Bridging Information and Communication Technology and Staff Professional Development: Case Study of Delta State Tertiary Institutions

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Abstract

The reinvention of knowledge with the advent of computers is exponentially changing our life options as well as the kind of educational processes (teaching/learning) required for students to succeed in this new knowledge environment. To thrive therefore in such in a changing world where science and technology have made changes to the way we live and so forth, teachers and students alike must also try to learn and adapt to new ways to teach/learn, how to think and be creative as well as understand how these technologies works. With the advent of these new technology, our schools are populated today, with students who have better understanding of the performance capabilities of these information and communication technologies (ICT) than the many adult teachers charged with the duty to impact knowledge and teach them. Teachers are therefore faced with the formidable task of reinventing schools/classroom for a society and world transformed by ICT – because most of these children have grown with this technology as a natural part of their landscape. The forceful impact of technology which is related to the shift in power structures in schools alongside changing the teacher/student roles have brought about great widespread access to electronic information and knowledge.

Keywords: Constructivism, Rationale, informatics, productivity, meida literacy, lifelong.

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1. Introduction

Technology is today, an integral part of our culture because actualizing our current societal goals and those of our generations ahead will be a mirage unless we have excellent understanding of it. [1] notes that science and technology have become our heritage and mankind's hope. Thus, the mission of today's

education must ensure students are scientifically literate to cope with technological changes of the ***data*** age. [2] notes goals of science and technology as:

(a) to provide preparation for training in science and mathematics,

(b) to provide basic mathematics and science literacy for everyday living,

(c) to provide basic skills and attitude to prepare us for technological growth and developments, and

(d) to help stimulate and enhances creativity.

Education is the art of transferring knowledge from a teacher to learner within a physical environ (called ***school with classroom***) and interrelationship that [3] calls a ***system*** of factors, which jointly affect learning individuals of cultural differences. The classroom provides the structure in which learning is organized and the school has three major components namely: learner, teacher and administrator. There are basically two styles of education delivery namely ***Traditional*** (a teacher employs face-to-face, oral method in which the teachers pass knowledge to a learner), and ***Alternative Delivery*** (learners can construct new knowledge and meaning from previous concept/beliefs with methods and strategies that involves media literacy. Thus, Alternative delivery is more concerned with what a learner understands as well as does with what he understands rather than the teacher's input; and the use of equipment becomes ***focus*** of study (technology education) and the educational ***support*** (educational technology) as seen in figure 1 [2,4].

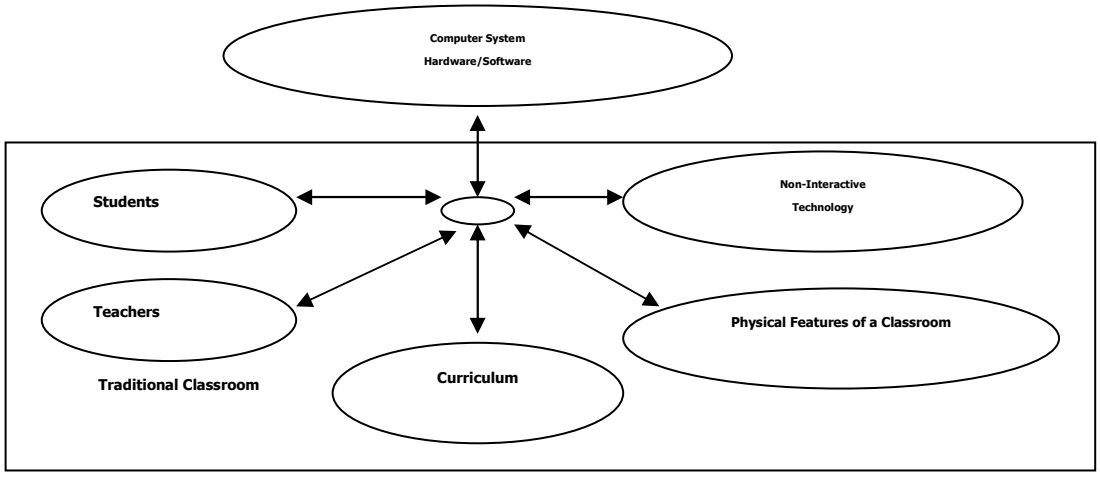

Figure 1: a demonstration of constructivist-class model

The awareness of Information and Communications Technology (ICT) and its integration into education is increasing. Despite the availability of such technological infrastructures and online resources, there is no professional development adopted by the government for teachers, as many teachers have not yet adapted to these new educational reforms for effective learning and teaching in Nigeria.

