State, Nigeria. To achieve the purpose, five hypotheses were formulated to guide the study. Literature related to the variables of the study were reviewed accordingly. Survey research design was adopted for the study. Population of study were students of five health institutions across the state, (males and females). The sampling technique used were the random and accidental sampling techniques. A sample of three hundred (300) respondents were selected for the study. Questionnaire was the main instrument used for data collection. The instrument was subject to face validation by the thesis supervisor, experts in measurement and evaluation in Faculty of Education. The cronbach Alpha reliability method was applied to determine the reliability of instrument. Three hundred (300) copies of questionnaire were administered to the respondents on face to face basis. At the end of the exercise, all copies of the questionnaire were successfully retrieved (100% return). The hypotheses were tested with the statistical package of social sciences (SPSS) version 20 at 0.5level of significance. The results revealed that computer services, e-learning facilities, internet services, significantly influence the academic performance of students in health training institutions. Recommendations and suggestions for further study were made.*

**KEYWORD:** educational technology, students' academic, performance in health training, institutions, Cross River State, Nigeria

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## INTRODUCTION

Technology has a long history of enhancing health promotion education in many different ways. Long before the emergence of the internet and the World Wide Web, computer and other technologies were used to store and retrieve information using large databases; and as early as 1979, technologies were predicted to become more indispensable as tools in diagnosis and decision making in health were developed. With the advancement in technologies, predictions about reforming health promotion education from the traditional teacher-centered curriculum to a more student - centered type of education in order to enhance creativity, boost academic performance and lead to positive changes in health practice, Houssay, Behadorami, Trotooncih and Alibi (2012).

With the advance in technologies, health information providers were predicted to spend less time delivering health in traditional settings such as lecturers but more time on facilitating electronic learning(e-learning) process and research, Housyai et al (2012). In addition, students in health institutions were predicted to take a more active role in their learning and alter pace of their own education using computers and other educational technologies such as electronic tablets, software programmes, computer Disc (CD), players (video and audio) and so on. Today, multi-media technology, the World Wide Web and the omni-present nature of networked computers have transformed educational technology. Health promotion education now uses technology more than ever to deliver learning resources and this increased use can be seen in the growing number of publications related to educational technology, Hollander (1999).

Arsenate and Chilin (2008) posited that educational technologies which are technological tools and media that assist in the communication of knowledge, its development and exchange have enhanced teaching and learning in health promotion and will continue to evolve and become further integrated into all aspects of the medical history. Continuing, Arsenate and Chilin (2008) said that, by extension, the information (education) technologies have made health knowledge accessible to everyone. Clients seeking health information not only use ICT to better understand health issues, but they also use networking to inform each other, rate their caregivers, question health procedures and touch malpractice suits. Hence, health care educators and experts must be well prepared to cope with changing patient/student behaviours and knowledge.

Berliner (2002) maintained that being one of the most effective tools for educational system improvement, educational technology plays an important role in learning facilitation. In order to have a deeper, more effective and long lasting learning impact, this systematic approach designs, implements and evaluates the teaching learning process using specific purposes, new methods of psychology and communication sciences and technologies. Bio informatics (1998) added that the development of the internet as a vehicle for World Wide Web communication and the emergence of the World Wide Web have made instantaneous access to much of the entire body of health information an exciting one. It is now one of the most important sources of information for students in health training institutions throughout the world. It has also become a popular machine for delivering

educational materials. Agreeing with the above, Manse (2002) expressed that the internet has been used to improve students' health education knowledge in diverse ways, improve audio visual aids for teaching of body organs, improve methods of diagnosis of diseases, improve procedures of medical examinations and also an important source of information for medical research.

Grimes (2002) ascertained that health students who have participated in online education and use of educational technologies have stated that this mode of education has several advantages over traditional method of instruction. These advantages include the convenience of taking academic programmes at periods suitable to would-be students and at places that they may not have to commute to attend, practical application of theoretical knowledge of some aspects of health such as cardiology and encouragement of self-learning. Cradler (2003) opined that with the growing movement of education towards the new technologies, there is need for experts in Educational Technology and the establishment of educational technology courses at post graduate levels.

Zahra, Farnaz and Rahmatalah, (2014). Revealed that educational technology and e-learning have risen to a point where many educational goals such as independent learning, self-directed e-learning, learning, regardless of time or place, collaborative learning and provision of immediate feedback and assessment of learning appear more achievable. As well, electronic health information through educational programmes has become very popular in developed countries and is rapidly developing as evident in tremendous broadening audience.

The Association of American Medical Colleges (AAMC 2007) stressed that educational technology tools offer compelling instructional capabilities and provide faculty and students with new and diverse educational learning possibilities. These resources can portray anatomical and physical processes with remarkable clarity, tailor instruction to learners' need, allow learner to practice skills in a safe environment, standardize instruction and assessment activities that can be offered anywhere and anytime. Continuing, AAMC (2007) said these educational technology tools are used extensively at all times on the health information continuum and vary widely in complexity, degree of realism and cost. Such educational technology resources include relatively straight-forward online multimedia tutorials, high fidelity visual applications like computerized scanning machines that give patients opportunities to see their malfunctioning body parts and the development of computer models (dummies) for the purpose of studies. To enhance electronic learning, many institutions have purchased commercial products developed for the health promotion education market while others have created in-house development teams of educators, illustrators, web-designers, programmers and other multimedia specialists.

To facilitate the use of effective educational technologies in health promotion education, the AAMC's institute for improving health promotion education charged a panel of experts to consider the correct use of certain educational applications at health training institutions and to examine the relevant literature in order to develop recommendations that could be used to help such institutions select, develop and use appropriate technologies (AAMC 2007).Houshyari et al (2012) affirmed that teaching and learning in health training institutions in particular, have undergone profound changes due to

acceptance and utilization of educational technologies and e-learning media. As a result of this technological relevance, many health training institutions around the world, particularly industrialized countries, have invested heavily in new improved educational technologies, or in the process of adapting to this technological revolutions. Unfortunately, most developing countries like Nigeria are still left out as most health training schools predominantly go by the traditional mode of teaching-learning in ill-conducive classrooms.

Ajuwon (2003) established that even with the relevance of these technologies, health students in Nigerian health care facilities have not fully utilized the opportunities they offer for proficient health promotion education due to financial and technical deficiency. Hence, improved efforts such as inclusion of computer education, investment in computer laboratories, improved educational technologies and internet access, must be a top-priority to the Nigerian government, particularly health stakeholders, in order to ensure high level academic performance of students in health training institutions.

### **Theoretical framework**

The following theories provided the framework for this study.

Technological Pedagogical Content Knowledge Model (TPCK) (2006)

Media Richness Theory (1986)

Technological Pedagogical Content Knowledge Model by Mishra and Koekler (2006)

### **The Technological Pedagogical Content Knowledge Model was propounded by Mishra and Koekler in 2006**

The theory state that effective teaching requires a special type of knowledge (PCK)that represents the blending of content and pedagogy into an understanding of how particular topics, problems or issues are organized, represented and adapted to the diverse interests and abilities of learners and presented for instruction. TPCK at its most foundational level is the inter-section between the development of knowledge of subject matter (content) TPCK at its most foundational level, is the intersection between the development of knowledge of subject matter (content),with the development of technology and the knowledge of teaching and learning(pedagogy). This framework, on a more global scale, combines appropriately selected technology with content- based learning experiences and pedagogical approaches. Within Mishra and Koehle's (2006) TPCK graphic (Figure), the over lapping of the discrete knowledge bases is obvious, as it is the centric overlap of all three. It is this area, when teachers can expertly understand and integrate all three knowledge bases, that the TPCK model postulates high quality and effective integration of technology, pedagogy and content as part of the teaching and learning experience. As Fouler, Wetzed, Buss and Lindsay (2011)contended, while teacher/educators may be well versed in the pedagogies associated with specific disciplines, and may teach using modern technology, these individuals may not be experts on how to teach with technology. It is this distinction, however subtle it may be, where the nature of deconstructing the TPCK theoretical model into usable and practical applications becomes increasingly valuable.

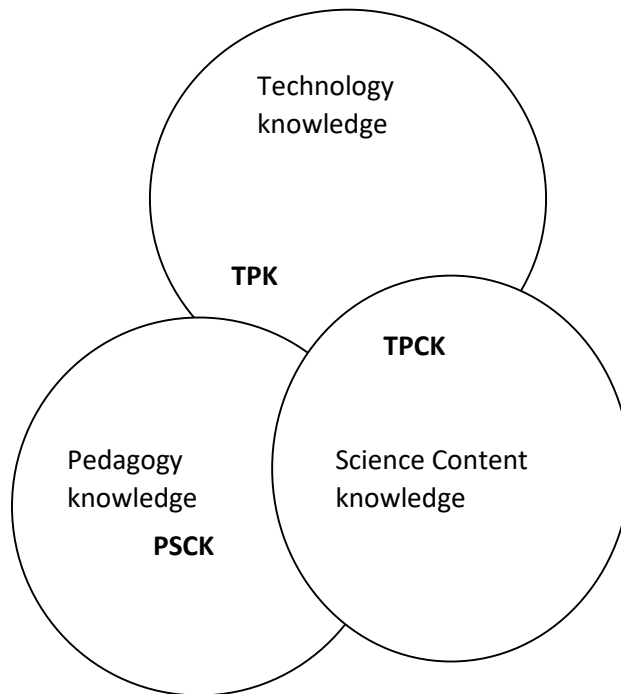
**Diagram Explaining Technology in Education**

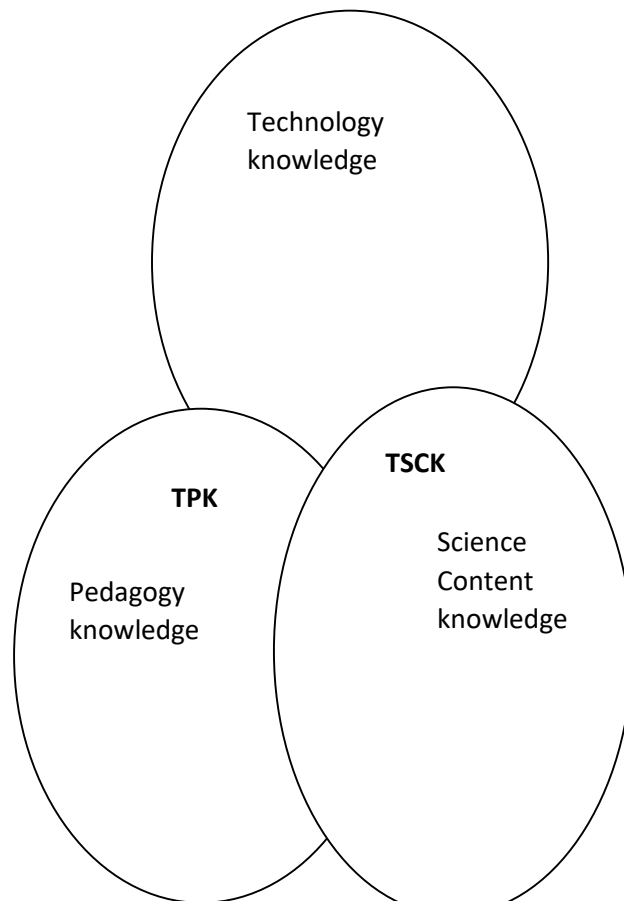
Figure 1. TPCK Model (Mishra and Koehler, 2006)

In Applying the TPCK Model in Pre-service and In-service Teacher Education Technology, pedagogy and content specific knowledge should be blended together to improve teaching and learning. The key aspects of this premise come into focus with Mishra and Koehler's (2006) TPCK model. Strongly supported in the literature, TPCK can be adapted into all learning levels and curricular areas (Koehler, 2011). This model provides the framework to identify and connect the interrelationships between technology, pedagogy, and content towards developing modern teacher's effective and appropriate use of educational technologies in their teaching prior to the TPCK model. Angel and Valanides (2005) argued that the application of technology, pedagogical, and content knowledge principles should be understood under the broad context of school environments, individual teachers' previous experiences, and epistemological beliefs about teaching and learning. In summary, previous research suggests that there is a need to address the issue of TPCK for successful technology integration. Personal beliefs about pedagogy and technology should be considered for the development of TPCK (S and Kim, 2009).

To better understand this model, it is expedient to take note of the spaces between the TPCK model, as the places where only two knowledge bases intersect and using science content knowledge as our example; these are Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TSCK) and Pedagogical Science Content Knowledge (PSCK). We refer to these as "dual-overlapping" areas throughout this interpretation. These dual-overlapping areas are of substantial

importance in terms of understanding how the various aspects of the TPCK model interact with one another. Research continues to show that novice teacher need to move from beginning behaviours and understandings located in the three discrete areas of Technology Knowledge (TK) Science Content Knowledge (SCK), and Pedagogical Knowledge (PK) through intermediate understandings of TPK, TSCK, PSCK towards an expert and integrated pedagogy (Hechter and Phyfe, 2010). As such we contend that learning how to navigate the 'space between' areas should be a critical and explicit step in teacher education as revealed in figure 2.

