

A Survey on the Use of ICT in Conventional Knowledge Approach in Enhancing Productivity at the Basic Educational Level

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ABSTRACT

The application of new teaching techniques and interactive methods bring changes in forms of organizing the teaching activities. Effective teaching at the basic classroom depends on the teachers' skills to maintain and raise the interest of the pupils in what is being taught. Teaching and effective learning require the use of appropriate pedagogic and methodological conventional knowledge approach to enhance productivity. The paper discusses information and communication technologies considering some of the objectives of Nigeria's ICT policy, components of teaching, equipment associated with information technology and its uses, usefulness of information technology, impact of ICT on pupils performance and the challenges of ICT on pupils performance. It was recommended that the Ministry of Education should provide relevant information technologies suitable for use at the basic educational level to facilitate the production of ICT compliance.

Keywords: Information Communication Technologies, Conventional Knowledge Approach, and Basic Educational level

Reference Format

Obaje Alex Friday and Ochijenu Mercy A. (2022), A Survey on the Use of ICT in Conventional Knowledge Approach in Enhancing Productivity at the Basic Educational Level.
Afr. J. MIS, Vol. 4, Issue 1, pp. 14 - 19.

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1. Introduction

Information Communication Technology is a revolution that involves the use of computers, internet and other telecommunication techniques in every aspect of human life. Information Communication Technology has become within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core courses of education, alongside reading, writing and numeracy Donald (2016). However, there appears to be a misconception that ICT generally refers to ‘computers and computing related activities’. This is fortunately not the case, although computers and their application play a significant role in modern information management, other technologies and systems also comprises of the phenomenon that is commonly regarded as ICTs (Adeleye, 2012).

In this respect, conventional approach should be viewed as a conglomeration of flexible and adaptable strategies and techniques, affirmed as beneficial in both research and real-world settings. It should be normal for the basic education teacher to stimulate pupil’s interest by bringing into the class elements of play, game, technology and reflective discussion. By adopting reliable and transparent assessment strategies, a conventional Basic education class can integrate portfolio, tours, project and debates into classroom deliberations and still remain conventional (Anyor & Abah, 2014). The adaptive nature of the conventional model of teaching makes it serve as a base for improvement of classroom instruction. As the basic teacher makes progressive judgment based on feedback received via assessment and evaluation strategies, opportunities are provided for enhancement of quality (Abah, 2016).

The idea that teaching and learning can successfully take place through the application of electronic communication facilities between teachers and pupils is one which had generated, hope and dismay and other times, excitement and fear. Hope that many more learners can be reached at more convenient pace, dismay that the infrastructures necessary for deploying an effective ICT platform is lacking in low-income countries like Nigeria. Previous studies have proved that ICT can help

- (1) motivate pupils’ engagement in the basic education classrooms,
- (2) enhance their basic education learning,
- (3) Make basic education an appealing subject, and
- (4) Improve their problem-solving, communication, decision-making, and research skills (Michael, 2015)

However, the use of information and communication technologies in the educative process has been divided into two broad categories: ICTs for Education and ICTs in Education. ICTs for education refers to the development of information communication technology specifically for teaching/learning purposes, while the ICTs in education

involves the adoption of general components of information and communication technologies in the teaching learning process. One of the most important factors for successful ICT classroom implementation is teachers’ positive beliefs on ICT in education (Gulbahar & Guven, 2008). The role of teachers for ICT integration is important, because they serve as gatekeepers. In other words, pupils’ access to an ICT environment depends on teachers’ attitudes towards ICT. If teachers are reluctant to implement ICT, their pupils may not have an opportunity to use ICT in the classroom. It is also important to train pupils to become digital citizens in the global world by equipping them with 21st century skills (Care et. al., 2018).

