INFORMATION AND COMMUNICATION TECHNOLOGY AS A PANACEA FOR EFFECTIVE TEACHING AND LEARNING: PSYCHOLOGICAL IMPLICATIONS

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Abstract

Information and communication technology has brought a new dawn in teaching and learning through its introduction of various learning devices using relevant technologies. This paper x – rayed the use of information and communication Technology (ICT) as a panacea for effective teaching and learning and what psychological implications it has for the learner. Use of ICT in the teaching/learning process has solved such problems complained of by both teachers and students such as: reading without understanding, a boring class, dryness of topic, stress in teaching, lack of interest by students, inadequate participation by students and many others. ICT has made teaching and learning of various subjects easy. The psychological gains include that of building self-confidence and interest in both learners and teachers in addition to enhancing motivation, full participation and retention of learnt materials among numerous others.

In the past millennium, individuals were contended with what they knew or had and people concentrated on immediate environment. However, with the globalization of world affairs and its commitant demands on workforce, it has become imperative for anybody who wants to be functional in the new scheme of things, eminent in diverse facets of life - education, health, agriculture, politics, trading, engineering and others to embrace the services of information and communication technology. This is necessary because the world has become a global village and the globalization of the world's economy has opened new doors which were previously unheard of, (Madaumere, Uba & Ogunleye). Thus, in the dissemination of information and knowledge, Information and Communication Technology (I C T) has enhanced the process by liberalizing and making it more accessible. This easy accessibility of information has given rise to the world having a knowledge economy, which its gains have opened up new vistas in technology and created such realities that have made possible, the seemingly impossibilities of past decades. Today, people stay in their rooms to access information, send and receive messages from various parts of the world through the use of cyberspace (Madumere, Uba & Ogunleye 2010). ICT therefore is an indispensable tool for national development in the world. The field of education is not exempted from this as it had immensely been affected by the influence of Information and Communication Technology in various institutions of learning. However in Nigeria, a lot still need to be done to maximize the benefits by providing the facilities to penetrate into the nooks and crannies of the institutions in various places especially in rural areas. According to Adewoyin (2007), ICT has an impact on the quality and quantity of teaching – learning activities and also in conducting or writing researches. Thus, the 21st century is undoubtedly described as a millennium of information explosion in the world. Etonyeaku (2010) observed that ICT has brought about an all-embracing convergence of computing, communication, information and knowledge which has changed the way we live, work or think.

At any point in time in the history of any nation, the educational policies had always been guided by the needs of the society. In Nigeria for instance, there are lots of challenges confronting both the government and people from various spheres of life – education, agriculture, security, environment, industries and others. These had brought about immense hardship, loss of lives and property, insecurity, hunger and so on. As these problems grew in size and complexity, it became necessary for complex machines to drive this growth in order to improve the situation as well as ameliorate hardship on people. These complex machines are realizable from information and communication technology.

Some work had been done on ICT as it relates to some aspects of human endeavour including education. However, enough attention has not been given to ICT in relation to teaching and learning. Also, its psychological implications have not been meaningfully ascertained. This gap is what this paper intends to bridge.

The Concept of Information and Communication Technology

Information and Communication Technology is a new communicating and computing technology used for creating, storing selecting, changing, developing, receiving and displaying different kinds of information (Adewoyin, 2007). It is the processing and dissemination of information through electronic machines. All over the world, ICT has significantly affected all spheres of human endeavour. The bedrock of ICT is the computer. All around the world, the educational system especially in the advanced countries is under increasing pressure to explore the new information and communication technologies to teach our students the knowledge and skills they require in the new millennium. According to Information and Technology Association of

America (ITAA, 2006) information technology is the study, design, development, implementation, support or management of computer- based information systems particularly software applications and computer hardware. In his own contribution, Osuala (2004) uphold that information and communication technology (ICT) is an increasing powerful tool for participating in global market; improving the delivery of basic services and enhancing local development opportunities. For the Nigerian information development Agency (2001) in Etonyeaku (2010), ICT means the use of hardware, software services and supporting infrastructure to manage and deliver information using voice, data and video while for Hornby 2009, ICT is the study or use of electronic equipment especially computer for storing and distributing information of all kinds including numbers, words and pictures.