### Diagram Explaining the 'Space between the TPCK Model'.



**Figure 2:** TPCK model showing spaces between (TPK, TSCK and PSCK). Mishra and Koehler (2006)

While it is theoretically impossible for pre-service or in-service teachers to ascend the model to a full integration of the knowledge types without passing through the intermediate dual overlapping steps, we believe this is a complicated trajectory. But certainly, explicit designed lessons in science methods courses, for example, may be pivotal in helping move pre-service teaches along the continuum from novice integration of these three framework elements to an expert level of full TPCK fusion . If this is achieved, it can inturn help the teachers impact positively/comprehensibly on the students via

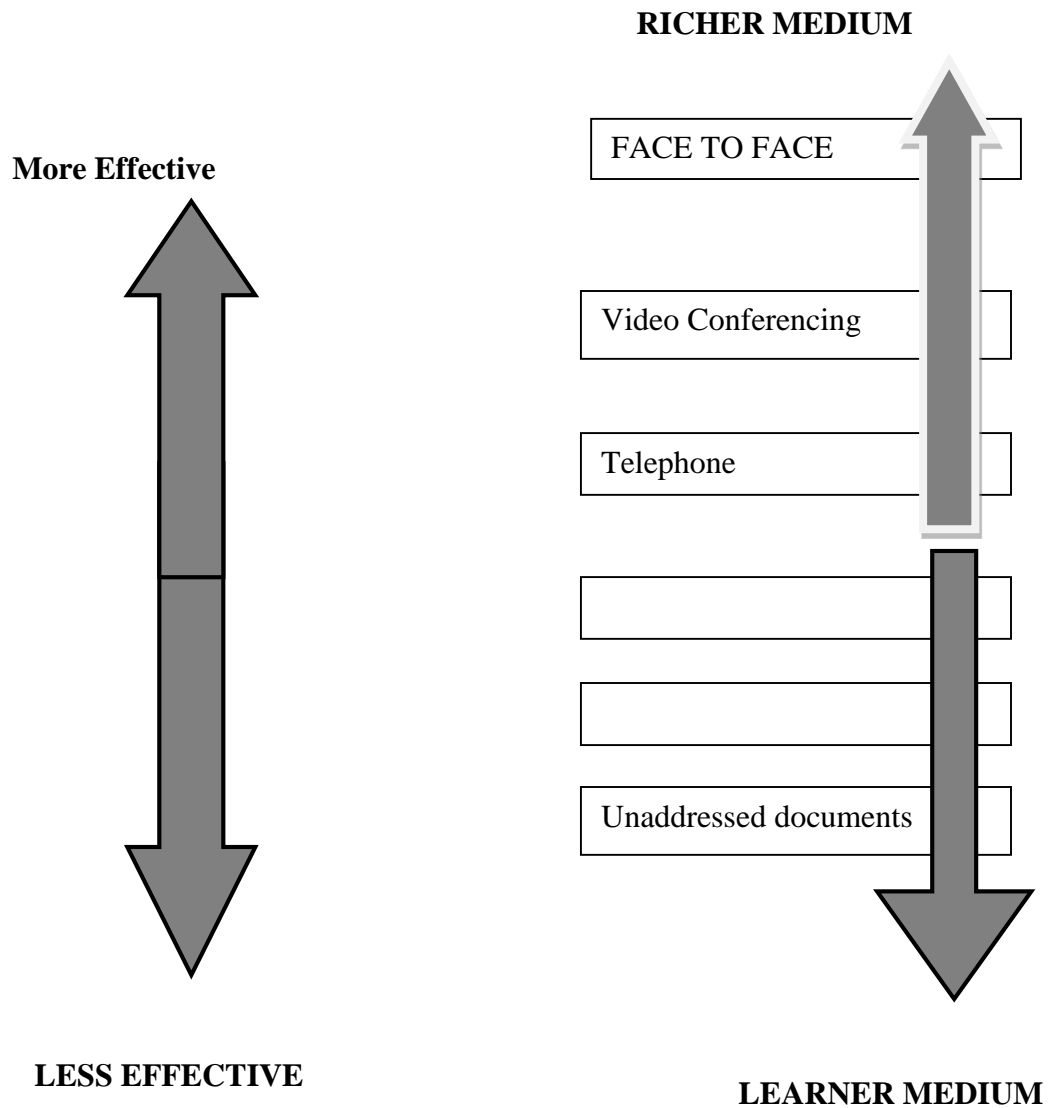
education technologies as well as about students' study culture and academic performance, the more they subscribe to these technology devices (Mishra and Koehler, 2006).

### **Media Richness Theory (1986)**

The Media Richness Theory (MRT) was propounded by Daft and Lengel in 1986. The theory states that all communication media vary in their ability to enable users to communicate and to change understanding. Media Richness Theory (MRT) predicts that communication channels will be selected based on how communicative they are. Daft and Lengel assume that teachers (managers) concentrate on task efficiency that is, achieving the communicative goal as efficiently as possible. MRT is used to determine the best medium for an individual or group to send messages to each other. Heads of institutions or classroom teachers may find that important decisions need be discussed in face-to-face interactions. They prefer oral communication because the various communicative cues afford more accurate and efficient interpretation of the message.

The Media Richness Theory is used to rank and evaluate the riches of certain communication media such as phone calls, video conferencing and email. MRT explains that richer personal communication mediums are generally more effective for communication than leaner, less rich media. According to Daft and Lengel (1986), a phone call cannot reproduce visual social cues such as gestures which makes it a less rich communication media than video conferencing which affords the transmission of gestures and body language.

The theory further explained with the diagram below:



### EXPLANATORY DIAGRAM

#### Media Richness Theory (Daft and Lengel 1986)

Relating the theory to this study, most of the richer, more effective mediums of communication are connected to technology. Therefore, educational technology is very relevant to students, especially those in health training institutions.



### **Purpose of the study**

The following are the purpose of the study:

1. To find out the extent to which availability of computer services promote students performances in health institutions.
2. To find out whether E-learning facilities significantly influence student's academic performance in health institutions.
3. To investigate the extent to which internet services influence student's performance in health institutions.

### **Research questions**

The following question were raised

1. How does availability of computer services influence students' academic performances in health institution?
2. How do E-learning facilities influence student's academic performances in health institutions?
3. Does internet service promote academic performance of students in health institutions?

### **Statement of hypothesis**

The following hypothesis was raised to guide the study:

1. Availability of computer services has no significant influence on academic performance of students in health institutions.
2. E-learning facilities do not significantly influence students' academic performance in health institutions.

### **Scope of the study**

The scope of the study is basically delimited to the “relevance of educational technology and student's academic performance in health training institutions in Cross River State, Nigeria.

The study further covered sub-variables such as the extent to which availability of computer services, E-learning facilities, internet facilities, slide projectors and mobile devices in health institutions influence student's academic performance.

## **LITERATURE REVIEW**

This chapter dwelled extensively on reviewing facts and literatures of scholars that are relevant to the study, “relevance of educational technology and students' academic performance in health training institutions in cross river state”. This is achieved through the following sub-headings:

- Availability of computer services and students' performance in health institutions.
- E-learning facilities significance and students' performance in health institutions.
- Internet services and students' performance in health institutions.

### **Availability of Computer Services and Students' Performance in Health Institutions**

Computers are the technologies used in conveying, manipulation and storage of data by electronic means, they provide an array of powerful tools that may help in transforming the present isolated teacher-centered and text-bound classrooms into rich, student-focused, interactive knowledge environments (Ogunsola, 2005). During the last two decades, education institutions have invested heavily in information and communication technologies (ICT) particularly computers. The use of computers has had a major impact in the school context, and in teaching and learning methods (Ema and Ajayi, 2006). One puzzling question is the effective impact of these computer usages on students' achievement and on the returns of education. Many academic researchers have tried to answer this question at the theoretical and empirical levels. According to Anyanwu (2003), they have faced two main difficulties, on one hand, student performance is hard to observe and on the other hand their effects are difficult to isolate from their environment. However, the effect of computer usage on learning is currently in relation to the internet to facilitate teaching and learning.

For many years, educational researchers have maintained an interest in the effective prediction of students' academic achievement at school. The prediction and explanation of academic achievement and the examination of the factors relating to these achievements are topics of greatest importance in different educational levels. Studies have shown that prior academic achievement is an important predictor of performance at other levels of education. Similarly, cognitive ability was found as the strongest predictor of academic achievement. Some studies confirm that the correlation between cognitive ability and academic achievement tends to decline as students' progress in the educational system. However, the direct link between computer usage and students' academic achievement has been the focus of extensive literature during the last two decades. Some of them help students with their learning by improving the communication between them and the instructors (Valasidou and Bousiou, 2005).

On the contrary, Leuven et al. (2004), stated that there is no evidence for a relationship between increased educational use of computer and students' academic achievements. In fact, they find a consistently negative and marginally significant relationship between computer usage and some student achievement measures. In support to these, some students may use computer to increase their leisure time and have less time to study. Online gaming and increased communication channels do not necessarily mean increased achievement.

Greenes and Shortliffe (1990), in countering the above notion, ascertained that presently, computers play a crucial role by providing care in all aspects of health, both in teaching and practice. Apart from the formation and maintenance of patient's records, they play a judicious role in public health surveillance. On one hand, computers are the key functionaries of health management information system and on the other hand, they are key handlers of geographic information system, electronic medical records, bioengineering, education, and research. They are also being used in statistical analysis of various data and hence, play an innovative role in leveraging the quality standards of public health professionals and workers. It has been suggested that the application of technology should be

encouraged and even incorporated as a routine part of students' daily activities within clinical activities and basic sciences, Benner and Boulware (1996).

Madhuri and Acharya (2015), further posited that no field today is uninfluenced by computers, and so are students and professionals in health, who have benefitted through the pioneering concept of health informatics. That is, the systematic application of information, computer science, and technology to public health practice, research, and learning, which eventually facilitates transmission of data from instructors to healthcare staff to local health agencies, then to state health agencies and finally to National Center of Disease Control leading to formation of Public Health Information Network (PHIN). Mayer (2005) states that people learn considerably better from a combination of both words and images (which technology enables), than merely from words alone. According to him, technology helps students become independent, proficient individuals and good researchers. Abuochedid and Eid agreed that there is a pronounced information gap between the developed and developing world, Abuochedid and Eid (2004).

Virki (2008). Maintained that with usage beyond comprehension and preference beyond inscription, computer is one of the greatest inventions of humans. Owing to high precision, speed, accuracy, regular updating of information and presence of world wide web of knowledge of current and historical concepts, computer plays an indispensable part in the lives of about 1 billion people. There was a time when there was minimal role of technology in public health and physicians only were the sole caretakers and saviors of people. Nowadays, technology is at its peak and there is a boom in the availability of the computers to an extent that nearly 500 million computers are available throughout the world (Madhuri and Acharya 2015). Yamani (2006) stressed the importance of technology as a source of gaining knowledge and maintaining currency and as such the need to change or revise the curriculum in health institutions where it is not applied. Increased use of computer services increases students' comprehension of content and development of skills in different areas, Panel (2002).

Benson (2001), opined that computer literacy by both educated and uneducated have become the most important factor for improved standard of living. There is no effective health education anywhere in the world without the application of Information and Computer Technology (ICT). Health education is the passing of health information to people on matters affecting their health for the purpose of change in health status. Humphrey (2000) perceived ICT as an unavoidable technology for the improvement of organization, team and people in the information age. Computer compliance by people has become the accelerator for productivity and prosperity. ICTs include electronic networks with complex hardware and software linked by a vast array of technological protocols. According to the United Nations Economic Commission for Africa (1999), ICTs cover internet service provision, information technology equipment, library and documentation centres, network based information services and other related communication activities, (Anie and Achugbue, 2009).

In addition, Dasgupta and Deb (2008), affirmed that software, like telemedicine, a computer-based programmed, further help health students and professionals' learning and practice processes. The World Health Organization (WHO) defines telemedicine as, "the delivery of healthcare services,

where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities". In a country like ours, with population of 1.21 billion residing in over 3.2 million square km area hindered by varied landscapes like mountain, deserts, plains, and the far-flung and hilly areas and lack of investment for healthcare and inadequate medical facilities in rural areas, adaptation of telemedicine technology offers one of the best options for delivering healthcare for rural and geographically distant population spread across India.

Telemedicine system consists of telemedicine platform (computer/laptop/palmtop/personal digital assistant/mobile), telemedicine software (for capturing of images/video) at students', patient's and doctor's end along with availability of communication media, which can be terrestrial or mobile connectivity. Most commonly, telemedicine allows real-time live video communication between patient and specialist but at times, when health providers are not available, images and videos can be stored and forwarded to them. Telemedicine has reduced distance and the extra strain for rural population to travel to super specialty hospitals in the cities. Apart from saving time, it has also reduced the cost of treatment and prognosis due to access to standard treatment. Critical care monitoring, where it is not possible to transfer the patient, can also be done with the help of telemedicine. It also helps in remote training of medical students/paramedical staff by experts in the field. It provides updated health information to health care workers and patients, decreases response time for the management of an epidemic/outbreak or a disaster, and helps in transmission of medical images for diagnosis, exchanging health services, or live education via videoconference Dasgupta and Deb (2008).

