INNOVATIONS IN RESEARCH AND PRIMARY EDUCATION IN NIGERIA: ISSUES AND IMPERATIVES

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Abstract

Information communications technology (ICT) has facilitated innovations both in research and education globally. The unfortunate under appreciation of its significance in the Nigerian educational system particularly in teaching at the primary school level gives cause for concern. This paper examines these technological innovations and outlines the available ICT devices that are applicable to primary education in Nigeria and their numerous benefits. The paper indicates that some of the challenges teachers face in this direction stems from computer illiteracy, lack of training, electricity issue, among others, but concludes that an ICT based transformation of the primary education system in Nigeria is imperative as this would reflect a primary education system that has incorporated ICT to some existing 21st century teaching methods already employed to enhance teaching and learning in Nigeria.

Key words: Innovations, Research, Primary Education, Issues and Imperatives

Education is a field that is subject to many fads, and what counts as a good idea varies over time across locations. It is a process that employs methods through which learning or acquisition of knowledge is facilitated. These include skill acquisition, values, beliefs, and habits. Methods employed in education include storytelling, discussion, teaching, training, and direct research. However, according to Afigbo (2006,13),

Education is a crucial technology of technologies in the fundamental sense that it is the means and process by which man ensures the transmission, from generation to generation and from society to society, of what he considers relevant ways and means of knowing and doing at

the mental, societal and material levels. It thus not only helps to create culture, or to preserve it but also to change it.

From the above standpoint, technology is inextricably glued to education such that it seems almost impossible for education to exist without technology or technology to exist without education. At present, most people are persuaded to believe that the key to educational improvement lies in developing a coherent and integrated system for educational administration, focusing on the teacher, the learner, the methodology, the learning situations and evaluation. No doubt, educational improvements depend on researches which yield innovations. In this context,innovations are used to refer to "new ideas, devices, or methods of doing things to bring about reformations".Moreover, innovation is often also viewed as the application of better solutions that meet new requirements, unarticulated needs, or existing market needs. Technology can also be used to mean the knowledge, collection of techniques, skills, methods and processes used in the production of goods or services, or in the accomplishment of set objectives.

Primary education as the first stage of compulsory education ranges between six (6) years to eleven (11) years. It is preceded by pre-school (nursery)education. As the foundation stage of education, primary education is very strategic hence the importance of research and innovations targeted at this level of education.

Research is a careful study of a subject, especially in order to discover new facts or information about it. Research also aims atestablishing or revising a theory, or a plan of action based on the facts discovered (Nwana, 1981 cited in Ifegbo, 2005). The existing problems that demand urgent attention and the desire to solve them always have been the motivating factor in all researches

Research and the application of technological innovations have begun to identify the programme characteristics of competent teachers in teaching and learning processes. However, the big question remains "How many of our primary school teachers are cognisance of these innovations?"

The need for technological innovation has brought about communication revolution and rapid development of Information Communications and Technology (ICT) applications in all areas of life. Therefore, this paper set out to:

1. Identify some of the innovations available to primary school teachers in the English Language, cultural and creative arts
2. Determine the extent to which these innovations have been accessed by teachers in the primary schools.
3. Identify the major challenges posed by these innovations to both teachers and learners at the primary level of education.
4. Suggest measures to overcome such challenges and the way forward.

The Issues: ICT Facilities as Innovations, Types and Usages

Many scholars have defined ICT in various perspectives given their perceptions and the areas of specialization. According to Nwachukwu (2011), ICT is basically an electronic based system of information, transmission, reception, processing and retrieval. Tinio (2002) defines ICT as a diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information. ICT is hereby regarded as a varied set of technological devices used to create new teaching and learning situations by enacting challenges in the real world into the classroom for both teachers and pupils to explore.One of the most significant developments that influences change in education particularly in the present century is the emergence of highly advanced communication technologies.For instance, the internet has emerged as a powerful medium to teach and learn foreign languages. In a study conducted by the centre of Applied Linguistic, it was noted that the use of technology and media has begun to play a heavy role in facilitating language learning in the classroom. With the help of computer software devices, music videos, television shows, films etc, children are readily exposed to foreign languages in the design of ICT-supported material. It is of importance to consider at least three fundamental facts in order to avoid untimely obsolescence: the technology cycle, linguistic content and assistance to learning(MacCarthy, 2002 cited in Okoro, Madubuike & Jaja, 2012,154).

Iwu(2006) defines ICT as the acquisition, processing, storage and dissemination of vocal, practical, textual and numeric information by a micro-electric based communication of computing and telecommunication. In other words, the technological feasibility of a global neighbourhood is no longer in doubt. The technologies are with us and are spreading rapidly and moving the world from analogue to a digital society(global village). Information today is undauntedly assuming the cultural and newest indicator of civilisation, new knowledge and new approaches to every conceivable aspect of human endeavour. Information and Communication Technologies (ICTs) have digitalised various types of information such as texts, sound integers, numbers, and could also integrate into a group such as the multimedia. The term “multimedia” is often used as an adjective to qualify products and technologies that use multiple media (Uduk, 2010, 20).

There are other outstanding and clear examples of integrated ICTs which range from artificial intelligence and the incorporation of the user- tailored interactive interfaces into information products and services; to the all-imposing internet, a connection of interconnected networks all freely exchanging information. The extent of fluidity and non-linearity of this period often characterised as communication revolution tends to pose great socio- economic, sociolinguistic and socio-cultural implications of a dizzy array of these technologies. Specifically speaking,

innovations in all ramifications thrive better and faster on the acquisition and effective use of ICTs. All sectors whether education, tourism, business, research, banking, entertainment, or media rely heavily on the currentwave of technological innovations to explore, to expand and to maximise set objectives.