Information and Communication Technology is synonymous with micro-electric revolution (Dixon 1988:2) and for others still, it is just the application of science to information handling function (Chalterton-1992). In spite of the numerous definitions and impression about ICT, one will not be mistaken to uphold that ICT is a technological messiah "born" to improve the world and mankind, its ugly effects notwithstanding. No wonder Borokinni (2001) posited that ICT is daily giving birth to new concepts, new products, new ideas and basically transforming not only our industries and business but also the education sector. It is therefore regarded in this global age as a way of life and only those who embrace it will survive and sustain their business now and in the future (Uchendu and Mbah (2007).

What Constitutes ICT: Components

Information and Communication Technology consists of the hardware, software, network and media for the collection, storage processing, transmission and presentation of

information as well as related services. A further breakdown of these components would include such technologies as faxes, moderns, scanners, radio, computer, television video, CD, DVD, telephone, satellite system robotics as well as equipment and services such as video conferencing and electronic mail. Eze and Ndukaihe (2010) posited that since 1970's, various kinds of ICT have been appropriated for teaching and learning and these include digital cameras projection technologies and the world wide web (WWW) internet broadcasting and telephony. Lending his voice Adomi (2011) upheld that there are many other technologies that can efficiently and effectively be employed to share knowledge over the web and these include podcasting, digital games simulations, iphone and ipod touch. Various types of ICT components are effective in teaching and learning and should be encouraged in schools.

Teaching and Learning

Hornby, (2001) posited that teaching is the act of showing somebody how to do something. It involves giving information about a particular subject. It implies encouraging people to accept something as a fact or principle. In the school setting, teachers are individuals (professionals) trained to perform the act and roles of teaching.

Learning on the other hand is a relatively permanent change in behaviour as a result of experience. Kimble (1981) in Nnachi (2007) defined learning as a relatively permanent change in behavioural potentiality, which occurs as a result of reinforced practice. There must be internal and external conditions, which must exist for learning to occur. Not all changes in behaviour refer to learning. For instance changes caused by biological experiences such as growth or environmental issues such as taking of drugs like alcohol, pills or drugs cannot be regarded as learning. Thus,

psychologists observe learning as a by-product of experience.

An individual may learn by teaching himself through the method of trial and error. A person may also learn by continuous observation of a phenomenon. One may also learn as a result of interaction with a teacher and/or others. In other words, learning occurs as a result of the interaction between an individual and the environment. The use of Information and Communication Technology cannot be over emphasized as they aid teaching and learning.

Need for ICT in Teaching and Learning in Secondary Schools

Information and Communication Technology has the potential to facilitate teaching and learning. For instance, appropriate use of ICT will eradicate completely, the boredom of students being reduced to mere listeners to the teacher's "sermon" in his talk-chalk approach, which had been in vogue prior to ICT. Some scholars posited that this technology gave educational acquisition a sophisticated and exotic outlook as ICT is being increasingly deployed as both administrative tool and instructional aids in developed countries. Beresfield (1999) upheld that in developed countries, ICT has changed how people live, work and play. Also, developed countries have exploited the potentials of ICT to transform their educational landscape.

Thus, ICT presents the opportunity to revolutionalize pedagogical methods and expand access to quality education, improve management of educational system, encourage learning by exploration, group independence, learning activities of learners, researching and a host of other gains, hence Kozma and Johnson (1991) stated that ICT can support learning in construction of knowledge, make available real world situation, drive students on basic concepts to reach mastery and facilitate collaborative activity among students. ICT also provides a

fertile ground for both students and teachers to be ICT compliant by achieving information and technologically based society. UNESCO (1998) in Etonyeaku (2010) noted that ICT challenges traditional conceptions of teaching and learning by reconfiguring how teachers and learners gain access to knowledge and providing an array of powerful tools that may help in transforming the present isolated teacher centered and text bound classroom into rich student-focused interactive learning environment, which the latest curriculum propagates. By this, effective teaching and learning are achieved through the use of ICT, which stimulates the learning environment and as well encourage both group and individual learning.

Subjects that can be Taught Using ICT

There is hardly any subject that ICT is not useful to. Therefore, there is need for Educators and curriculum planners to emphasize its use in teaching and learning as exemplified in the following subject areas.