Al-Musa and Al-Mobark (2005) stated that comprehensive use of computer technology creates a good environment that facilitates and upholds active learning of students in an educational environment. This is designed to help students achieve meaningful learning - "which in turn, could result in positive, cumulatively progressive gains in learning outcomes, Michael (2012). To support the above statements, Habib (2010), stressed that the many weaknesses of paper-based medical record system which includes illegible handwriting, incomplete data, unsafe and non-confidential, and poor availability of materials have given rise to the use of Electronic Medical Records (EMR), seen to be a more secure and confidential method of keeping records. With an aim to modernize the health system by inculcating and promoting the use of health information technology, it helps in collecting complete information about individual patients including registration, clinical record, laboratory, and imaging. In recent years, computerization of patient records has increased at a high rate, and this trend is likely to continue. Mother and Child Tracking System (MCTS) is one of the most recent examples of use of Electronic Health Record System implemented as part of the Janani Suraksha Yojna Scheme for providing incentives to mothers who deliver in hospitals. EMR also allows tracking of patients requiring follow up e.g., human immunodeficiency virus (HIV)-infected patients. It also allows management of diseases requiring long treatments e.g., multidrug-resistant tuberculosis (MDR-TB) or extensively drug-resistant tuberculosis (XDR-TB). Apart from this, it also helps Clinicians and

public health professionals and workers to provide comprehensive care to individuals because of the strong search and record-keeping ability of this system. (Government of India Ministry of Health and Family Welfare, Maternal Health Division, 2006).

Through utilizing computers in healthcare systems, a standard of uniform medical references can take place in hospitals and offices throughout the world. By this concrete system, healthcare services, hospital expenses, & the effectiveness of treatment can all be evaluated on the same basis. Because of this, accuracy and productiveness is ensured. In a world constantly growing and expanding, adding healthcare to the growing list of fields that utilize computers is a sensible approach. Technology is constantly improving, and the healthcare areas can use this to their advantage. As uniform systems develop around the globe, doctors, nurses, students, researchers and countless other individuals can come together for a common goal of improving healthcare. The future can involve records that will utilize medical terminology and evaluation in an effective way. Through this collaboration, the healthcare system has a positive outlook for future workings. (Lce 2013)

### **E-Learning facilities significance and students' performance in health institutions**

E-learning can simply be described as learning conducted through electronic media, typically on the internet. It can also be described as the act of accessing educational curriculum outside the traditional classroom to deliver a course, program or degree online. E-learning is different from the use of DVD, CD-ROM, video tape or television channel. In the use of electronic learning (e-learning), the student can communicate with the lecturers and other students (colleagues). In this type of learning, assignment, tests and examinations are marked and graded, Okoro (2000).

In e-learning, education/knowledge is transferred and delivered to a large number of recipients at the same or different times. Learning is accessed twenty-four hours a day, any-where, any time. Moore, Dickson-Deane and Galyen (2011) described the increasing use of web-based technology to provide a better learning environment in tertiary education as a global trend. They defined e-learning as the usage of electronic devices, with or without the help of internet to provide a student-friendly learning environment. It is termed student friendly because it includes all categories of learners-full time, part-time distant learners, etc.

According to Berjemo (2005), is the exchange of information between students and instructors online resulting to a natural evolution of distance learning. In distance learning or distance education, learners who may not always be present at school are benefactors. It gives opportunity, mostly, to those who are unable to receive formal education as full time students. e.g working adults (Moore, Dickson-Dean and Galyen, 2011).

Kaplan and Haenlein (2016), affirmed that distance education or distance learning is the education of students who may not always be physically present a school. Traditionally, this usually involved correspondence courses wherein the student corresponds with the school via post. Today it involves online education. Courses that are conducted (51 percent or more) are either hybrid, blended or 100% distance learning. Massive open online courses (MOOCs), offering large-scale interactive participation and open access through the World Wide Web or other network technologies, are recent

developments in distance education. A number of other terms (distributed learning, e-learning, online learning, etc.) are used roughly, synonymously with distance education.

Lever-Duffy and McDonald (2007), unraveled that although the expansion of the Internet blurs the boundaries, distance education technologies are divided into two modes of delivery: 'synchronous learning' and 'asynchronous learning'. In synchronous learning, all participants are "present" at the same time. In this regard, it resembles traditional classroom teaching methods despite the participants being located remotely. It requires a timetable to be organized. Web conferencing, video conferencing, educational television, instructional television are examples of synchronous technology, as are direct-broadcast satellite (DBS), internet radio, live streaming, telephone, and web-based VIP.

Web conferencing software helps to facilitate meetings in distance learning courses and usually contain additional interaction tools such as text chat, polls, hand raising, emoticons etc. These tools also support asynchronous participation by students being able to listen to recordings of synchronous sessions. Immersive environments (notably Second Life) have also been used to enhance participant presence in distance education courses. Another form of synchronous learning that has been entering the classroom over the last couple of years is the use of robot proxies including those that allow sick students to attend classes. Some universities have been starting to use robot proxies to enable more engaging synchronous hybrid classes where both remote and in person students can be present and interact using tele robotic devices such as the Kubi Telepresence robot stand that looks around and the Double Robot that roams around. With these telepresence robots, the remote students have a seat at the table or desk instead of being on a screen on the wall.

In asynchronous learning, participants access course materials flexibly on their own schedules. Students are not required to be together at the same time. Mail correspondence, which is the oldest form of distance education, is an asynchronous delivery technology, as are message board forums, e-mail, video and audio recordings, print materials, voicemail, and fax. The two methods can be combined. Many courses offered by both open universities and an increasing number of campus based institutions use periodic sessions of residential or day teaching to supplement the sessions delivered at a distance. This type of mixed distance and campus based education has recently come to be called "blended learning" or less often "hybrid learning". Many open universities use a blend of technologies and a blend of learning modalities (face-to-face, distance, and hybrid) all under the rubric of "distance learning". Distance learning can also use interactive radio instruction (IRI), interactive audio instruction (IAI), online virtual worlds, digital games, webinars, and webcasts, all of which are referred to as e-learning. (Lever-Duffy and Mc Donald, 2007).

Gold and Maitland (1999), maintained that the widespread use of computers and the internet have made distance learning easier and faster, and today virtual schools and virtual universities deliver full curricula online. The capacity of Internet to support voice, video, text and immersion teaching methods made earlier distinct forms of telephone, videoconferencing, radio, television, and text based education somewhat redundant. However, many of the techniques developed and lessons learned with earlier media are used in internet delivery. The first completely online courses for graduate credit were

offered by Connected Education, starting in the Fall of 1985, leading to the MA in Media Studies from The New School. The first new and fully online university was founded in 1994 as the Open University of Catalonia, headquartered in Barcelona, Spain. Between 2000 and 2008, enrollment in distance education courses increased rapidly in almost every country in both developed and developing countries. Many private, public, non-profit and for-profit institutions worldwide now offer distance education courses from the most basic instruction through to the highest levels of degree and doctoral programs.

Levels of accreditation vary: widely respected universities such as Stanford University and Harvard now deliver online courses but other online schools receive little outside oversight, and some are actually fraudulent, i.e., diploma mills. In the United States (US), the Distance Education Accrediting Commission (DEAC) specializes in the accreditation of distance education institutions. In the United States in 2011, it was found that a third of all the students enrolled in postsecondary education had taken an accredited online course in a postsecondary institution. Even though growth rates are slowing, enrollment for online courses has been seen to increase with the advance in technology. The majority of public and private colleges now offer full academic programs online. These include, but are not limited to, training programs in the mental health, occupational therapy, family therapy, art therapy, physical therapy, and rehabilitation counseling fields. Even engineering courses that require the manipulation and control of machines and robots that are technically more challenging to learn remotely are subject to distance learning through the internet. (Gold and Maitland, 1999).

Olszewski-Kubilius and Corwith (2011), posited that distance education has a long history, but its popularity and use has grown exponentially as more advanced technology has become available. By 2008, online learning programs were available in the United States in 44 states. Internet forums, online discussion group and online learning community can contribute to an efficacious distance education experience. Research shows that socialization plays an important role in some forms of distance education. E-courses are also a viable option for distance learning. There are many available that cover a broad range of topics. As well, distance education can be delivered in a paced format similar to traditional campus based models in which learners commence and complete a course at the same time. Paced delivery is currently the most common mode of distance education delivery. Alternatively, some institutions offer self-paced programs that allow for continuous enrollment and the length of time to complete the course is set by the learner's time, skill and commitment levels. Paced courses may be offered in either synchronous mode, but self-paced courses are almost always offered a synchronously. Each delivery model offers both advantages and disadvantages for students, teachers and institutions.

Oblinger, (2000), argued that e-learning can expand access to education and training for both general populace and businesses since its flexible scheduling structure lessens the effects of the many time-constraints imposed by personal responsibilities and commitments. Devolving some activities off-site alleviates institutional capacity constraints arising from the traditional demand on institutional buildings and infrastructure. Furthermore, there is the potential for increased access to more experts in the field and to other students from diverse geographical, social, cultural, economic, and

experiential backgrounds. As the population at large becomes more involved in lifelong learning beyond the normal schooling age, institutions can benefit financially, and adults learning business courses may be particularly lucrative. Distance education programs can act as a catalyst for institutional innovation and are at least as effective as face-to-face learning programs, especially if the instructor is knowledgeable and skilled.

Yuan and Gay (2006), stressed that distance education (e-learning) can also provide a broader method of communication within the realm of education. With the many tools and programs that technological advancements have to offer, communication appears to increase in distance education amongst students and their professors, as well as students and their classmates. The distance educational increase in communication, particularly communication amongst students and their classmates, is an improvement that has been made to provide distance education students with as many of the opportunities as possible as they would receive in in-person education. The improvement being made in distance education is growing in tandem with the constant technological advancements. Present-day online communication allows students to associate with accredited schools and programs throughout the world that are out of reach for in-person learning. By having the opportunity to be involved in global institutions via distance education, a diverse array of thought is presented to students through communication with their classmates. This is beneficial because students have the opportunity to "combine new opinions with their own, and develop a solid foundation for learning". According to Oblinger (2000), it has been shown through research that "as learners become aware of the variations in interpretation and construction of meaning among a range of people [they] construct an individual meaning", which can help students become knowledgeable of a wide array of viewpoints in education. To increase the likelihood that students will build effective ties with one another during the course, instructors should use similar assignments for students across different locations to overcome the influence of co-location on relationship building.

Nguyen (2015), submitted that the high cost of education affects students in higher education, to which distance education may be an alternative in order to provide some relief. Distance education has been a more cost-effective form of learning, and can sometimes save students a significant amount of money as opposed to traditional education. Distance education may be able to help to save students a considerable amount financially by removing the cost of transportation. In addition, distance education may be able to save students from the economic burden of high-priced course textbooks. Many textbooks are now available as electronic textbooks, known as e-textbooks, which can offer digital textbooks for a reduced price in comparison to traditional textbooks. Also, the increasing improvements in technology have resulted in many school libraries having a partnership with digital publishers that offer course materials for free, which can help students significantly with educational costs.

Kirtman (2009), supported that within the class, students are able to learn in ways that traditional classrooms would not be able to provide. It is able to promote good learning experiences and therefore, allow students to obtain higher satisfaction with their online learning. For example, students can review their lessons more than once according to their need. Students can then manipulate the



coursework to fit their learning by focusing more on their weaker topics while breezing through concepts that they already have or can easily grasp. When course design and the learning environment are at their optimal conditions, distance education can lead students to higher satisfaction with their learning experiences. Studies have shown that high satisfaction correlates to increased learning. For those in a healthcare or mental health distance learning program, online-based interactions have the potential to foster deeper reflections and discussions of client issues as well as a quicker response to client issues, since supervision happens on a regular basis and is not limited to a weekly supervision meeting. This also may contribute to the students feeling a greater sense of support, since they have ongoing and regular access to their instructors and other students.

Brown (2013), contended that distance learning may enable students who are unable to attend a traditional school setting, due to disability or illness such as decreased mobility and immune system suppression, to get a good education. Distance education graduates, who would never have been associated with the school under a traditional system, may donate money to the school. According to Zang, Zhou and Nunamaker (2004), the most important element that supports the use of technology in the education system is the internet. E-learning has become one of the fastest moving trends in education and poses a promising alternative to traditional learning.

Even though e-learning is widely practiced in tertiary institutions within Malaysia, there are still problems and difficulties in the implementation of e-learning in universities. According to Embi, the problems in implementation e-learning are related to the governance of e-learning, e-content development, and issues faced both by the lecturers and students. Thus, it is vital for us to understand the student's perception on e-learning as they are one of the users of the system. It is important to study the impact and students' perception on e-learning as to improvise the e-learning practice to create a more productive learning session. A study on the factors that may influence the effectiveness of e-learning is substantial, as it will help the lecturers and policy-makers to identify the barriers faced during the e-learning implementation and find ways to overcome it. (Embi, 2011).