This key objective of this investigation is to uncover the compelling reasons why technology integration have become a desired goal as well as consider its impact on student learning with teachers taking advantage of these new technologies for their teaching tasks The teachers concern is not whether integration will yield better teaching results than the traditional processes – because, many research have focused and outlined that even though e-Education is still at its infancy with a few side effects, its benefits can never be overestimated [11].

The intent of ICT learning outcomes is that students should have a knowledge skill and attitude that will serve themwell for entry level, further studies and lifelong learning that will aid them to strive to become inquisitive, discerning and caring persons [Alberta Learning, 2005). Students must be prepared to understand, use and apply ICT in effective, efficient and ethical ways because technology integration into the Nigerian Educational System must be cross-curricular and not to be treated as an introductory course, topic in and of itself, since the role of ICT in schools at its best in practice – is receiving a great deal of attention (Ojugo, Aghware and Abala-Odibo, 2006).

ICT requires a considerable change that will enable students take advantage of unregulated online resources, which they can to contribute and extend they share their knowledge with the rest of the society. Leaping into the ***knowledge*** age is not all about technology integration; but more about changes made in the teaching/learning methods as enabled and required by the new medium – ICT. It also requires thoughtful teachers to face fundamental issues and ask questions such as: nature of literacy and awareness of these teachers in this new hypermedia environment, how do teachers negotiate this new technology and what are their expectations.

The integration of ICT into the educational system has brought about power shift in teacher/student structures equipping students to become the producers of knowledge instead of knowledge-consumers. The issue as for teachers is not whether or not ICT offers a better way of teaching and learning – because ICT integration questions the traditional method of education. ICT has changed forever how people manage

process and share information (Goldman-Segall, 1998). Its integration does not eradicate the presence of classroom teachers – but rather stresses an ever increasing, importance of teachers to take advantages of the unique capabilities of ICT to help enfranchise and emancipate their students, because the framework for measuring the quality of engaged student's learning is grouped into eight categories namely: vision of learning, tasks, assessment, teacher roles, instruction, grouping, learning context and students' roles (Jonassen, Peck and Wilson, 2000; Males, 2006; Ojugo et al, 2006).

For more than a century now and in 2003, Nigeria launched the ***CANi*** (computer for all Nigerian initiative) project. Then Microsoft and Intel in the same year were to establish five hundred (500) e-schools in Africa. A result of the societal shift/changes made in response to such new medium as it has become a fast emerging force for leveraging educational reforms. Hence, knowledge and learning in the current past share dominant characteristics making it sequential, hierarchical, externally determined and controlled, and compulsory for all (IT digest, 2006; Jonassen et al 2000; Males, 2006). This integration will allow students access to a wide range of information and expertise via the Internet – such that the only for school boards to regain control over the kind and amount of information that students access is via the use of security software. But this on the other hand, makes the Internet access useless to students and teachers (Clifford, Friessen and Jacobsen, 2007).

2. ICT Framework In Education

The provision of modern technological equipment at all school levels varies due to their various levels of preparedness – both by teachers and students. A look at students' ability in obtaining the necessary flexibility in an information age correlates amongst others, level of information setting of schools. This helps to provide schools with various expanse of data in printed and electronic forms via updates, networks and via experts in the informatics field.

ICT integration into education results in great reforms to the learning process; and educators who advocate such reforms, opines that such learning is informed by constructivism [6]. Constructivism pleads the need for students to develop high thinking skill as opposed to the failure of the current schooling methods to provide such opportunities [7-8]. Thus, a critical factor to ICT integration is ***constructivism***, so that learning takes place as the learner completes tasks for which *media* support is required and used to maintain such learning environment and learners [9].

Technology creates ideal learning. Thus, [10] notes it has been ignored or its past implementation has failed widely as it creates a learner-

centered, learning environment with a belief that they learn more from what they do/think rather the teacher's input. We must take care, not to allow the dynamic nature of technology overshadow the enduring nature of learning and ever-increasing knowledge base about learning [7, 4].