Science Subjects: In teaching and learning of science subjects, technological devices such as digital games could be used to motivate the young learners in developing good mental skills. Adolescents for instance could be assisted to acquire technological skills, which will help them to cope with complex problem solving as well as higher order thinking skills by providing cognitive bridge between concrete experience and scientific abstracts (Okorodudu 2010). Examples of digital games and simulations include splinter cell, solitaire, and mortal combat; rattle snake, prince of Persia, god of water and others. These games enhance the learner's achievement by stimulating his cognitive processes. For instance knowing the 20 elements in a chemistry class and how to accurately apply them to achieve results will require students' high order thinking.

In the teaching of Mathematics, ICT can be used to support the teacher, minimize his stress, improve lesson design, motivate the students and thereby achieve effective teaching and learning. ICT bridges Mathematical phobia of students, builds confidence in them, helps them improve their Mathematical abilities by testing their conjectures, learning from feedback and using reasoning to modify their solutions. It also enables them to access geometrical, graphical and statistical ideas as well as make connections in their learning. ICT adds value to the lesson. For instance, computers offer powerful opportunities for students to explore mathematical ideas, to generalize, explain results, analyze situations and receive fast, reliable and non-judgmental feedback. ICT grants students access to information not otherwise readily available and, because students sourced the information on their own, creativity comes into play; such information permeates in them while retention is enhanced and effective learning achieved.

ICT and Arts Subjects

Interest and creativity are active/vital tools which the teacher can use to drive home his lesson and these services the use of ICT accomplishes. This fact makes the use of ICT very relevant in the teaching of various Arts subjects. In the teaching of reading any language, for instance computers or tape recorder could be used. The teacher may present a recorded passage or a unit that might be separated from the rest of the passage with a period or comma. After listening to the unit, the students try to duplicate the unit with the same phrasing and intonation. This method helps to improve expression and phrasing.

In the teaching of Oral English, listening comprehension, stress and others, computer and tape recorder play important roles. Pre-recorded vowel/consonant sounds, phonemes, words or sentences are played on the computer or tape as a

model. Students listen to it and try to re-produce same. Students are drilled on pre-recorded discussions/conversation or paragraph. They listen to it and answer questions (Listening Comprehension) or may bring out the theme(s) of the paragraph (Summary) this has the advantage of enhancing performance on students. In senior secondary school certificate examination (SSCE) West African Examination Council (WAEC) uses recorded tapes in examining students. In some aspects of language such as Oral English. Unfortunately, observation shows that some schools do not use such ICT facilities while teaching their students. These students become more confused during the oral examination and may not understand the message because they are not familiar with the medium of instruction. This partly accounts for students, poor performance in English language. In the development of speaking skills, the teacher can present a photo/picture movie (without sound) to the students and at the end, tell the students to add meaning and sound to it by narrating the story on the movie orally. He may request them to write the story and this will result to the development of writing skills.

Other subjects such as religion, social studies, music could be taught using ICT. Issues like moral education, citizenship education and others could be effectively taught with ICT where instructional items are presented on projectors, computers or slide and students see it in a near real life situation. For instance, the topic: "The Good Samaritan" would inculcate positive emotion, kindness and love in students if taught through this way.

ICT and Vocational Subjects

ICT facilitates the teaching of vocational subjects, which include dressmaking, welding, cooking, designing, carpentry, black-smiting, weaving, agriculture and many others. For instance, ICT in form of computer, projection slide and others may be used to teach students a step-by-step process of production from the beginning to the end of each of the above stated vocations. Such processes may be pre-recorded from industries, workshops, farms and others. By this, students are encouraged and see things for themselves.

From the foregone, it is evident that effective teaching and learning using ICT is enhanced by **simulation**. According to Nwajiobi and Oshegbu (2009) simulation embodies the principle of learning by doing. To learn about a system, one must build a model of some sort and then operate the model. ICT offers this service of modeling and makes the child see the learning activities as natural as in role-playing. By this, children simulate the activities they watched on the computer, projector and others. They may also indulge in role-playing. Thus to understand reality and all its complexities we must build artificial objects and dynamically act out roles with them. However, to simulate something physically, it is necessary to first create a mathematical model, which represents that physical object. Thereafter, the computer can be used to execute. It is necessary to create a computer programme for one to be able to execute the model on the computer. Computer simulation is an important feasible way of getting results within limited time especially for large-scale model.