Yengin, Karahoca, Karahoca and Ozcinar (2010), ascertained that another technology that caused the development of e-learning is the mobile learning. Currently with the tremendous growth of mobile technology along with the easy access of internet in various places, mobile learning is being actively studied as one of the platforms used for learning purpose. Based on a study done at OUM, the majority of students already possessed mobile phones and believed that they are ready to be engaged in mobile learning. An online survey on the mobile learning readiness of two local universities in Malaysia namely Universiti Teknologi MARA (UiTM) and National University of Malaysia, in respect to the students' skills, psychology, and budget was also conducted. Based on the results, the majority of students readily welcome the idea of implementing mobile learning in their educational system as they are already familiar with the device. However, some of the students still feel hesitant when it concerns the monetary issues as they are unsure in what way their finances will be affected by applying mobile learning.

According to Efferth (2011), the under graduate health students have actively used e-learning to improve the attractiveness of learning some courses like pharmacology and microbiology. Apart from that, validation of e-learning on the knowledge and acceptance was also reported and the majority of the students felt that e-learning is effective as well as a convenient way to be up-to-date with the current health-related issues. A systematic review on the effectiveness of e-learning in health education conducted using an assessment of perception on benefits of e-learning, relevance of specific learning course, and e-learning functionality was recently reported. This review found that e-learning in health education effectively increases knowledge and is a highly acceptable instructional format for community health students, nursing students, medical and pharmacy students, albeit the increment in terms of skills or professional practice has not been proven. (Efferth, 2011).

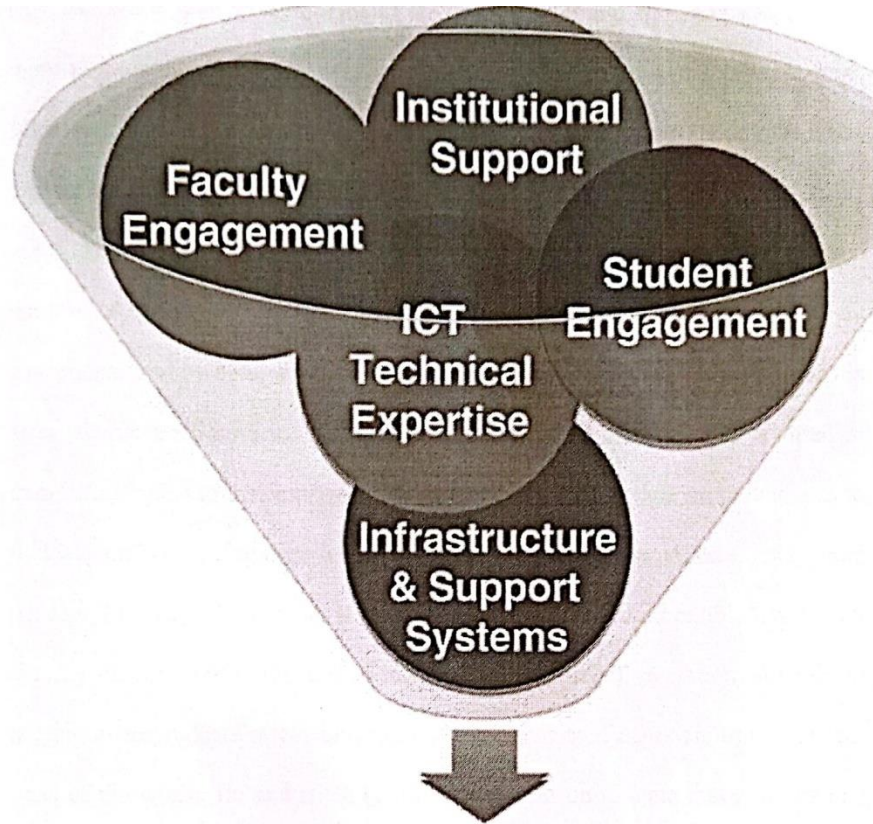
Throughout the intervention of e-learning at the university level, we can see the positive impression of e-learning on the university organizations. These include cost reduction in delivering teaching materials, increased ability of the network to accommodate higher amount of workload, and improved accessibility and availability of the teaching materials to distance learners. George et al. cited a paper stating that e-learning can be cost efficient if the current lecturers are actively involved in the content generation for their particular disciplines and thus the development of the contents would not require the involvement of many faculties at every stage. (George et al, 2014). Goi and Ng also cited a paper stating that with e-learning, the cost of university infrastructure can also be reduced as there will be no requirement to build a physical campus when the students are able to access the learning materials from their home. Furthermore, the ease of accessing learning materials regardless of time and place will enable the universities to reach out to a wider audience, hence enabling the institutions to grow at a faster rate. For example, OUM has successfully registered more than 60,000 students since its opening in 2000 and most of the OUM's students are working adults. (Goi and Ng, 2009).

The impact of e-learning on students can be studied by assessing the students' knowledge, skills, and attitudes. The impact of e-learning intervention on students' knowledge can be assessed through a number of ways such as by using multiple choice questions, gap text questions, short essay questions, matching and short answer questions, and open ended questions. Based on the systemic review by George et al, 27% of the reviewed research from various disciplines showed a significant increase of knowledge after the e-learning intervention compared to traditional learning where 48% of the reviewed research showed no significant difference of knowledge between e-learning and traditional learning. As for students' skills, it can be assessed by using rating scale, search skill test, Likert-type questionnaire, and written assessments such as data collection sheets. A systemic review was done in 2014, showing that the majority of students do acquire greater skills on handling devices and performing procedures after the intervention of e-learning compared to the traditional learning process. (George et al, 2014).

Love (2012) asserts that continuous training is deemed compulsory for all healthcare professionals to ensure knowledge, skills and competencies. These trainings are not only maintained but also regularly updated and upgraded. According to him, training is important for most professionals, but especially in healthcare, it can mean the difference between life and death. Online training brings important

benefits healthcare workers professionals including the ability to receive training at any time, from anywhere, on any device and on-the-go reducing, reducing lost time and less productivity. In health training, devices like interactions video can be used to impact basic knowledge, and face-to-face time can be reversed for more engaging activities. Refresher courses can be taken by the health workers at any time and learning can be easily monitored. Love (2012) went on to state that as technologists in health continues to launch new equipment and products aimed at improving patient care and treating illnesses, effective training for any device or drug is essential for physicians, nurses, clinicians and technicians. When it comes to on-line device and drug training, a blended environment that includes internet training makes a great deal of sense for the industry.

Coopasami, Knight and Pete (2017), reported that McVeigh, in a study, observed that while learning was once confined to the classroom, it now extends beyond the institutions. She maintains that the future of training healthcare practitioners will include e-learning in order to facilitate lifelong continuous learning. E-learning can enable students in health institutions to achieve an effective balance between education, work and their personal lives. Since the curricula of most departments in health institutions have “practical experience”, where the students are sent out to the service areas for weeks or even months, e-learning allows for flexibility in terms of time and is a valuable tool for these students. Gupta, Marsden, Oluka and Lucas (2017) agreed that there has been a strong support in developing countries for the integration of e-learning into existing healthcare teaching programmes because of the need to increase the number of qualified health providers. In the context of safety in the hospitals, it is important to guarantee a sufficient level of knowledge in health professionals. As an alternative to traditional education, which is relatively labour intensive and time consuming, e-learning can be useful when improving knowledge in a large group of health students, Steeg, Ukema, Wagner and Langelaan (2015). Agreeing with the above in their study, Seble et al (2013) stated that the most common use of ICTs in health profession education was to access information that supplements formal teaching. This was made open when a student used an internet search engine to find articles, images or slides regarding a given illness or medical practice. According to them, Kalita et al. in 2007, studied the extent to which students in health institutions utilized computer based literature searches to supplement teaching of evidence -based medicine.



**DIAGRAM – E-Learning Strategy**

### **Internet services and students' performance in health institutions**

The Internet is a global linking of computers that allows information transfer. It was established in the early 1960s by the U.S. Department of Defense (Schneider, Evans, & Pinard, 2006), primarily for military purposes. Since then, the continual improvement of the Internet technology has provided an extraordinary level of public accessibility to a wide range of forms of communication, e.g. intra-organizational and inter-organizational email; data storage, management and transfer; social websites like Facebook, text messaging such as Twitter, and so forth. Due to the development and spread of cheaper and more user-friendly computer technology and software (e.g., portable computers, Microsoft Word, etc.), the use of the Internet has increased dramatically. In 2010, the world's Internet use was 28.7% of the population.

Internets are loose amalgamation of computer networks interconnected worldwide through several backbone networks, Adomi (2008). It emerged as an educational tool by being a source of getting the right information and solutions in an academic environment. The application of these innovations has resulted in tremendous gains to the country's economy, making many Nigerian Universities to find ways of improving their information and communication policies. Falaye and Aladeniyi (2012). The internet is more informative, fast and accessible throughout the day Penny (2006). The use of internet (if maximized), plays a major role in helping undergraduate researchers access large number of materials from different parts of the world, Ilo and Ifijeh (2010). They went on to state that students and lecturers can achieve the same goal from different points without physical interaction. Lecturers and students can exchange ideas easily because of internet. Ikoro (2002) noted that staff and students in academic community enjoy internet as a result of the facilities it offers. A study carried out by Jagboro (2003) indicated that students used it for e-mail, to get research materials and course materials. The study showed that users accessed internet in their homes, colleges or school library. According to Oyedun (2007), most of the students claimed that through internet services in the library, they have improved considerably in their academic performance.

Internet is the fastest growing communication technology and has emerged as a major source of information that connects people, data and other computers, reducing the world to the much talked about global village, Bankole (2012). According to Yunus and Khayal (2000), internet is the only force that is transforming peoples' lives and that promises to make a great impact in the future. Without the internet, planes would not fly, financial markets would not operate, supermarkets would not restock, taxes would not get paid, healthcare would not excel and so on, Huttner (2007). The internet places information on our finger tips and everywhere, making our lives easy and smooth, Ahmad (2011).

While this may not seem like a very large portion of the world's population, the growth in the use of the Internet has been dramatic. For example, between 2000 and 2010, the rate of growth of

Internet use was 44.8% (Internet World Stats,2010).Likewise, in Thailand, while 26.3% of the Thai population were Internet users in 2010, the growth rate in Internet use was even larger than for the world as a whole, growing 660.3% from 2000 to 2010 (Internet World Stats, 2010).Zang, Zhou, Nunamaker (2004) described the internet as an open and unregulated community of people who communicate freely across an international electronic network. As in many other fields the internet is also present in the health domain. The development of the internet as a vehicle for world-wide communication, and the emergence of the World Wide Web, has made instantaneous to much of the entire body of health information an exciting one, Bio Informatics (1998).It has also been used for health education purposes in health institutions like organ teaching, diagnoses of diseases; conduct of medical examinations and for research by students of these health institutions (Panel 2002, Biggs 2003, Michael 2001,Al-Musa and Al-Mobark 2005).

Students of health institutions who have participated in online education have stated that this mode of education has several advantages over traditional methods of instruction. These advantages include the convenience of taking a course at a time that fitted students schedule and at a place that they did not have to commute to attend, Griffin (2003).

There are many benefits associated with Internet use, such as access to needed information, worldwide access to news and events, and interpersonal communication through email. However, along with the phenomenal growth of the Internet and its use, there has been a growing concern worldwide regarding the risks associated with Internet over-use (Buchholz, 2009). It is now believed that there could be widespread “addiction” to it, in particular amongst college and university students (Kim, et al., 2010).

As a consequence of the negative media attention directed at the use of the Internet, the Thai Webmaster Association offered practical suggestions that the Thai government should adopt to minimize the problems associated with Internet use. For example, the Association suggested that the National Legislative Assembly push through anti-cybercrime legislation and that the Ministry of Information and Communication Technology should shut down “dangerous” Internet sites as quickly as possible. The Thai government has attempted to address some of the social problems associated with the use of these new technologies, particularly the Internet, by initiating a social marketing campaign advising parents to use computer programs that block children from viewing inappropriate websites. In addition, in 2007, anti-cybercrime legislation was passed by the National Legislative Assembly that criminalized pornography and some online “dating” sites and allowed the government to block entry into the Thai Internet network. Other strategies included media campaigns that were launched and designed to prevent Internet Addiction (IA) and related problems, such as the Child Watch and Internet Shops program, the Safe and Creative Internet Fair, and the Network on Students' Behaviours Development (Nguyen 2015).

Irrespective of the conceptual debate surrounding internet addiction (IA), many academics and researchers believe that excessive use of the Internet has the potential to become an addiction (Griffiths, 2000), and some empirical research suggests that some students have already become addicted (Leuven et al., 2004). For example, epidemiological studies among school students in various countries have found that the prevalence rates of IA cover a wide range, from a low of 1% in Greece (Tsitsika et al., 2009) to a high of 36.7% in Italy (Milani, et al., 2009). It should be noted that the percentage of IA identified in various studies will vary depending on the time the study was conducted, the instruments used for classifying addictive users, and the sampling strategy used in the collection of the data.

The National Statistical Office (2008), reported that in Thailand, the number of Internet users has increased dramatically in recent years, especially among adolescents. In 2008 about 28.2% of the Thai population had access to the Internet and of those, 68.2% were young people aged 6 to 24-years-old. By 2009, about 43.9% of Thai households were reported as having access to the Internet and over 16.99 million Thai people use the Internet as an integral part of their personal, social and occupational lives. Moreover, 93.7% of Thai Educational Institutes have Internet access, thus providing students with daily access to high speed Internet.

