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# INSTRUCTIONAL ARCHITECTURES AND ELECTRONIC TECHNOLOGY – A MULTIDISCIPLINARY IMPERATIVE FOR NIGERIA

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**Abstract**

*Innovative practices in education continue to pose some serious challenges to teachers who want to discharge their chore to the*

*satisfaction of all stakeholders in education. A significant innovation needed in the Nigerian classrooms is the teacher re-envisioning of self and job. This implies and includes the forging of interdisciplinary relationships that enhance instructional architectures that would amplify and situate electronic technology in the Nigerian classrooms*

**Key words:** instruction, electronic devices, multidisciplinary.

## Introduction

Teachers' Registration Council (2002) describes teaching as a systematic, rational and organized process of transmitting knowledge, attitude and skills in accordance with professional principles. This definition implies that anyone who engages in teaching but does not follow professional principles is not a teacher. The same handbook also describes a teacher as a person who had undergone approved professional training in Educational appropriate levels, capable of imparting knowledge, attitudes and skills to the learner. It is the teacher who, to a great extent, moves educational efforts to the desirable height of effectiveness using acculturation and enculturation principles. The teacher introduces the learner to all tangible and intangible materials within his environment which are needed for his educational growth and survival in life.

Adirika (2013) opines that the Nigerian society has witnessed a new wave in computer usage since the time of President Olusegun Obasanjo. She however laments the colossal failure that were the machines and equipment brought into schools for the teaching of introductory technology in the 1980's as most of such machines remained in their cases and boxes, unused, enexplored and unharnessed. The reasons were not farfetched. The Executive secretary, national Board for Technical Education, Dr. Nuru Yakubu, attributed such failures to the inability of teachers and their classroom teachings procedures to change with the amazing pace being dictated by trends in science and technology. He noted that technology had not affected the Nigerian classrooms much and reiterated the need for teachers, not only to aim at acquiring formal training but also to utilize

and sustain the support from colleagues to help themselves to learn new ways and how best to integrate and use technology in their teaching (Punch, 26 Sept 2006)

### Why bother with electronic devices for teaching and learning?

Electronic technology presents new options, new possibilities and indeed new opportunities for learning. No wonder the National Policy on Education (FRN, 2004) provides not only for the establishment of educational resource centres with multidisciplinary activities but also radio and television educational broadcasting that would form a feature of educational support service system. Governments' purchasing of various electronic and electrical gadgets and technology in order to actualize their benefits is only a first step and indeed a less significant step. The disposition towards acquiring the skills for their effective utilization is of greater importance and incidentally, one of the biggest challenges facing anyone who uses electronic tools because Potherfield (2001) argues that such knowledge is not always easy to acquire.

Adirika (2014) also posits that all teachers may not designate as net generation members because they lack the Information Communication Technology (ICT) skills. They get their children and students to teach them to connect, navigate and utilize digital applications and tools thus making such students and children 'the teachers'. Such role reversal situations may indeed affect psychologically, teacher's confidence levels, in many ways because they see their incompetency thrown directly at their faces not because they did not complete their formal education nor diligently earn their qualifications but because their earnings have been overtaken by emerging situations that also seem to make them obsolete and improperly fitted. The need to re-envision and reposition the teacher for educating in the new age cannot, therefore, be over-emphasized.

The use of electronic technology for teaching can bring topics to life. Electronic discussion tools such as e-mails, conferencing software and online chart services can seed discussion questions before classmates,

can draw out shy students, as well as help to follow up on discussions or questions on readings between classes. The whole idea is to improve learning and teaching.

The improvement of teaching and learning has been identified as problematic (Anyakoha, 2012). Reasons she identified include: lack of instructional technologies, lack of adequate teacher retooling and improvement programmes, ICT accessibility and utilization by students and teachers, non application of new pedagogical models associated with asynchronous teaching in the form of online classes which can be either rescheduled or self-paced for the active engagement of students rather than just on passive reception of information and other related methods. All these call for a review of teaching and the envisioning of the teacher as the sole custodian of knowledge and the skills needed to achieve educational goals. The current trend of large population of students with fewer classrooms and inadequate number of teachers that are common place in the Nigeria educational setting calls for this necessity. Electronic teaching and learning may answer to these needs.

## Some basic issues

From the teaching perspective, instructional media choices are determined by factors such as structural goals, methods, learning tasks, practical constraints, and characteristics of students among others. The teachers' preferences and attitudes may also influence the media that are actually used. The effective teacher however, bothers about issues of simplicity versus complexity; wants to be congruent with modalities as opposed to in-congruencies, bothers about how to cue in students at emphatical points, works to provide students with memory supports using audio/visual methods, makes use of practice/rehearsals that import high fidelity simulations for procedural skills. Making other provisions that account for affective cognitive apprenticeships that result in learning effectiveness to a great extent preoccupies the committed teacher.