Psychological Implications

Teaching and learning is more effective when the learning experiences are presented in such a manner that the learners' various senses are touched and manipulated. By this, the use of ICT in teaching and learning motivates the learner, making the class very lively and active, and keep the children on the move and ever prepared to learn. ICT in the class stimulates the learners' interest. Perhaps one of the major contributions of ICT in the classroom is that it makes teaching and learning, **learner-centred,**

which modern curriculum advocates. This counterfeits the teacher-centred approach in which the teacher does all the talking and gets the students bored while some sleep in class. They hear the teachers "sound of words without comprehending and during examination, they memorize the teacher's notes and "give back to the teacher what he/she gave them in class" without understanding the meaning.

The use of ICT in teaching and learning inculcates the psychological gain of **self-confidence in the learner.** This is because the students themselves manipulate as well as interact with the learning experiences, instructional materials and other variables used in the process. To achieve this, they develop the tendency for **investigation**, and **exploration** of the learning situation and its variables and finally arrive at the **discovery** of the expected outcome of the lesson and probably achieve a "EUREKA JOY". Nevertheless, as students interact with the learning environment, the teacher's role is to standby to watch the children and to promptly "panel beat" any shortfall in their activities where necessary. He also re-emphasizes their gains in terms of aspects where they perform very well and thus encouraging them. By this, teaching and learning become less stressful. For the teacher, it spares him the enormous energy he expends in talking and sweating all through the class while for the students, they develop immense **interest** as they manipulate the instructional materials. Again, a well-directed use of ICT in teaching and learning makes the students contributory and participatory partners in the process of achieving the desired objectives, **retention** is enhanced while forgetting is minimized to a near zero point.

Development of **Creativity** in the learners is an important gain which also instills confidence in the learner as well as enhances the individual's self-esteem and as such, a prominent psychological gain derived from the use of ICT. For instance, after students had watched a recorded learning activity such as baking, designing, poultry, court session, debates and others, they may need to practice what they have seen through *simulation.* According to Nwajiobi and Osegbo (2009), children understand the world around them by simulating (with toys and figures) most of their interactions with other people, animals and objects. In doing this, they may embellish their own activities by adding colour, flavour and flair to achieve an enhanced performance and result. By this, learners create new spheres, ideas and innovations. Today in Nigeria, creativity, which is the ability to produce ideas that are both noble and valuable (Myers 2004) is one of the phenomenon which the nation yearn for enhanced technological and other developments. Moreover, ICT learning induces *reinforcement* in learners. For instance, if students' activities during learning are recorded on a tape recorder or video and thereafter re-played for them. They observe their performances, criticize their activities themselves and get reinforced to do better after the self-evaluation. Summarily, ICT instills *motivation* in learners and this is a driving force in every sphere of endeavour. For this, Amiable and Hennessy (1992) upheld that people will be most creative when they feel motivated primarily by the interest, enjoyment, satisfaction and challenge of the work itself.

Conclusion

ICT is an invaluable component of teaching and learning in modern times hence its contributions in education cannot be over-emphasized. It has extensive advantages and services to schools and this has propelled teaching and learning to a higher level. Some of such services include: Computer operations, Internet, web, e-mail, virtual classes, supporting system, tape recording, distance learning, e-

conferences and lots of others. ICT has been noted to be a sure way of achieving effective teaching and learning in schools as well as attaining the desired objectives of education. It instills imaginative thinking skills in learners by providing them the ability to see things through new ways, recognize patterns, and make connections. Various psychological gains of ICT in learning were explored and these include enhanced self-confidence, interest, motivation, creativity, reinforcement and discovery skills in the learner. It also promotes retention of learnt materials. The emergence of ICT has nicknamed the new era as "Computer Age" and has introduced various changes in the educational system which have made learning more interesting and dynamic.

Recommendations

To enhance effective teaching and learning using ICT, the following recommendations have been made:

1) Adequate ICT facilities should be installed in secondary schools by the government, school authorities or other relevant agencies
2) ICT related learning should be included in the curriculum.
3) Teaching of ICT as a subject should be made compulsory for secondary school students
4) Every secondary school should have an integrated laboratory or room where students can meaningfully engage themselves when free rather than indulge in cult activities or other indisciplinary behaviours which may lead them into trouble.
5) Well-trained ICT personnel should be deployed to secondary schools to help gear the channel and ICT needs of students appropriately.
6) School Management should ensure that there is internet connection to the school

ICT unit to enhance students' exploration, and knowledge.
7) Teachers should be assisted to have their own computers and to be well guided.
8) Award of prizes should be given for best performance in ICT in classes, by school administrators while School Board and/or government award prize for best performance of school in ICT.

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