According to Bernhardt and Hubley (2001), it was estimated in a study carried out by Telcordia that nearly 500 million people throughout the world use the internet and is still growing. According to them, health information is one of the researched topics online. People now have access to more health information than before because of the existing web sites, Inglehart (2010). The internet is also revolutionizing health education research and practice. They went on to state that health education and health promotion professionals are largely in the business of compiling, facilitating, developing, packaging and delivering health information to and between students and teachers in health institutions, individuals and communities, Bernhardt & Hubley (2001).

Tattersall (2002), stated that the internet-based applications have also the potential for improvement of clinical practice services through better timing, adjustment according to patient's needs and integration of evidence-based guidelines in the information systems. After first clinical trials, it became obvious that even severe conditions may be efficiently treated at home providing appropriate communication with the patient as well as monitoring of vital signs and symptoms via tele-medical infrastructure is assured. Teleconferencing system may be installed in patient's home and used by the patient with assistance of family members or social workers. As well, the inclusion of patients in the process of diagnostics and therapy is perceived nowadays as one of the key conditions of successful care.

Yousef (2008), noted that the availability of the Internet has brought significant changes to health services. The fact that the number of elderly people in the U.S. and other industrialized nations is rising is beginning to put pressure on health services. There are not enough resources to take care

of the elderly without the Internet. This increase in the elderly is one reason for the increase in home care. With "Internet access available to everyone and the advent of wireless technologies, advanced tele homecare is a possibility for a large proportion of the population".

New developments, such as "network technologies that connect sensors and input devices in the patient home to a home health care provider" made home care for even gravely ill patients a possibility. In one study, it was found that it's possible to hook monitors in the patient's home to the health care provider via the Internet. Because this is possible, health care for the elderly has improved.

Duplaga, (2003), opined that the Internet users surfing on the Web frequently use it as the source of health related information. Self-education is important opportunity for chronic patients related to the widespread use of Web-based applications. Internet technologies enable individualized education and training process. More advanced solutions emerge the patient in the environment supporting self-management of the medical problem but also imposing the regularity of activities. In such environment the patient gains self-assurance that in case of deterioration the appropriate information will be forwarded to healthcare provider. Hence, full exploration of advantages related to the use of information technologies and internet services yield many other fields of application in healthcare such as the implementation of preventive measures, the efficient use of individual genetic information in early stages of health-supporting interventions (e.g. lifestyle modification, diet, avoiding specific factors), the transformation of the traditional contacts between health professional and patients and development of virtual support environments for people with special needs.

The clinical care incorporates new modes of services delivery through the use of systems supporting electronic healthcare record, telemedical applications or electronic prescribing. Telemedicine offers broad spectrum of clinical scenarios enabling the e-visits for patients, teleconsultations between health professionals representing different medical centres or specialties, telepresence and tele training in interventional specialties or even virtual surgery. The availability of information system in medical facility enables the implementation of reminding and alerting applications or decision support tools enhancing the quality of the process of care. According to Kaplan and Haenlein (2016), internet is one of beneficial tools in this era of information technology (IT) for health education purposes, business purposes and from the academic point of view, for upgrading of skills and capabilities of students which assist them in studies and professional life, after graduation from the schools. Globally today, the use of internet facilities for communication and sharing of knowledge can never be overemphasized. In Africa, especially the academic environment, use of the internet has come to stay. Students of all fields, including health, enhance their academic performance through searching for current information outside their own institution.



## **RESEARCH METHODOLOGY**

### **Research Design**

The study adopted a social survey research design which involves a systematic and comprehensive collection of data about opinion, attitude and behavior of people on the subject-matter in view. It allows inferences to be made and drawn from sample population, thereby allowing generalization about the whole population to be made without necessarily seeking the opinion of the whole population. The underlying principle of social survey research is that the consensus of individual opinions of the sample population on a particular subject or problem is expected to provide solution to the problem(s) studied.

These are in line with the nature of the study which seeks the opinions of the sample population, so as to make generalization on the total population's opinions.

### **Population of the study**

The population of the study consists of a cross-section of students and teachers (lecturers) in health institutions across the state. Five (5) out the ten (10) health institutions were randomly selected for the study. The population of study numbered about 10,000 respondents.

### **Sampling techniques (procedure)**

The simple random sampling technique was adopted to select the institutions while the accidental sampling technique was adopted to select the sample for the study. Isangedighi, Joshua, Asim and Ekuri (2004) asserted that simple random technique is a means by which researchers give every member of the population equal and independent opportunity of being selected. The main purpose of using simple random sampling technique was to compose a sample that would yield research data that can be generalized to a larger population. The technique employed by the researcher was the hat and draw (balloting) method. Here, the researcher wrote the names of all the schools (institutions) on slips of papers, rolled each slip into a paper ball, mixed those paper balls well in a container (hat), and blindly drew the required number of institutions.

The accidental sampling was adopted to select the sample for the study. Accidental sampling is a non-probability sampling technique in which the evidence of drawing samples by chance is limited (Isangedighi et al 2004). Here the researcher sampled only the respondents who were ready to volunteer information at the time of data collection. This method is considered most appropriate because of the convenience it provides in sample selection. At the end of the exercise, three hundred (300) respondents were selected for the study.

### **Sample**

The sample for the study consisted of 300 respondents which were selected from five health institutions namely -College of Health Technology, Calabar, Federal School of Psychiatric and Mental Nursing, Calabar, School of Nursing, Itigidi, School of Health Technology, Okpoma, Yala Local Government Area and the Community Health Offices' Programme, University of Calabar Teaching Hospital, Calabar.

### **Instrumentation**

The instrument for data collection was the questionnaire, interview and documentary evidence. According to Isangedghi et al (2004), the questionnaire is a device for data collection in which respondents provide written answers to written questions or statements which are used as a means of getting the respondent's information about himself or herself, events, phenomena or object of interest. The questionnaire was divided into two sections; section A contains the demographic data, while section B contains the actual questionnaire items which are 20 in number.

The items were close-ended but in-depth and exhaustive in order to help the researcher elicit the relevant information for the study. The response scale is the Likert type response scale with a four-point scale rating from 4 (strongly agree) to 1 (strongly disagree) the questionnaire which consists of 20 items is designed to determine relevance of educational technology and students' performance in health institutions.

The first 5 (five) items centered on availability of computer services and academic performance of students in health institutions. The next 5 items focused on E-learning facilities and academic performance of students in health institutions. Following this are 5 items on internet services and academic performance of students in health institutions. Next are 5 items on mobile services and academic performance of students in health institutions and finally, 5 items on slide projectors and academic performance of students in health institutions. The items were positively worded to enhance understanding by respondents.

### **Validity of the Instrument**

Validity refers to the degree to which an instrument accurately measures what it is intended to measure or the extent to which a true and accurate measure of a trait is probable Isangedighi et al (2004). Face validity was established for the instrument of the study. Face validity refers to the way the questionnaire items appear to take care of relevant content in the area of interest. Furthermore, the face and content validity were established using experts in research in the Department of Education and the supervisor. The experts and supervisor certified that the instrument was face and content valid and could be used for the research study.

### **Reliability of the instrument**

Reliability refers to the degree of consistency that an instrument demonstrates in measuring what it purports to measure. The Cronbach Alpha reliability method was applied to determine the reliability of the instrument. To establish the reliability, a pilot testing was carried out. During the pilot/trial testing, 30 respondents were administered copies of questionnaire at the School of Midwifery, Calabar and the Faculty of Medical Sciences, Cross River University of Technology, Calabar, after two weeks respectively. Using two schools was to ensure consistency of results. The results gotten from both exercises were the same. This method gave the instrument its reliability.

### **Procedure for data collection**

The instrument was administered by the researcher assisted by research assistants. The research assistants were four (4) in number and were trained by the researcher. In the data collection procedure, 200 copies of the questionnaire were administered to the male and female students and 100 copies were administered to the male and female teachers (lecturers), assisted by the research assistants. At the end of the exercise, 300 copies of questionnaire, representing 100% were successfully completed and returned. Data obtained from 300 copies of questionnaire were used for analysis.

### **Procedure for data preparation and scoring**

After collecting the copies of questionnaire, codes and scores were assigned to each item. For ease of data preparation, a coding schedule was prepared by developing a key for each of the constructs of the instruments in a tabular form.

### **Procedure for data analysis**

The data collected were first presented in a tabular form to show the various questions from which the data were collected. The analyses of the data were firstly descriptive in nature and later presented statistically in percentage and chi-square to reveal the respondents' view on each question.

At the end, Conclusions were drawn to each analysis while testing hypothesis in chapter four using the Pearson product correlation statistics

## **DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS**

### **General description of research variables**

The main independent variables of this study were gender, age and computer literacy. The summary of data of the study are computed and presented, their frequencies, percentages are shown in tables.

**Presentation of results**

The chapter contains data that are collected, prepared, analyzed and interpreted to test the research hypotheses of the study. These Results were generated with aid of the computer software, Statistical Package for Social Sciences (SPSS) Version 20. The hypotheses were tested at .05 level of significance.

The data used were obtained from the 300 questionnaires distributed and collected from the respondents selected from five health institutions namely - College of Health Technology, Calabar, Federal School of Psychiatric and Mental Nursing, Calabar, School of Nursing, Itigidi, School of Health Technology, Okpoma, Yala Local Government Area and the Community Health Officers' Programme, University of Calabar Teaching Hospital, Calabar.

**Presentation of data analysis:****Hypothesis one:**

H<sub>01</sub>: Availability of computer services has no significant influence on academic performance of student in health institutions.

**Table 4.1**

Pearson correlation co-efficient analysis in relation of Availability of computer services and academic performance of students in health institutions.

<b>(N=300)</b>			
<b>VARIABLES</b>	<b><math>\bar{X}</math></b>	<b>SD</b>	
<b>r- calculated value</b>			
Availability of computer services And 564	3.831	1.738	
Academic performance of students in health institutions.	4.1423	1.509	
<b>*significant at .05 level, df = 298, critical value = .195</b>			

Result from table 4.1 above reveals that the Pearson product moment coefficient analysis of the relationship between Availability of computer services and Academic performance of students in health institutions yielded calculated-r of .564. This indicated a positive correlation, which was significant at .05 level with a degree of freedom of 208. Hence, Availability of computer services significantly influences academic performance of students in health institutions.

**Hypothesis two:**

H<sub>02</sub>: E-learning facilities do not significantly influence students' academic performance in health institutions.

**Table 4.2**

Pearson correlation co-efficient analysis in relation of E-learning facilities and students' academic performance in health institutions.

(N=300)			
VARIABLES	$\bar{X}$	SD	r-calculated value
E-learning facilities	4.195	1.039	
And			.532
Academic performance of students in health institutions.	4.1423	1.509	

**\*significant at .05 level, df = 298, critical value = .195**

Result from table 4.2 above reveals that the Pearson product moment coefficient analysis of the relationship between E-learning facilities and students' academic performance in health institutions yielded calculated-r of .532 which was significant at .05 level with a degree of freedom of 298. This implies a positive correlation. Hence, E-learning facilities influence students' academic performance in health institutions.

**Hypothesis three:**

H<sub>03</sub>: Availability of internet services does not significantly influence students' academic performance in health institutions.

**Table 4.3**

Pearson correlation co-efficient analysis in relation of Availability of internet services and students' academic performance in health institutions.

<b>(N=300)</b>			
<b>VARIABLES</b>	<b><math>\bar{X}</math></b>	<b>SD</b>	<b>r- calculated value</b>
Availability of internet services	3.95	1.407	
And			.497
Academic performance of students in health institutions.	4.1423	1.509	

**\*significant at .05 level, df=298, critical value = .195**

Result from table 4.3 above reveals that the Pearson product moment coefficient analysis of the relationship between Availability of internet services and Academic performance of students in health institutions yielded calculated-r of .497 which was significant at .05 level with a degree of freedom of 298, Hence, Availability of internet services influences significantly Academic performance of students in health institutions.

## **DISCUSSION OF FINDINGS**

This section discussed findings from the analysis. These discussions were done according to the hypotheses of the study.

### **Availability of computer services and academic performance (hypothesis one)**

Based on the findings from hypotheses one, it was shown that availability of computer services has a significant influence on academic performance of students in health institutions. This finding is sustained by Greenes and Shortliffe (1990), who ascertained that presently, computers play a crucial role by providing care in all aspects of health, both in teaching and practice. Apart from the formation and maintenance of patient's records, they play a judicious role in public health surveillance. On one hand, computers are the key functionaries of health management information system and on the other hand, they are key handlers of geographic information system, electronic medical records, bioengineering, education, and research. They are also being used in statistical analysis of various data and hence, play an innovative role in leveraging the quality standards of public health professionals and workers. Benner and Boulware (1996), in their study, posited that the application of technology should be encouraged and even incorporated as a routine part of students' daily activities within clinical activities and basic sciences.

This is also supported by Madhuri and Acharya (2015), who further posited that no field today is uninfluenced by computers, and so are students and professionals in health, who have benefitted through the pioneering concept of health informatics. That is, the systematic application of information, computer science, and technology to public health practice, research, and learning, which eventually facilitates transmission of data from instructors to healthcare staff to local health agencies, then to state health agencies and finally to National Center of Disease Control leading to formation of Public Health Information Network (PHIN). Mayer (2005) stated that people learn considerably better from a combination of both words and images (which technology enables), than merely from words alone. According to him, technology helps students become independent, proficient individuals and good researchers.