[11] notes the concept of ***constructivism*** as one in which a learner has the ability to actively construct knowledge as he learns. It also emphasizes knowledge as a construction of reality in the learner's mind because knowledge is a dynamic adaptation towards an interpretation of experience. It supports many interpretations to reality based on knowledge constructed from experience and media-rich class. It focuses on knowledge ***construction*** rather than ***consumption*** – as the learner constructs data from experiences and mental beliefs, interpreting events accomplished outside the mind. We thus see the world we describe rather than describing the world we see. When integrated across curriculum, it provides appropriate level of difficulty due to its tasks that are of real world relevance with engaged-learning and teachers becoming knowledge guides [12] as seen in figure 2.

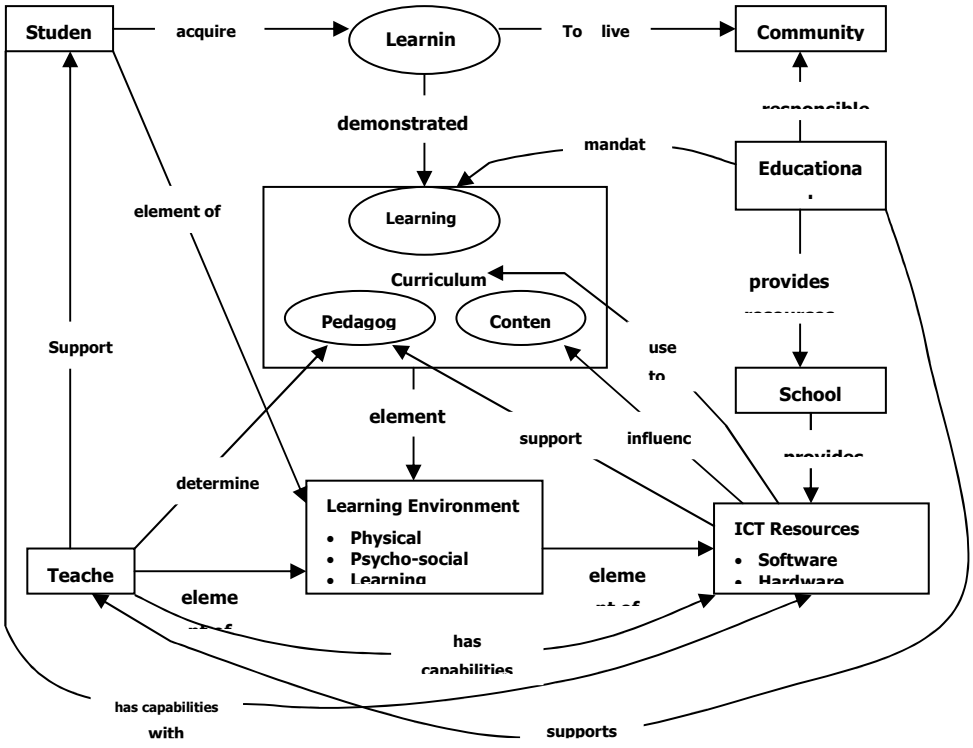

Figure 2 shows the concept map indicating the relationship between the learning

Today' education is transformed by new technologies that provide large amount of data to learners, coupled with the fact that knowledge doubles at increasing speed requiring a transformative method to education. Its challenge is that educators and learners are ***suspicious*** of the educational practices as it differs from what they are used – as constructivism removes ***statewide*** assessment, which traditional model promotes by ***aligning*** tests. The issues of fund shortage, unclear vision to keep the change from occurring rapidly as well as teachers not having a good understanding of how ICT works as they are charged with the duty of emancipating students, are in continual resolution.

This paradigm shift will require teachers to be retraining, role redefinition as well as acculturation to put this systemic change in place – even though it may be slow [13].

[14] presents some known constructivist principles which inlucde:

- Learning is ***active*** and consists of meaning construction and constructing system for meanings.
- ***Language*** influences greatly what we learn.
- Learning is a social activity associated with connections the learner makes with others.
- Learning is ***contextual*** – as learner cannot learn isolated facts or theories in abstract ethereal land, separate from real world situations.
- ***Motivation*** is a key in learning to help us know how the acquired knowledge can be put to use.
- ***Knowledge*** is important – as we cannot comprehend new ideas without some structure developed from prior knowledge to build on.

earning is not ***instantaneous*** but takes time – as the learners must revisit principles, reflect on them and using them as often as possible.