Methods are instructional techniques that facilitate learning while media are the means of implementing those methods as well as conveying the material to be learned. Whereas any medium can be rendered ineffective by inappropriate methods; instruction based on sound methods will succeed no matter the medium. Teachers are highly trained in methodology, yet they may possess little control and knowledge in regard to technological gadgets that have evolved after their formative preparations or that are still emerging.

### Instructional Architecture

Millis (2002) identified 4 forms of instructional plans designated architecture to include, receptive architecture, directive architecture, guided discovery architecture and exploratory architecture. Each of these architectures has distinct features and goals which a single teacher cannot adequately and exhaustively answer to anywhere and at anytime. It would be clearer and easily comprehensible to present this thought in a table.

### Table 1: instructional architectures summary

| Architecture | Features | Goals | Other possible participants aside of the teacher |
|---|---|---|---|
| Receptive | Provides linear information – typically with low learner control and few interactions | To inform or motivate performers | Mass Communicator, Counsellor |
| Directive | - Short lessons<br>- Frequent practices<br>- Corrective feedback<br>- Simple to complex | Teaching procedural skills to novices | Technological gadgets peers, experts, minders mass Communicators |
| Guided discovery | - Problem based<br>- Situates learning in job like environment<br>- Uses simulation to compress experience<br>- Errors are encouraged<br>- Support is provided through coaching and expert models. | To build expert-like problem solving knowledge and skills. To accelerate expertise in principle- based domains | Teachers, technological gadgets , experts in various fields and job settings, simulators, analysts, mass Communicators |

| Exploratory | - | High learner control | For reference or | Teachers, |
| | - | Provides rich environment for learners to explore | for training of learners with good self | Counselors Technologists , experts, educational |
| | - | Provides effective navigation for learner orientation | regulatory skills | psychologists |

The architectures are in close relations with how learning happens. Psychologists believe that information enters the brain through the senses. Where attention is directed, the information that is perceived moved into the working memory. The working memory is the main work area for thought, the conscious centre of the brain but its storage capacity is limited so it processes and sends into the permanent storage – the long term memory. Information in this area must be used or practiced to avoid its being lost. The information is thus secured but whenever it is needed, it must be retrieved from the long term memory and brought back into working memory for processing – this is the final goal of testing and training.

Sound instructional methods support and promote the smooth processing of all phases of human information processing. Instructional methods that positively interact with the memory system and processes strongly favour the features of cognitive apprenticeship.

## Features of cognitive apprenticeship

The first feature of cognitive apprenticeship is the situated learning environment. When learners work in actual job contexts, the simulations respond in job realistic fashion. Another feature is the problem-based learning through guided discovery. This allows learners freedom to access various sources of information as well as take various actions to resolve issues using careful construction and sequencing of cases. The third feature, naturalistic feedback and learning from errors allow discussion and judgments on how well outcomes are based on simulations. Errors are seen as opportunities for learning and are encouraged.

Other features are time compression, reflections, replay and collaborative learning. Much as time compression can be provided for in the classroom, the actual use of the computer to compress time and experience is a unique strategy for accelerated expertise. By compressing experience with good instructional support, experience can be built faster – a weeks' work can be compressed into 2 hours of simulation. Reflection and replay encourage reflective practices. They allows for replay of case studies by trying different options and approaches to see how they would work. Collaborative learning on its part embodied all the benefits of learner working in groups to solve problem collaboratively. The use of intranet and internet could be technologically integrated to give the design.

### Interdisciplinary dimensions

The features outlined above have implications for multidisciplinary electronic teaching and learning. Issues that relate to these include the identification and determination of essential media characteristics that would be called into use, taking into account issues of convenience, access and distribution. It is also comforting to consider both the process and the product while engaging in electronic teaching and learning. These do not happen opportunistically from using technology. They are planned and interactively refined. Recognized stages in online community are not taking for granted.

Schrum and Hong (2002) contend that faculty members may know little about how to assist students and students may be ill prepared for the new demands put upon them by emerging technologies used for teaching and learning. Whereas asynchronous learning networks (ALNs), of which computer conferencing and e-mailing tend to establish high levels of activity and responsiveness, there are other important factors that enhance e-tutoring.

Other critical issues bother on questions such as;

When are other teaching/learning needed? Who is involved in what particular activities? What are the people involved like? What is the

current performance? What performance is desired? What are appropriate solutions? Answers to all these questions allude to effectiveness and calls team play into place. A range of experts, personalities and disciplines are directly and indirectly implicated. E-learning and teaching do not just happened. They are carefully planned for and properly designed; teaching/methodologies design teams, learning design teams and subject matter teams are all needed. Within each team are required persons with sound project leadership skills, project managers, instructional designers, graphic designers, desktop publishers, interface designers, video specialists, audio specialists, programmes, multimedia designers, the customers, high performers, representatives from the target group among others.