Furthermore, Yamani (2006), stressed the importance of technology as a source of gaining knowledge and maintaining currency and as such the need to change or revise the curriculum in health institutions where it is not applied. Panel (2002), upheld that increased use of computer services increases students' comprehension of content and development of skills in different areas. This finding was reinforced by Benson (2001), who buttressed that computer literacy by both educated and uneducated have become the most important factor for improved standard of living. There is no effective health education anywhere in the world without the application of Information and Computer Technology (ICT). Health education is the passing of health information to people on matters affecting their health for the purpose of change in health status. Humphrey (2000) perceived ICT as an unavoidable technology for the improvement of organization, team and people in the information age. Computer compliance by people has become the accelerator for productivity and prosperity. ICTs include electronic networks with complex hardware and software linked by a vast array of technological protocols. In addition, Dasgupta and Deb (2008), affirmed that software, like telemedicine, a computer-based programmed, further help health students and professionals' learning and practice processes.

### **E-learning facilities and academic performance (hypothesis two)**

Findings from hypothesis two indicated that E-learning facilities do significantly influence students' academic performance in health institutions. This finding is in line with the study of Moore, Dickson-Deane and Galyen (2011) described the increasing use of web-based technology to provide a better learning environment in tertiary education as a global trend. They defined e-learning as the usage of electronic devices, with or without the help of internet to provide a student-friendly learning environment. It is termed student friendly because it includes all categories of learners-full time, part-time distant learners, etc.

Gold and Maitland (1999), further maintained that the widespread use of computers and the internet have made distance learning easier and faster, and today virtual schools and virtual universities deliver full curricula online. The capacity of Internet to support voice, video, text and

immersion teaching methods made earlier distinct forms of telephone, videoconferencing, radio, television, and text based education somewhat redundant.

Olszewski-Kubilius and Corwith (2011), posited in their study, that distance education has a long history, but its popularity and use has grown exponentially as more advanced technology has become available. By 2008, online learning programs were available in the United States in 44 states. Internet forums, online discussion group and online learning community can contribute to an efficacious distance education experience. Research shows that socialization plays an important role in some forms of distance education. E-courses are also a viable option for distance learning. There are many available that cover a broad range of topics. As well, distance education can be delivered in a paced format similar to traditional campus based models in which learners commence and complete a course at the same time. Paced delivery is currently the most common mode of distance education delivery. Alternatively, some institutions offer self-paced programs that allow for continuous enrollment and the length of time to complete the course is set by the learner's time, skill and commitment levels. Paced courses may be offered in either synchronous mode, but self-paced courses are almost always offered asynchronously. Each delivery model offers both advantages and disadvantages for students, teachers and institutions.

Oblinger, (2000), argued that e-learning can expand access to education and training for both general populace and businesses since its flexible scheduling structure lessens the effects of the many time-constraints imposed by personal responsibilities and commitments. Devolving some activities off-site alleviates institutional capacity constraints arising from the traditional demand on institutional buildings and infrastructure. Furthermore, there is the potential for increased access to more experts in the field and to other students from diverse geographical, social, cultural, economic, and experiential backgrounds. As the population at large becomes more involved in lifelong learning beyond the normal schooling age, institutions can benefit financially, and adults learning business courses may be particularly lucrative. Distance education programs can act as a catalyst for institutional innovation and are at least as effective as face-to-face learning programs, especially if the instructor is knowledgeable and skilled.

Yuan and Gay (2006), stressed that distance education (e-learning) can also provide a broader method of communication within the realm of education. With the many tools and programs that technological advancements have to offer, communication appears to increase in distance education amongst students and their professors, as well as students and their classmates. The distance educational increase in communication, particularly communication amongst students and their classmates, is an improvement that has been made to provide distance education students with as many of the opportunities as possible as they would receive in in-person education. The improvement being made in distance education is growing in tandem with the constant technological advancements. Present-day online communication allows students to associate with



accredited schools and programs throughout the world that are out of reach for in-person learning. By having the opportunity to be involved in global institutions via distance education, a diverse array of thought is presented to students through communication with their classmates. This is beneficial because students have the opportunity to "combine new opinions with their own, and develop a solid foundation for learning". According to Oblinger (2000), it has been shown through research that "as learners become aware of the variations in interpretation and construction of meaning among a range of people [they] construct an individual meaning, which can help students, become knowledgeable of a wide array of viewpoints in education. To increase the likelihood that students will build effective ties with one another during the course, instructors should use similar assignments for students across different locations to overcome the influence of co-location on relationship building.

Nguyen (2015), submitted that the high cost of education affects students in higher education, to which distance education may be an alternative in order to provide some relief. Distance education has been a more cost-effective form of learning, and can sometimes save students a significant amount of money as opposed to traditional education. Distance education may be able to help to save students a considerable amount financially by removing the cost of transportation. In addition, distance education may be able to save students from the economic burden of high-priced course textbooks. Many textbooks are now available as electronic textbooks, known as e-textbooks, which can offer digital textbooks for a reduced price in comparison to traditional textbooks. Also, the increasing improvements in technology have resulted in many school libraries having a partnership with digital publishers that offer course materials for free, which can help students significantly with educational costs.

Kirtman (2009), supported that within the class, students are able to learn in ways that traditional classrooms would not be able to provide. It is able to promote good learning experiences and therefore, allow students to obtain higher satisfaction with their online learning. For example, students can review their lessons more than once according to their need. Students can then manipulate the coursework to fit their learning by focusing more on their weaker topics while breezing through concepts that they already have or can easily grasp. When course design and the learning environment are at their optimal conditions, distance education can lead students to higher satisfaction with their learning experiences. Studies have shown that high satisfaction correlates to increased learning. For those in a healthcare or mental health distance learning program, online-based interactions have the potential to foster deeper reflections and discussions of client issues as well as a quicker response to client issues, since supervision happens on a regular basis and is not limited to a weekly supervision meeting. This also may contribute to the students feeling a greater sense of support, since they have ongoing and regular access to their instructors and other students. Brown (2013), contended that distance learning may enable students who are unable to attend a traditional school setting, due to disability or illness such as decreased mobility and immune

system suppression, to get a good education. Distance education graduates, who would never have been associated with the school under a traditional system, may donate money to the school. According to Zang, Zhou and Nunamaker (2004), the most important element that supports the use of technology in the education system is the internet. E-learning has become one of the fastest moving trends in education and poses a promising alternative to traditional learning.

Even though e-learning is widely practiced in tertiary institutions within Malaysia, there are still problems and difficulties in the implementation of e-learning in universities. According to Embi, the problems in implementation e-learning are related to the governance of e-learning, e-content development, and issues faced both by the lecturers and students. Thus, it is vital for us to understand the student's perception on e-learning as they are one of the users of the system students. It is important to study the impact and students' perception on e-learning as to improve the e-learning practice to create a more productive learning session. A study on the factors that may influence the effectiveness of e-learning is substantial, as it will help the lecturers and policy-makers to identify the barriers faced during the e-learning implementation and find ways to overcome it. (Embi,2011).

Yengin, Karahoca, Karahoca and Ozcinar (2010), ascertained that another technology that caused the development of e-learning is the mobile learning. Currently with the tremendous growth of mobile technology along with the easy access of internet in various places, mobile learning is being actively studied as one of the platforms used for learning purpose. Based on a study done at OUM, the majority of students already possessed mobile phones and believed that they are ready to be engaged in mobile learning. An online survey on the mobile learning readiness of two local universities in Malaysia, namely Universiti Teknologi MARA (UiTM) and National University of Malaysia, in respect to the students' skills, psychology, and budget was also conducted. Based on the results, the majority of students readily welcome the idea of implementing mobile learning in their educational system as they are already familiar with the device. However, some of the students still feel hesitant when it concerns the monetary issues as they are unsure in what way their finances will be affected by applying mobile learning.

According to Efferth (2011), the under graduate health students have actively used e-learning to improve the attractiveness of learning some courses like pharmacology and microbiology. Apart from that, validation of e-learning on the knowledge and acceptance was also reported and the majority of the students felt that e-learning is effective as well as a convenient way to be up-to-date with the current health-related issues. A systematic review on the effectiveness of e-learning in health education conducted using an assessment of perception on benefits of e-learning, relevance of specific learning course, and e-learning functionality was recently reported. This review found that e-learning in health education effectively increases knowledge and is a highly acceptable instructional format for community health students, nursing students, medical and

pharmacy students, albeit the increment in terms of skills or professional practice has not been proven. (Efferth, 2011).

Coopasami, Knight and Pete(2017),further supported this by reporting that MeVeigh, in a study, observed that while learning was once confined to the classroom, it now extends beyond the institutions, She maintains that the future of training healthcare practitioners will include e-learning in order to facilitate lifelong continuous learning. E-learning can enable students in health institutions to achieve an effective balance between education, work and their personal lives. Since the curricula of most departments in health institutions have "practical experience", where the students are sent out to the service areas for weeks or even months, e-learning allows for flexibility in terms of time and is a valuable tool for these students. Gupta, Marsden, Oluka and Lucas (2017) agreed that there has been a strong support in developing countries for the integration of e-learning into existing healthcare teaching programmes because of the need to increase the number of qualified health providers. In the context of safety in the hospitals, it is important to guarantee a sufficient level of knowledge in health professionals. As an alternative to traditional education, which is relatively labour intensive and time consuming, e-learning can be useful when improving knowledge in a large group of health students, Steeg, Ukema, Wagner and Langelaan (2015).Agreeing with the above in their study, Seble et al (2013) stated that the most common use of ICTs in health profession education was to access information that supplements formal teaching. This was made open when a student used an internet search engine to find articles, images or slides regarding a given illness or medical practice. According to them, Kalita et al in 2007, studied the extent to which students in health institutions utilized computer based literature searches to supplement teaching of evidence-based medicine.

### **Availability of Internet services and academic performance (hypothesis three)**

Findings from hypothesis three indicated that availability of internet services significantly influence students' academic performance in health institutions. This is validated by the study of Falaye and Aladeniyi (2012), who revealed that the internet services emerged as an educational tool by being a source of getting the right information and solutions in an academic environment. The application of these innovations has resulted in tremendous gains to the country's economy, making many Nigerian universities to find ways of improving their information and communication policies.

Ilo and Ifijeh (2010), supported this by positing that the use of internet (if maximized), plays a major role in helping undergraduate researchers access large number of materials from different parts of the world, they went on to state that students and lecturers can achieve the same goal from different points without physical interaction. Lecturers and students can exchange ideas easily because of internet. Ikoro (2002) noted that staff and students in academic community enjoy internet as a result of the facilities it offers. A study carried out by Jagboro (2003) indicated that

students used it for e-mail, to get research materials and course materials. The study showed that users accessed internet in their homes, colleges or school library. According to Oyedun (2007), most of the students claimed that through internet services in the library, they have improved considerably in their academic performance.

Panel (2002); Biggs (2003); Michael (2001); Al-Musa and Al-Mobark (2005), in their studies, reported that internet services has also been used for health education purposes in health institutions like organ teaching, diagnoses of diseases; conduct of medical examinations and for research by students of these health institutions.

Griffin (2003), further reported that students of health institutions who have participated in online education have stated that this mode of education has several advantages over traditional methods of instruction. These advantages include the convenience of taking a course at a time that fitted students schedule and at a place that they did not have to commute to attend.

Buchholz, (2009), stated that there are many benefits associated with Internet use, such as access to needed information, worldwide access to news and events, and interpersonal communication through email. However, along with the phenomenal growth of the Internet and its use, there has been a growing concern worldwide regarding the risks associated with Internet over-use.

The internet is also revolutionizing health education research and practice. They went on to state that health education and health promotion professionals are largely in the business of compiling, facilitating, developing, packaging and delivering health information to and between students and teachers in health institutions, individuals and communities, Benhardt & Hubley (2001).

Tattersall (2002), stated that the internet-based applications have also the potential for improvement of clinical practice services through better timing, adjustment according to patient's needs and integration of evidence-based guidelines in the information systems. After first clinical trials, it became obvious that even severe conditions may be efficiently treated at home providing appropriate communication with the patient as well as monitoring of vital signs and symptoms via tele-medical infrastructure is assured. Teleconferencing system may be installed in patient's home and used by the patient with assistance of family members or social workers. As well, the inclusion of patients in the process of diagnostics and therapy is perceived nowadays as one of the key conditions of successful care.

Yousef (2008), noted that the availability of the Internet has brought significant changes to health services. The fact that the number of elderly people in the U.S. and other industrialized nations is rising is beginning to put pressure on health services. There are not enough resources to take care of the elderly without the Internet. This increase in the elderly is one reason for the increase in

home care. With "Internet access available to everyone and the advent of wireless technologies, advanced tele homecare is a possibility for a large proportion of the population".