The problem is that many schools do not have ICT equipment or qualified strategies to teach computer studies. Apart from this, research has shown that many schools do not have qualified ICT personnel and facilities to effectively teach the pupils. Because of this, many pupils do not understand the concept in ICT and as such cannot apply the knowledge in exploiting and making use of ICT knowledge as required, this affects pupils negatively in their performance since the information is difficult to generate to enhance productivity and performance (Heafner, 2004)

2. Diffusion of Innovations Theory Rogers (1995)

Diffusion innovation theory focuses on how instructional technologists can use the theory of innovation diffusion with the hopes of increasing the implementation and utilization of innovative instructional products and practices. The application of diffusion theory to instructional technology is useful for examining how media literacy proponents can apply the diffusion of innovations theory to increase the adoption of media literacy programs in schools. Rogers view diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system". Rogers described an innovation as any new idea, practice, or object considered new to an individual. To Rogers, “technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome”. It is clear that technology is information, not just equipment.

Rogers explains that there are four major theories that deal with the diffusion of innovations. These are the innovation-decision process theory, the individual innovativeness theory, the rate of adoption theory, and the theory of perceived attributes. Educational technologists should study diffusion theory for three reasons. First, educational technologists do not know why technological innovations are, or are not, adopted. Some blame teachers and a resistance to change, while others blame bureaucracies and lack of funding. By studying diffusion theory, educational technologists may be able to explain, predict and account for factors that influence or

impede adoption and diffusion of innovations. Secondly, instructional technology is inherently innovation-based. As technology advances, so do the instructional materials produced as a result of such advancement. These materials need to be introduced and diffused into the educational system. Therefore, understanding the best way to present innovations for potential adoption is necessary. Thirdly, educational technologists may be able to develop a systematic model of adoption and diffusion. Such models have been useful in instructional development. Therefore, it seems wise to explore the factors that affect diffusion and attempt to build an effective model of diffusion.

Literacy is a technological innovation; it is useful to apply the tenets of diffusion theory to better understand media literacy's diffusion into the social system for several reasons. First, diffusion theory provides a framework that helps media literacy proponents understand why media literacy is adopted by some individuals and not by others. Nigeria started implementing its ICT policy in April 2001 after the Federal Executive Council approved it by establishing the National Information Technology Development Agency (NITDA), the implementing body (NITDA, 2003). The policy empowers NITDA to enter into strategic alliances and joint ventures and to collaborate with the private sector to realise the country's vision of, "making Nigeria an IT capable country in Africa and a key player in the information society by the year 2005 through using it as an engine for sustainable development and global competitiveness (Agyeman, 2007).

The following are some of the objectives of Nigeria's ICT policy:

1. To ensure that ICT resources are readily available to promote efficient national development
2. To guarantee that the country benefits maximally, and contributes meaningfully, by providing the global solutions to the challenges of the Information Age
3. To empower Nigerians to participate in software and ICT development
4. To encourage local production and manufacture of ICT components in a competitive manner
5. To establish and develop ICT infrastructure and maximise its use nationwide
6. To empower the youth with ICT skills and prepare them for global competitiveness
7. To integrate ICT into the mainstream of education and training
8. To create ICT awareness and ensure universal access in promoting ICT diffusion in all sectors of national life
9. To create an enabling environment and facilitate private sector (national and multinational) investment in the ICT sector
10. To encourage government and private sector joint venture collaboration

11. To develop human capital with emphasis on creating and supporting a knowledge-based society
12. To build a mass pool of ICT literate manpower using the NYSC, NDE, and other platforms as a train-the-trainer scheme for capacity-building. (Agyeman, 2007)

Conventional knowledge approach is a means of sharing information so easily to incorporate integrative and cooperative learning in Basic education. It seeks to support the learner's ability to transfer their learning process to succeed in complex performance. The teacher achieves this through feedback, conferencing and guided practice, while the learners are expected to refine skills and deepen understanding. Based on this view, Coe et al. (2014) observed six components of teaching which includes.