## Necessary adjustments

Co-operative teaching and learning involves much more than a single classroom practice, whether one looks look at it in terms of regular teaching or from electronic teaching and learning perspective. It is a deep and broad strategy for helping people work together, and to get to learn together. The proponent of cooperative learning, Dewey in (Mayer, 2008) opines that the primary aim of education was to develop socially responsible citizens who could co-operative to solve problems. To Dewey, if students were to become socially responsible adults, they would need to participate in planning and evaluating their learning experience in school. These would make them to empathise with others, respect the rights of others and work together rationally. The challenges of working together and learning together cannot be down played in educational settings and situations. A move away from the totalitarianistic view of the teacher as the custodian of knowledge must be initiated now to save the face of all concerned in the noble profession. Globalization calls for the development of an infrastructure that moves towards universal access to education in order to develop and acquire the transformative power of cooperation for deep teaching, learning and change (Chiu 2008).

Team building and class climate building should be constructively adjusted in educational situations in line with research and new knowledge. Setting the stage for cooperative group work demands compromise, understating and broadmindedness. Structured discussions and interactions that are properly documented would provide reference points on which improvements can be made. A great attention should be paid to group processes. Reflective task structures, positive interdependence and status treatment are focal issues. Practice, dissemination, research and teacher education should be continuous and open.

The objective of every collaboration work on electronic teaching/learning should be focused on helping both teachers and learners to achieve efficient outcomes in relation to predetermined objective. Adjustments in activity identifications, possible constraints for completing the activities should be roundish considered and effected. Role distribution in consideration of specialization and experience must become prominent. Whatever the type of representation or its makeup, respect for feelings of others, their rights and the need to amicably work to resolve problems are paramount. Provision for and adjustments in conceptions of mistakes in educational classrooms should become a feature in classrooms (Mitnik, Raceharren, Nwosbaum and Soto, 2009).

## Conclusion

Constructivism is the foundation of collaborative work. At the core of constructivism is the idea that people can learn from their own experiences, that learning is active and that one can make meaning of the world around him from what he sees, feels, hears, smells, by asking questions, exploring new ideas and evaluating existing knowledge. Adjusting for these in teaching as well as in learning gives credence to e-teaching and learning efforts. Everyone should cease to be passive absorbers of knowledge and information given by others. Active and interactive contributions made to teaching and learning make education a meaningful social process. No aspect of society

should allow its abstention from educational practices. It is important that all reflect, inquire, and contribute to it all. Is education, after all, not a tool for socialization and transformation of society?

## The way forward

In view of current difficulties in the production and recruitment of all necessary staff required for the rapid development of all sectors in the educational enterprise, the federal government of Nigeria is encouraged to adjust her laws and policy provisions to allow for interministerial and interdisciplinary utilization of experts and skills. The measure would give opportunities to teachers and learners, experts and skilled artisans to develop a new network of relationship that would foster cohesion and build understanding among the Nigerian populace.

Revaluation and reconsideration of experts across board and across disciplines would engender smooth interaction among experts. The present situation, in which different experts are placed on varied salary scales from others creates animosity and hinders genuine and positive inter dependence. Status reconsideration and appropriate placement of persons with similar qualifications on a similar salary scale and footing irrespective of whether the person works with the federal, state, local government or private sector would facilitate friendship among a people that are already divided by various issues such as ethnicity, religious dissentions, political affiliations and language distributions.

A new form of rescheduling that would allow face to face time to execute assigned jobs by people from different disciplines should be incorporated in the Nigeria educational setting for the success of electronic teaching and learning processes. Interpersonal relationship that also increase communicative skills, engender trust, motivate leadership capabilities should be enable to thrive for effective good dynamics.

Accountability should be incorporated in such a way that group members have both individual accountability to their part of the overall task as well as group accountability for their completion of the overall assigned tasks. A process of self-evaluation and self criticisms are important. In assessing and criticizing self, one comes to a realization of his roles in the overall success or failure of projects rather than pass the bulk- a trait that must be jettisoned in the Nigerian citizenry in order to achieve a redirection of social menace evident within the milieu.

Almost all students and teachers have computers and cell phones everywhere they are. Technology integration into all learning and educational endeavours now make a natural fit. E-teaching and learning not only enhance teaching and learning but also the creative, critical thinking that moves everyone concerned to the top in terms of desired outcomes. E-teaching and learning also enable the demonstration of lessons in ways that are both interactive and collaborative and keep everyone engaged both physically and mentally. Emerging Technologies can be made partners in Nigeria's new educational environment. They can, and they do make the classroom truly global both in discovery and processes.

Teachers should be trained to acquire the processes of group dynamics that would enable them easily allow others without a feeling of interference or usurpation. Sponsoring seminars, conferences and workshop should be used to achieve these as a first step. Sponsored interdisciplinary workshops, seminars, and conferences would also pave the way for initial rapport before try-outs are effected.

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