Duplaga, (2003), opined that the Internet users surfing on the Web frequently use it as the source of health related information. Self-education is important opportunity for chronic patients related to the widespread use of Web-based applications. Internet technologies enable individualized education and training process. More advanced solutions emerge the patient in the environment Supporting self-management of the medical problem but also imposing the regularity of activities. In such environment the patient gains self-assurance that in case of deterioration the appropriate information will be forwarded to healthcare provider. Hence, full exploration of advantages related to the use of information technologies and internet services yield many other fields of application in healthcare such as the implementation of preventive measures, the efficient use of individual genetic information in early stages of health-supporting interventions (e.g. lifestyle modification, diet, avoiding specific factors), the transformation of the traditional contacts between health professional and patients and development of virtual support environments for people with special needs.

The clinical care incorporates new modes of services delivery through the use of systems supporting electronic healthcare record, tele medical applications or electronic prescribing. Telemedicine offers broad spectrum of clinical scenarios enabling the e-visits for patients, teleconsultations between health professionals representing different medical centres or specialties, telepresence and tele training in interventional specialties or even virtual surgery. The availability of information system in medical facility enables the implementation of reminding and alerting applications or decision support tools enhancing the quality of the process of care. According to Kaplan and Haenlein (2016), internet is one of beneficial tools in this era of information technology (IT) for health education purposes, business purposes and from the academic point of view, for upgrading of skills and capabilities of students which assist them in studies and professional life, after graduation from the schools. Globally today, the use of internet facilities for communication and sharing of knowledge can never be overemphasized. In Africa, especially the academic environment, use of the internet has come to stay. Students of all fields, including health, enhance their academic performance through searching for current information outside their own institution.

## **SUMMARY**

The study is conducted to examine the "relevance of educational technology and students' academic performance in health training institutions in Cross River State". To achieve this, five specific objectives were developed from which five research questions and five hypotheses were formulated in line with variables of the study. The study adopted a social survey research design

and the instrument used was questionnaire to gather information. The data were analyzed using Pearson product moment correlation coefficient statistical analysis at .05significance level at 298 degree of freedom and the following findings were made; that Availability of computer services; e-learning facilities; Availability of internet services; Use of mobile device and Slide projectors all significantly influence the Academic performance of students in health training institutions in Cross River State.

### **Recommendations**

The followings are the recommendations of the study;

1. Sufficient efforts should be put towards ensuring computer services and other related resources are available to students (males and females) to achieve the desired improved performance.
2. Government should adopt these modern educational technologies in the training curriculum of health training institutions, irrespective of gender.
3. E-learning facilities should be provided by the government and its various agencies, its utilization by health training institutions should be sustained, not minding the age of student.
4. Internet services should be available to health training institutions and its use by the student irrespective of age in the course of their studies should be maintained

### **REFERENCES**

- Aachen Brener MS (2007): Analysis of creative and effective technology behaviours of university instructors (Doctoral Dissertation) Available from Proquest Dissertation and these database, 2007 (UMI, No.3371039).
- Abimbade, A. (2002). Perspective of Technology Integration and Effectiveness of Computer Assisted Instruction (CAI) In Primary Mathematics classroom. *Uniqua. Research Chronicle*, 4 (2),88-107.
- Abuochedid, K. & Eid, G. M. (2004), E-learning challenges in the Arab world: Revelations from a case study Profile. *Qual Assur Educ.*, 12(1) pp 15-27.
- Adomi, E. E. (2008). Collection Development and Management, Benin City. Ethiopia.
- Ahmed, C. (1998). Power point versus traditional overheads. Which is more effective Association for Health. *Physical Education and Recreation*, Sioux, South Dakota.
- Ajuwon, GA (2003) computer and internet use by first year clinical and nursing students as a Nigerian teaching Hospital. *BMC med. Info and Decision making*, 3:10.
- Al-Musa, A. & Al-Mobark, A. (2005). E-learning, the fundamentals and the implementations. *datanet*. Riyadh
- Angeli. C. and Valarvides N (2005) pre-service teachers as ICT. Designers: An instructional design model based on an expanded view of pedagogical content knowledge. *J. of computer assisted learning*, 21 (4):29-302.

- Anie, S. O. & Achugbue, E. I. (2009). Library Information and Communication Technology in Nigerian Universities Library Hi Tech News 26, No. 7. pp 8-10
- Anyanwu, J.M. (2003). The effectiveness of Instructional Materials in Teaching of social studies in some selected Post Primary Schools in Owerri Educational Zone, Imo state. B.Ed. unpublished research project.
- Anzaku, A.S. (2011). The indices of internet and obstetrics. Journal of medicine in the tropics. Vol. 16. Issue: 2. pp. 71-75.
- Apperson, J. M., Eric L. L., & Scepansky, J. A. (2006). The impact of presentation graphics on students' experience in the classroom. Computers & Education 47:116-126.
- Association of American medical colleges (AAMC, 2007) .Effective use of educational technology in medical educational.
- Atkins-Sayre, W., Hopkins, S. & Sayre, W. (1998). Rewards and liabilities of presentation software as an ancillary tool: Prison or paradise? Paper presented at the National Association Eighty Fourth Annual Convention New York.
- Bartlett, R. M., & Strough, J. (2003). Multimedia versus traditional course instruction in introductory social psychology. Teaching of Psychology, 30(4), 335-338.
- Beets, S. D. & Lobingier, P. G. (2001). Pedagogical techniques: student performance and preferences. Journal of Education for Business, 76, 231-235.
- Benner, E. S. & Boulware, D. W. (1996). Medical Informatics for medical students: not just because it's there. Med. Educ. Online.
- Benson, A.C. (2001). Neal-Schumann Complete Internet Companion for Librarians. New York: Neal-Schumann Publishers. pp 24.
- Berjemo, A. (2005). Influence of e-learning facilities on academic performance of business education students in Nigeria University. <https://nairaproject.com/projects>.
- Berliner D (2002). educational researcher: the hardest science of all educational researcher, 31(8):18-20.
- Bernhardt, J.M. & Hubley, J. (2001). the use of World Wide Web and Internet in pharmacy Practice: An Exploratory study. <https://scialert.net/fulltext>.
- Biggs, J. (2003). Teaching for quality. Learning at university (2nd ed.). Society for Research into Higher Education/Open University Press, Buckingham.
- Bio Informatics (1998). Searching the Net. Serm Nuncl Med. 28:177-187.
- Brewster, J. (1996). Teaching abnormal psychology in a multimedia classroom. Teaching of Psychology. 23 (4) 249-252.
- Brown, G. & Atkins, M. (1988). Effective Teaching in Higher Education, London. UK: Routledge.
- Brown, R. (2013). The New York Times. A Swiveling Proxy That Will Even Wear a Tutu.
- Buchholz, L. (2009). Teen Internet addicts more likely to self harm. Retrieved from <http://abcnews.go.com/US/wireStory?id=9245921>.

- Caroline F, Gemma P, Louise W, Leandro G, Lambert F, Phil E, Vikram P, Andy H (2010). The Effectiveness of Mobile-Health Technologies to Improve Health Care Service Delivery Processes: A Systematic Review and Meta-Analysis. Accessed online on 20th Feb.,2018.
- Coiera, E. (1995). Medical Informatics. BMI.310:1381-1386.
- Coopasami, M., Knight, S. & Pete, M. (2017). E-learning readiness amongst nursing students at the Durban University of technology.(An article).
- Cradler, J., Mcnabb, M., Freeman, M. & Burchett, R. (2002). How does technology influence student learning? *Learn Lead Technol*, 29 (8) pp.46-49.
- Dasgupta, A. & Deb, S. (2008). Telemedicine: A new horizon in public health in India. *India Journal of community medicine*. Vol.33. Issue 1. pp.3-8.
- Dike, V. M. (1993). *Library Resources in Education*. Enugu. ABIC Publisher.
- Duplaga, M. (2003). *The Impact of Information Technology on Quality of Healthcare Services*. Jagiellonian University Medical College, Skawinska Str.8,31-066 Krakow,Poland.
- Effectiveness of Computer Assisted Instruction (CAI) in Primary.
- Efferth T. (2011). E-learning in pharmacology and pharmacy. *Educ Sci.*; 1(1): 4-14.
- Ema, E. & Ajayi, D. T. (2006). *Educational Technology: Methods, Materials, Machines*. Jos: Jos University Press Ltd.
- Embi MA (2011). E-Learning in Malaysian institutions of higher learning: Status, trends and challenges. Paper presented at: International Lifelong Learning Conference (ICLLL 2011), Seri Pacific Hotel, Kuala Lumpur.
- Erwin, T. D.&Rieppi, R. (1999). Comparing multimedia and traditional approaches in undergraduate psychology classes. *Teaching of Psychology*.26 (1)58-61.
- Eze,E. U. (2013).Effect of Instructional Materials on the Academic Performance of Juniouir Secondary School Students in Social Studies. Unpublished PGDE Thesis. Imo State University, Nigeria.
- Fayemi, C.J.B., Wirth, G.I., Ramirez-Angulo, J. (2015). Design of Class-E power VCD in 65nm CMOS technology- TIB.<https://www.tib.eu/suchen/Design-of...>
- George, P.P., Papachristou, N., Belisario, J.M., et al (2014). Online eLearning for undergraduates in health professions: A systematic review of the impact on knowledge, skills, attitudes and satisfaction. *J Global Health*; 4(1): el-17.
- Goi,(C. L.,Ng,P.Y (2009). E-learning in malaysia: Success factors in implementing e-learning program. *Int J Teach Learn High Educ*; 20(2): 237-46.
- Gold, L., Maitland, C. (1999). Phipps, Ronald A.; Merisotis, Jamie P., eds. *What's distance learning in higher education*. Washington, DC: Institute for Higher Education Policy. Retrieved 23 January 2011.
- Gopal, V. P. (2010). *Importance of Audio-Visual in teaching methodology*. Mahourasta. India. Government of India. Ministry of Health and Family Welfare, Maternal Health Division. New Delhi: Janani Suraksha Yojana; 2006. [Last accessed on 2013 Nov 1]. Available from: [https://nrhm-mis.nic.in/UI/Reports/Documents/JSY\\_Study\\_UNFPA.pdf](https://nrhm-mis.nic.in/UI/Reports/Documents/JSY_Study_UNFPA.pdf).



- Grader J. (2003). Technology's impact on technology, and learning and learning with technology 30(7):54-57.
- Greenes, R. A. & Shortliffe, E. H. (1990). Medical Informatics: Computer Application in Healthcare. Menlo Park.
- Griffin, J. D. (2003). Technology in the teaching of neuroscience: enhanced student learning. Adv. Physiol Educ, 27 (3) pp. 146-155.
- Griffins, M. (2000). Does Internet and Computer "Addiction" Exist? Some Case Study Evidence. Cyber psychology and Behavior, 3(2), 211-218.
- Grimes EB (2002), students' perceptions of an online Dental terminology course. J. Den Edu, 66(1):100-7.
- Gupta, M., Marsden, S., Oluka, T. & Lucas, H. (2017). The Electronic Journal of e-learning, volume 15, issue 2. (pp144-155).
- Habib JL. (2010). Electronic Health Records (EHRs): Meaningful use, and a model EMR. Drug Benefit Trends, 22:99-101.
- Hollander S. (1999) Assessing and enhancing medical students/computer skills: A Two year experience. Bulletin of the medical library associated 87: 67-73.
- Holley, D. (2002). "Which room is the Virtual Seminar in please?" Education and Training, 44 (3), 112-121.
- Horton, W. (2005). Leading e-learning; <http://www.e-learniguru.com>. ASTD, pg. 147.
- Houshyari A. B, Bahadorami M, Trotooncih M and Alibi P. (2012). Information and communication technology in medical education. On Experience from developing country. JPMA, 47:75-9.
- Humphrey, W. S. (2000). The Team Software Process. (MM/SE/-2000-TR-023). Software Engineering Institute, Pittsburgh. Pp 36-54.
- Huttner, J. (2007). Academic Writing in a Foreign Language: an Extended Genre Analysis of Student Texts, Frankfurt.
- Iglehart, J. K. (2010). Health Reform, Primary Care and Graduate Medical Education. NEngl J Med; 363(6):584-590.
- Ikoro, F.M. (2002). information sources for effective teaching and learning in Nigerian languages. lang. Librarianship J. 1 (2): 21-29.
- Ilo, I.P. & Ifijeh, G. (2010). Impact of Internet on Final Year Students Research: A case study of Covenant University, Ota, Nigeria. Library, Philosophy and Practice. Available; <http://unlib.unl/LLP/ilo-ifijeh.htm>.
- Internet World Stats. (2010). Internet Usage Statistics: The Internet big picture: World Internet users and population stats, from <http://www.internetworldstats.com/stats.htm>.
- Isangedighi, A.J., Joshua, M., Asim, A. and Ekur, E. (2004). Fundamentals of Research and statistics in education and social sciences. Calabar. University of Calabar Press.
- Jagboro, K. O. (2003). A study of internet usage in Nigerian Universities. A case study of Obafemi Awolowo University, Ile-Ife, Nigeria. First Monday 8 (2-3). Available:

<http://www.firsmonday.org/htbin/ogiwrap/bin/ojs/index.php/fm/article/viewArticle/1033/954>.