1. Pedagogical Content Knowledge: The most effective basic education teachers have deep knowledge of the subject the teachers teach. As well as a strong understanding of the material being taught, basic teachers must also understand the ways pupils think about basic concepts, be able to evaluate the thinking behind pupil's own methods, and identify pupil's common basic misconceptions.
2. Quality of Instruction: This entails specific practices, like reviewing previous learning, providing model responses for pupils, giving adequate time for practice to embed skills securely and progressively introducing new learning.
3. Classroom Climate: Good basic subject teaching covers quality of interactions between the teacher and the pupils by creating a classroom that is always demanding more, but still recognizing pupils' self-worth.
4. Classroom Management: This refers to a basic teachers' ability to make efficient use of lesson time, to coordinate classroom resources and space, and manage pupils' behaviour with clear rules that are consistently enforced.
5. Teacher Beliefs: This is an explanation of why teachers adopt particular practices, the purposes they aim to achieve, the theories about what learning is and how it happens and teachers conceptual models of the nature and role of teaching in the learning process.
6. Professional Behaviours: These are behaviours exhibited by teachers such as reflecting on developing professional practice, participation in professional development, supporting colleagues, and liaising and communicating with parents.

3. Equipment associated with information technology and its uses in a conventional setting

Lingard, et al., (2003), observed that Information Technology is not an island on its own. It combines the efforts of some machines in achieving its objectives. Among these technologies are: The internet, Electronic mail, Telephone, Facsimile, Telex, Laminating Machine, Dictaphone, Word processor, Intercom system and computer. All these equipment are further explained below.

The Internet: The internet is Inter-connection networks; a global computer network connected via huge networks of telecommunication link. The internet allows you to access a whole resources of information stored at different sites (called hosts) and locations all around the world.

Electronic Mail: E-mail can be used to exchange messages or ideas among people or organizations with the use of computer network. One of the advantages of the e-mail is the speed at which it gets to its destination.

Word Processor: It is an electronic device, which translates ideas into words, put words on paper and communicate such words through electronic communication facilities. It is used to produce reports, and other written messages. It is computer-like, and comprises Visual Display Unit, Central Processing Unit and Storage, Keyboard and a printer.

Intercom System: Inter-communication systems provide a means of quick verbal communication between individuals whose offices are connected to the systems circuits.

Computer: All computer system performs the following basic operations. They are, input, storage, processing, output and control. These basic operations are further explained below:

Input: This is the process of entering data and instruction into the computer system.

Storage: The computer system stores the data and instruction and make available for processing as at when required.

Processing: The computer performs arithmetic or logical operations on data and converts data into useful information.

Output: This is the process of producing the results of the processing to the user, such as a printer report or a report that can be viewed on the computer monitor.

Control: The computer controls the manner and sequence in which all the above operations are performed.

Usefulness of information technology: The use of ICT in acquiring knowledge and skills has become an essential element in educational training and skill acquisition, and these ICT elements in the educational process have unprecedented benefits that have made educational data reliable. Heafner

(2004) asserted that technology in education with reference to ICT encompasses the following:

1. Media and audio visual (AV) communication e.g. alternative instructional delivery systems such as radio and educational television.
2. Vocational training tools such as computer-based training (CBT), computer-aided design (CAD), etc.
3. Computer and computer based system for instructional delivery and management e.g. computer-aided Instruction (CAI), etc.
4. Internet or web-based education that is, education information obtained from various web sites.

Information technology is also useful on the followings:

- **Coordination of Department:** The essence of coordination department is to coordinate. The head of department will be able to coordinate every activity of his various departments via his information technology network available to him, thereby harnessing any vital information that needs to be put in place.
- **Confidentiality of Information:** Confidentiality is maintained. Thus, some 'top-secret' information is usually restricted if kept in a diskette or stored with a password.
- **Efficient Record Keeping:** Information technology removes the problem created by keeping record manually, such as loss of records, information, waste of time etc.
- **Time Saving Device:** Information technology aids in the economy of time. Data related to an establishment are collected on time and as at when needed.