- Knowledge construction is ***mental*** – since it happens in the mind of the learner.

3. New Paradigms: A Constructivism Class

Education, transformed yields the following:

- Shift from whole class to smaller groups
- Teachers coach weaker students rather than all.
- Students become actively engaged, cooperative and less competitive
- Students learn differently than simultaneously.
- Integrate visual/verbal thinking rather than primacy of verbal thinking as in traditional class.

Stakeholders may become ***suspicious*** of the educational practices as it differs from what they know – because constructivist learning removes ***statewide, aligned*** assessment. Thus, learners will take ***standardized*** tests, which does not assess ***what*** they are learning but what new meaning they derive of concept. Class structure will become more ***fragmented*** and problems will abound due to lack of funds and unclear vision to keep this systematic change from occurring as rapidly as possible.

b. Statement of Problem

This investigation seeks to uncover the reasons for technology integration in schools, which has become a desired goal

as well as consider its impact on student learning as teachers take advantage of these new technologies for their teaching task.

c. Research Questions

The research question developed to guide the researcher is as follows:

Research Question 1

Is there adequate facilities and funding by the government to aid ICT integration?

Research Question 3: Are there educational reforms as well as curricular restructuring to cater for these changes?

Research Question 4: Are there technological roadblock towards the achievement of ICT integration?

Research Question 5: What professional development programs are put in place to equip teachers of the vast advantages of ICT media when integrated?

d. Methodology

The research methodology adopted will be viewed under the following headings namely:

1. Sample Population

For understandability and reliability of information retrieved from the respondents, the investigation was limited to the twelve (12) tertiary institutions in Delta state. From this entire total population, samples were randomly selected from science, social science, business and arts related fields or courses. Two hundred and forty (240) ***teachers*** and ***administrators*** were selected for the study, to help alleviate falsehood of results obtained as well as be able to give a fair picture of the entire population.

2. Instrument

Interview and questionnaires were administered to help with collection of data. This was analyzed using a simple majority – to give the investigation true and clear picture.

e. Data Analysis And Findings

Below we discuss the following research questions:

Research Question 1: Is there adequate facilities and funding provided by the government to aid and cater for ICT integration?

Table1:**Technology Integration and Educational Reforms**

Table 1

Items	**Yes**
Awareness of ICT projects (NEPAD, CANi) by government alongside introducting e-schools in Nigeria and/or Africa at large with her launch in 2003.	40%
Teachers awareness of technology integration's expectations	45%
Willingness and adaptation to the new scheme by teachers	88%

From respondents made up of teachers and administrators, result findings in Table 1 shows that 40% of the respondents are aware of such ICT introduction of e-schools in Nigeria and Africa at large. 45% claimed to have knowledge of what government expectations are on them with the technology integration in schools; while project plans for technology integration into schools launched in 2003 as well as 88% indicated willingness to adapt to the new scheme.

Research question 2: Are there educational reforms and curricular restructuring are in place to cater for these changes and ICT integration?

Table 2: Curricular-restructuring

Items	Yes
Awareness of the educational reforms to aid ICT integration	40%
Development of informatics lessons to meet with new scheme	92%
School board, administrators, teachers and IT experts responsible for curricular restructuring	90%
Alternative to site breakdown	38%

Result findings showed that 40% of the respondents are aware of educational reforms (this proceeded from the introduction of ICT projects for technology integration into the Nigerian educational system and introduction of e-schools launched in 2003). 92% made their observations clear of their awareness that government must develop new lessons on informatics to be restructured into the curricular to meet specifications by the new scheme and technology integration. 90% indicated that ICT experts, teachers, school board and administrators must be involved in the restructuring of school curricular; while 38% stated the need for alternative measures in case the sites crash.

Research Question 3: What staff professional development programs are put in place to equip teachers of the vast advantages of ICT media when integrated?