- James, K. E., Burke, L. A. & Hutchins, H. M. (2006). Powerful or Pointless? Faculty versus students' perception of PowerPoint in business education. *Business Communication Quarterly*. 69:374-396.
- Johnson, S. (2005). Everything bad is good for you: how today's popular culture is actually making us smarter. Riverhead. New York.
- Kalita, J., Misra, U.K. & Kumar, G. (2007). Computer - based literature search in medical institutions in India. *An India Acad Neurol*....."
- Kamba, M. A. (2009). Problems, Challenges and Benefits of implementing E-learning in Nigerian Universities: An Empirical Study. *International Journal of Emerging Technologies in Learning*.
- Kaplan, A. M.; Haenlein, M. (2016). "Higher education and digital revolution: About MOOCs,SPOCs, social media, and the Cookie Monster". *BusinessHorizons*. 59 (4): 441-50.
- Karsanti T. and Charlin B (2008) information and communication technologies (ITC) in medical education and technology in higher education 5:68-81.
- Kim,J.H.,Hui,H.L.C.,Lau,C.H.,Kan,P., Cheuk, K. K., & Griffiths, M (2010). Brief report: Predictors of heavy Internet use and associations with health promoting and health risk behaviors among Hong Kong university students. *Journal of Adolescence*,33(1),215-220.
- Kirtman, L. (2009). "Online Versus In-Class Courses: An Examination of Differences in Learning Outcomes" (PDF). *Issues in Teacher Education*. 18 (2): 103-115.Retrieved30 March 2013.
- Lee Ventola, MS (2015). *Mobile Devices and Apps for Health Care Professionals:Uses and Benefits*. Accessed online on 20th Feb,2018.
- Lee, E. (2013)."5 Ways Technology Is Transforming Health Care." *Forbes*, Jan.2013. Accessed via Web on 17 Feb., 2018.
- Leuven, K. U., Johan, D., &Hogskolan, K. T. (2004). The impact of ICT on students' performance: A case study of ASA University.
- Lever-Duffy, J.; McDonald, J.B. (2007). *Teaching and Learning with Technology*. Ana A. Ciereszko, Al P. Mizell (3rd ed.). Allyn & Bacon. p. 377. ISBN 0-205-51191-0. Retrieved 23 January 2011.
- Love, L. (2012). Lucas love Health Care E-learning College.[www.lucaslovehealthcare.com/new-e-learning-college](http://www.lucaslovehealthcare.com/new-e-learning-college).
- Luppicin, R. (2005). A systems definition of educational technology in society.*EducTechnol Society*. 8 (3) pp. 103-109.
- Madhuri, P. & Acharya, J. (2015). Unprecedented role of computers in improvement and transformation of Public Health: An emerging priority. *Indian Journal of community Medicine: official publication of Indian Association of Preventive and Social Medicine*. 40 (1) 8.

- Mansor, I. (2002). -personal relationships and problematic Internet use in adolescence. *Cyberpsychology and Behavior*, 12(6),681-684.
- Mansor, I. (2002). Computer skills among medical students; a survey at King Abdul Aziz University, Jeddah. *J. Avub Med Coll.* 14(3): 13-15. [GoogleScholar](#).
- Mantei, E. J. (2000). Using internet classnotes and PowerPoint in the physical geography lecture. *Journal of College Science Teaching*. 29,301-305.
- Mayer, R.E. (2005). *The Cambridge handbook of multimedia learning*. Cambridge University Press.
- Mcnaught, A. (2007). Moving Images and Sound, Inclusive and Accessible. Moving Images, Knowledge and access: The BUFVC Handbook edited by C. Grant and I. Mekere. London. British Universities Film and Video Council, pp.29-33.
- Michael, J. (2001). In pursuit of meaningful learning. *Adv. Physical Educ.* 25(3)pp.145-158.
- Michael, S. (2012). Understanding the implication of online learning for Educational Technology. <https://tech.ed.gov/files> 2013.
- Milani, L., Osualdella, M.A., &Blasio, P.D. (2009). Quality of interpersonal relationships and problematic internet use in Adolescence. <http://dei.org/10.1089/cpb.2009.0071>.
- Mishra P.and Koehler MJ (2006). Technology pedagogical content knowledge : A framework for teacher knowledge. *Teachers college records* 108 (6) :1017-54
- Monsor I. (2002). Computer skills among medical students. A Survey at the king Abdul Aziz University Jeddah. *J Ayub Med. Coll.*, 14(3):13-15.
- Moore JL, Dickson-Deane C, Galyen K. (2011). E-Learning, online learning, and distance learning environments: Are they the same? *Internet High Educ.*; 14(2):129-135. more effective for learning? Paper Presented at conference for
- Moreno, R. (2004). Decreasing cognitive load for novice students: Effects of explanatory versus corrective feedback in discovery-based multimedia. *Instructional Science*; 32: 99-113.
- Munro, R. (2000). Exploring and explaining the past: ICT and history. *Education Media International*,37 (4):251-256. *Med. Coll.* 14(3):13-15.
- Murray, B. (2001). Technology invigorates teaching, but is the pizzazz worth the price? *APA Monitor* 30(4),1,36-37. National Statistical Office. (2010). *ICT Household 2009*. Bangkok, Thailand:
- Natoli, C. (2011). The Importance of Audio-Visual Materials in Teaching and Learning. [www.whelium.com/channels/224-early-childhood-ed](http://www.whelium.com/channels/224-early-childhood-ed).
- Nguyen, T. (2015). "The Effectiveness of Online Learning: Beyond No Significant Difference and Future Horizons" (PDF). *MERLOT Journal of Online Learning and Teaching*; 11(2):309-319.
- Nurjahan, M. I., Lim, T. A., Yeong, S. W., Foong, A. L. & Ware, J. (2002). Utilization of information technology in medical education: a questionnaire survey of students in a Malaysian institution. *Med J Malaysia*. 57(suppl E): 58-66. [PubMed Google Scholar](#).

- Nwamarah, U. N.&Okoro, U. C. (2014). Influence of e-learning facilities on academic performance of students in Nigerian Universities. Nsukka. God's own Press.
- Oblinger, D. G. (2000). "The Nature and Purpose of Distance Education". The Technology Source, Michigan: Michigan Virtual University (March/April).Retrieved 23 January 2011.
- Odusanya, O.O. &Bamabala. A. (2002). Computing and information technology skills of final year medical and dental students at the College of Medicine, University of Lagos, Nigeria. Niger Post grad Med J. 9(4) 189-193. [GoogleScholar](#).
- Ogunsola, L. A. (2005). Information Communication Technologies and the effects of Globalization: Twenty-First century "Digital Slavery" for Developing Countries-Myth or Reality? Electronic Journal of Academic and Special Librarianship 6(1-2);pp.1-10.
- Okoro, E. (2000). The intersection of education, teaching and learning with ICT.<https://nairaproject.com>projects>.
- Olaniyi, S. S. (2006). E-learning Technology: The Nigeria Experience p. 2-3. A paper presented at the Shape the Change XXIII FIG Congress Munich Germany, October 8-13,2006. The International Bureau of Education of UNESCO (2014): <http://www.ibe.unesco.org/links.htm>. Retrieved on 19/1/2015.
- Olsen, S. (2005). Are we getting smarter or dumber? Brain Fit & Brain Training.Posit Science.
- Olszewski-Kubilius, P.; Corwith, S. (2011). "Distance Education: Where It Started and Where It Stands for Gifted Children and Their Educators." Gifted Child Today, v.34 issue 3,p.16-24.
- Oyedun, G. U. (2007). Internet use in the Library of Federal University of Technology, Minna. A Case Study. Gateway Library Journal. 10(1)23-32.
- Ozdalga E, Ozdalga A, Ahuja N. (2012). The smartphone in medicine: a review of current and potential use among physicians and students. J Med nternet Res.; 14(5):128.
- Panel, I. L. (2002). Digital transformation: a framework for ICT literacy. Educational Testing Service.
- Penny, T. (2006). Early Years. Oxford. Heinemann Educational Publishers.
- Poslad, S. (2009). Ubiquitous computing smart devices, smart environ-ment and smart interaction. Accessed online via n.m.wikipedia.org on 25<sup>th</sup> Feb., 2018 (1) Pp 15-27.
- Rankin, E. L., &Hooas, D. J. (2001). The use of PowerPoint and student performance. Atlantic Economic Journal, 29, 113.
- Robinson R, Molenda M and Rezabek L. (2006) facilitating learning.AssociationAugust, 2017.
- Rocklin, T. (1998). The National Teaching and Learning Forum. New York,NY; Greenwood Publishing Group; PowerPoint is not evil.
- Rosenberg, M. J. (2001).E-learning strategies for delivering knowledge in the digital age, vol 3. McGraw-Hill. New York.
- Sahu, D. R. & Supe, A. N. (2000). The art and science of presentation: 35-mm slides. J Postgrad Med. 46:280-285.

- Sazmandasfaranjan, Yasha; Shirzad, Farzad; Baradari, Fatemeh; Salimi, Meysam; Salehi, Mehrdad (2013). "Alleviating the Senses of Isolation and Alienation in the Virtual World: Socialization in Distance Education". *Procedia - Social and Behavioral Sciences*. 93: 332-7.
- Schneider, G.P., Evans, J., & Pinard, K. T. (2006). *The Internet Fourth Edition-Illustrated Introductory* (4th ed.). United States of America: Thomson Course Technology.
- Seaman, M. A. (1998). Developing visual displays for lecture-based courses. *Teaching of psychology*, 25 (2), 141-145.
- Seble, F. et al (2013). E-learning in medical education in resource constrained low-and middle-income countries.
- Seth, V., Upadhyaya, P., Ahmad, M. & Moghe, V. (2010). Power Point or chalk and talk: Perception of medical students versus dental students in a medical college in India.
- Shallcross, D. E. & Harrison, T. G. (2007). Lectures: electronic Presentations versus chalk and talk-a Chemist's view. *Chem Educ Res Pract*. 8: 73-79.
- Smith, S. M. & Woody, P.C. (2000). Interactive effect of multimedia, instruction and learning styles. *Teaching of Psychology*, 27 (3), 220-223.
- So, HJ and Kim, B (2009) learning about problem-based learning: students teachers integrating technology, pedagogy, and content knowledge. *Australians J. of Edu. Tech*, 25 (1): 101-16.
- Soyemi, J., Oloruntoba, S. A. & Okafor, B. (2015). Analysis of Mobile Phone Impact on Student Academic Performance in Tertiary Institutions. *International Journal of Emerging Technology and Advanced Engineering*. Vol 5. Issue 1, January 2015.
- Steege, L., Ukema, R., Wagner, C. & Langelaan, M. (2015). The effect of an e-learning course on nursing staff's knowledge of delirium: a before- and-after study.
- Stolof, M. (1995). Teaching physiological psychology in a multimedia classroom. *Teaching of Psychology*, 22(2) 138-141.
- Szabo, A., & Hastings, N. (2000). Using IT in the undergraduate classroom: should we replace the blackboard with PowerPoint? *Computers and Education*, 35, 175-187.
- Tattersall R. (2002). *The expert patient: a new approach to chronic disease management for the* Thana Press Limited. the implementations. datanet.Riyadh.
- Tsitsika, A., Critselis, E., Kormas, G., Filippopoulou, A., Tounissidou, D., Freskou, A., Kafetzis, D. (2009). Internet use and misuse: a multivariate regression analysis of the predictive factors of internet use among Greek adolescents. *European Journal of Pediatrics*, 168(6), 655-665.
- Ugwulebo, J.E. & Okoro, S. N. (2016). Impact of Internet usage on the academic performance undergraduate students: a case study of University of Abuja, Nigeria. *International Journal of Scientific & Engineering Research*. Vol. 7, Issue 10.
- Valasidou H. & Bousiou, A. (2005). *Information Communication Technologies and Development*. Available at: <http://usdnhq.undp.prg/it4dev/> {Accessed 10 2012}.

- Virki, E. (2008). Barriers and strategies on adoption of e-learning in Tanzania  
<https://files.eric.ed.gov/fulltext>
- Virtanen, J. I. & Nieminen, P. (2002). Information and Communication Technology among undergraduate dental students in Finland. *EJDent Edu.*6(1)147-152.
- Walton, A. J. (2005). Lectures, Tutorials and the Like. Oxford and Lancaster, UK; MTP.
- Yamani, H. (2006). Electronic Learning to face challenges of Saudi higher education in the light of the requests of technology age (unpublished Master's Thesis). Umm Al-Qura University, Saudi Arabia.
- Yengin I, Karahoca D, Karahoca A, Ozcinar Z. (2010). Being ready for the paradigm shifts in e-learning: Where is the change happening and how to catch the change? *Procedia SocBehav Sci.*; 2(2): 5762-68.
- Yousef, M. O. (2008). Information and Communication Technology and Education. Analyzing the Nigerian Policy for Information Technology. *International Education Journal*, 2005, Vol. 6 (3), pp 316-321.
- Yuan, Y. C.; Gay, G. (2006). *Journal of Computer-Mediated Communication.* 11(4):1062-84.
- Zahra S, Farnaz T and Rahnatalah A (2014). The role of educational technology in medical education. *J.Adi Med.Edu Prof*, 2(4):183.
- Zang, D., Zhou, J. L. & Nunameker(Jr), J. F. (2004). Can e-learning replace classroom learning? *Commun ACM*, 47(5) pp.75-79.