Michael (2005) gave the following Impact of ICT on pupil performance

1. The positive impact of ICT use in education has not been proven generally, despite thousands of impact studies, the impact of ICT use on pupils achievement remains difficult to measure and open to much reasonable debate.
2. Positive impact more likely when linked to pedagogy. It is believed that specific uses of ICT can have positive effects on pupil achievement when ICTs are used appropriately to complement a teacher's existing pedagogical philosophies.
3. 'Computer Aided Instruction' has been seen to slightly improve pupil performance on multiple choice, standardized testing in some areas. Computer Aided (or Assisted) Instruction (CAI), which refers generally to pupil self-study or tutorials on PCs, has been shown to slightly improve pupil test scores on some reading and math skills, although whether such

improvement correlates to real improvement in pupil learning is debatable. (www.infodev.org/articles/impact-icts-learning-achievement)

4. Need for clear goals ICTs are seen to be less effective (or ineffective) when the goals for their use are not clear. While such a statement would appear to be self-evident, the specific goals for ICT use in education are, in practice, are often only very broadly or rather loosely defined.
5. There is an important tension between traditional versus 'new' pedagogies and standardized testing. Traditional transmission-type pedagogies are seen as more effective in preparation for standardized testing, which tends to measure the results of such teaching practices, that are more 'constructivist' pedagogical styles among others.

4. Challenges of ICT on pupils' performance

Heafner (2004) opined that efforts toward the use of ICT in pupils' performance communication interaction have met several challenges. These challenges include:

1. Inadequate ICT infrastructure including computer hardware and software.
2. Resistance to change from traditional pedagogical methods of teaching Business Education to more innovative and technology based teaching and learning methods.
3. Lack of skilled manpower to manage available system and inadequate training facilities for business educators at the tertiary level.
4. Poor electricity distribution.
5. Majority of business educators do not make use of ICT facilities based on the fact that ICT facilities do not exist in their various schools. This was supported by a communiqué issued by the National Information Technology Development Agency (NITDA, 2003), posited that access to internet and other ICT relevant tools to classroom teaching and learning are very limited in Nigerian society. The report further revealed that over 90 percent of educational institutions are without ICT tools and the teachers lack adequate skills and abilities to operate the available ICT tools.

Donald (2006) also supported the above assertion, that there are inadequate or non-existent physical facilities such as room space for computers, electric generator, furniture and most especially lack of good maintenance culture. All these offer little or no stimulus to ICT usage in the classroom communication interaction in Business Education. Agyeman (2007) identified some problems of using ICT in the classroom communication interaction at the basic education level:

1. Lack of facilitating structures.
2. Lack of government commitment towards provision of infrastructures and fund.
3. Computer literacy.

4. Another major setback in the utilization of ICT in classroom communication interaction in Basic education is epileptic power supply.

According to the Assessment and Teaching of 21st Century Skills expressed in ways of thinking include creativity, critical thinking, problem solving, decision making and learning. Communication and collaboration are particular to ways of working since Information and Communications Technology (ICT) and information literacy are necessary tools for working. Skills for living in the world include citizenship, life and career skills, and personal and social responsibility. It is thus the duty of the mathematics teacher to optimize available resources in sequencing learning experience targeted at fostering these skills.

Conventional knowledge approach is the most common learning behaviour found in school, this can be very effective in sharing information that is not easily found elsewhere, present information in a quick manner, generate interest in the information and teach learners to learn best by listening. Though the challenges of conventional knowledge approach shows that not all learner learns best by listening, keeping learner's interest is often difficult, the approach require little or no critical thinking and assumes that learners learn in the same impersonal way.

5. Conclusion

Conventional knowledge approach and integration of ICTs into the process of knowledge production and administration has given rise to new forms of knowledge acquisition. This help the pupils to master the process of information dissemination, transfer and facilitate the process of adaptation to the ongoing evolution of the economic, social and cultural environmental activities. Therefore, it is used to improve the administrative and management functions and considered to harnessing electronic technology in its various forms to improve human productivity and efficiency in the areas of information communication technology

6. Recommendations

1. The ministry of education should provide relevant information technologies suitable for use at the basic educational level to facilitate ICT compliance
2. Teachers should be mandated to use information communication technology in a conventional knowledge approach in the teaching and learning of the pupils at basic level of education.
3. Parents should be encouraged to provide necessary assistance to their wards by either providing technologies or the process of teaching information communication technology to the pupils after school normal classes.

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