Table 3: Staff Professional Development Plans

Items	Yes
Teacher's Role awareness with technology integration.	44%
Computer Awareness and appreciation by teachers in the aspects of programming and other concepts/applications.	93%
Professional in-service time and funding	87%
Job satisfaction with the new scheme	75%
Quality of learning	90%

Result findings showed that 44% of the respondents are aware of teachers' role with the new educational reforms and they are aware of what the government/society expects from them – especially with the misrepresentation/misunderstanding of them that they taught technology integration into educational system will make their roles as teacher insignificant. For this reason, 93% of the respondents have undergone computer literacy and awareness training, which has prepared them towards the integration of technology into education. 87% have already made plans towards purchasing of new computers equipment amongst other facilities to aid them fully harness and integrate fully into the new scheme – as government has also started training teachers to aid with the scheme. 75% noted their assurance in that the new scheme will grant better job satisfaction than the traditional method of teaching/learning – though it is a little-bit more tasking than the conventional, traditional approach of education. 90% also indicated that technology integration into education assures a more engaged quality of students learning.

Hypothesis 4: Are there technological roadblocks to be expected during this transition?

Table 4: Technological Roadblocks.

Items	Yes
Enough time for planning and development of informatics lessons with the integration of ICT in schools	92%
Adequate technical support for ICT integration	54%
Expertise level required for integration and expert's expectations	94%

Result findings showed that 92% of the respondents agreed that there was always time for planning and development of informatics lessons to aid the technology integration. 54% stated that there are adequate technical supports to aid this integration; while 94% responded that they were aware of the expectation on the part of experts that will be required. In addition, respondent were asked to rate which were of utmost importance and their result were:

(1) Staff professional development,
(2) alleviation of technological roadblocks,
(3) Curricular restructuring, and
(4) Educational reforms. Most of the respondent indicated that the fact that that government has provided the equipment to aid technology integration does not bring about reforms in educational policies.

Summary

A growing number of teachers are very enthusiastic about adopting ICT, though not all of them are aware of its implication but they are quite sure it will equip them well enough with the will-power required to help emancipate their students academically, due to the potentials of these ICT tools. The type of professional development available for teachers who wish to develop their technology integration capacity has undergone some changes overtime. The ***first*** effort is to focus on machine and learning technology skills, which will equip the teachers to move to the next stage.

The ***second*** effort is the realization that technology integration has less to do with technology itself; but deals rather much more, with the approaches to education. Hence, workshops on teaching with technology will help bring about skills development and also account for large-scale transformation in teaching practices – bearing in mind that teachers are being asked to risk two major changes to their practices of teaching and learning namely:

(1) Reformed traditional teaching approaches and roles, and
(2) Technology integration.

The ***Third*** effort is in staff professional development consisting of online mentorship and support that responds to teachers' individual needs as focused on the present case study, the Nigerian educational system.

f. Conclusion

This study contributes to knowledge in four broad ways namely:

(1) its outcome gives a full description of individual, group and organizational adoption patterns of technology for teaching and learning across disciplines at the various school and educational levels, showing the way it can be implemented

(2) it shows some case histories of adoption decisions and experiences of individual teachers,
(3) it picturdes exemplary practices for teaching, learning and research; and (4) shows evidences linking technology integration, engaged students learning and staff professional development.

The significant contribution to knowledge by this investigative study is both theoretical and practical as follows:

- It increases the understanding and diffusion of ICT innovations as well as the application of its theories and conceptual models in education – showing its potential challenges with the encouraging of widespread adoption of ICT integration for teaching/learning to implement technology outcome curricular across subject areas in schools.
- It highlights a systematic documentation of adoption pattern and characteristics of administrators and teachers wiling to integrated ICT with the support of network facilities. The result of the investigation shows that the use of shared instrument for access of widespread information by both teachers and students alike based on the scale of engaged student learning and the stages of technology adoption, will form the foundation for the next step in the planning and implementation processes at each school. This information is useful to all stakeholders in educations.

This mode of teaching and learning in its best practices provides the much-needed images of how ICT integration will be used efficaciously in education for meaningful students learning outcomes – because knowledge of this kind will be useful at the organizational and individual level for the staff professional development in technology integration as well as for further research in such areas.

Recommendations

During the course of this research, some recommendations that were observed and made by the researchers are as follows:

- Government should develop strategies to help fund ICT integration in the Nigerian educational system such as ***CANi*** as well as provide information and infrastructures of these new technologies – bearing in mind that educational reforms do not come about with just the provision of ICT equipments such as computers in schools.

- Staff professional development programs should be organized as we are often and sometimes caught up in "blame the teacher" syndrome – even when adequate schemes for professional development have not been put in place to help equip these teachers as well as redirect their steps towards the emancipation of these students.

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