Therefore,some of the major contributions of ICT in teaching and learning situations could be summarized thus:

i. ICT stimulates learners to learn.
ii. It improves learning through self-discovery.
iii. ICT enhances retention i.e. (concretizes learning).
iv. It helps learners to explore more learning experiences and
v. It reinforces learning by doing

ICT devices that could be used in the classroom as strategies for problem solving according to Browne, Shirville and Whitaker (2008) include:

1. Interactive white board: This device provides touch control of computer applications. This enables the learners to show and illustrate anything that can be on the computer screen. As a visual aid, its interactive nature provides the learners the opportunity to draw, write or manipulate images.
2. Class website: one of the ways to encourage creativity and help pupils to display their work is to create a web page. The moment a web page is designed, the teacher can post home work/assignment or projects for the pupils to access, work and vice-versa.
3. Computer/power point slide presentation: With the computer in the classroom, teachers in primary schools should be able to demonstrate a new lesson before the pupils. Computer can also be used for power point presentation. The learners can even learn at their own pace without the teacher's assistance.
4. Wireless classroom and microphones: The wireless microphone contributes immensely by enabling learners in the classroom to hear their teachers more clearly especially in a noisy environment. The clarity in the teacher's voice enhances understanding of the concept being taught.

However, the fact remains that majority of our primary school teachers are still ignorant of these technologies and so are yet to be ICT compliant. This is because these technologies are hardly made available at the public schools where they could be trained to use them for teaching purposes.

The quality of teaching is a crucial factor in promoting quality assurance in our schools. Effectiveness is the product of a competent teacher. The implication is that a competent teacher should be one who is academically balanced; capable of using appropriate teaching methods, and cares about the welfare of thelearners under him/her.

Anokam (2009) opines that subject matter can only be defined to be well taught when the teacher presents the content correctly. The teaching method employed is an essential factor in making a subject attractive. Subject matters are method selection- restricted. This implies that a teaching method maybe suitable for a topic and unsuitable for another topic.

Teaching methods can be broadly grouped into – Teacher-Centred method and learner-Centredmethod. The teacher-centred approach is not only autocratic but inductive. Examples of this method are lecture method which does not give learnersthe opportunity for asking questions. Rather they are passive learners unlike the learner-centred method which is heuristic, democratic and deductive in principles. Examples include the discovery method, discussion, dramatisation, hands on and hands off, team/project, method among others.Nevertheless, it does not end in the teacher having total mastery of the subject matter but, the knowledge and application of the current pedagogy.

Some 21st Century Teaching Methods

Education in the 21st century can be rightly referred to as being research-based, integrative and interdisciplinary in content. Some 21st century teaching methods according to the constructivists are predictions, concept mapping, graphic organisers, scaffolding, brainstorming, know-want-to-know-learn, peer teaching and learning, think-pair share, jig-saw, field trip, case studies, problem solving, role playing and audio-visual computer aided instruction, collaboration, hands-on-and-hands-off among others. For the scope of this study, only those methods suitable for teaching/learning in the primary school will be explicated below:

i. **Prediction method:** This is most suitable in teaching comprehension passages. The method makes the pupils to think and report as they look at the passage

ii. **Concept mapping:** This method is favourable in the teaching of grammar in language classes. Topics such as parts of speech, sentence types are made more meaningful when concept-mapping method is employed. It acts both as pre-teaching strategy and post-teaching strategy. Pupils in primary schools don't have enough time to copy and read verbose notes but concept mappings are visual illustrations that give a summary of topics. The teacher initiates the map while the learners develop it by their personal contributions.

iii. **Graphic organisers:** These are visual diagrams which help the pupils to retain what has been taught.

Scaffolding method is like a ladder, it is a strategy to get the learner from where he is to the supposed level. In brainstorming, a picture or drawing with objects in different positions could be displayed by the teacher for the learners to task their brain as they participate in the lesson. Know-want-to-know-learn involves what the learner already knows,which he uses to identify what he does not know and wants to know. The area of want to know is the area of need for the learner. The one he does not know and has not learnt becomes a task which he must complete and at the end learning takes place.

Peer teaching and learning is a method whereby strong learners are planted in a group of struggling learners to re-teach what the teacher has taught. The strong learners use the language the struggling learners understand without fright and inhibition in asking questions. This method saves the teacher a lot of time and

it helps in class control. Think pair share groupis a method that is creative and involves critical thinking. The pupils think, as they are paired to share ideas andlearn from one another.

Often, teachers rely on demonstration method to aid comprehension of the content of the lesson. One of the most common ways teachers can accomplish this is by showing instead of just telling; and, by way of computer based displays and experiments. Other things the teachers can use are projectors to display graphics and visual brainstorm webs. The majority of individual learners benefit from this method of teaching despite their learning styles.Primary school pupils needsupported practice especially when reading is taught. Collaboration method makes the teacher to create an activity and then encourage the pupils to work together either in a group or with a partner. This method inspires pupils in problem solving, communication skills and interactive learning. The method is also helpful in determining which areas the pupils need assistance in and which areas they are stronger. Collaboration methods should be followed by group discussions where pupils can converse about their perceptions and experiences.

Also, the hands-off method is a style of teaching in which teachers give their pupils only minimal instructions. They urge their pupils to study independently. This enhances their self-actualisation and critical thinking skills. This teaching style is considered more sophisticated. It works best for pupils in their later years in primary school. Pupils who can take on more responsibilities related to the learning process are ideal candidates for this teaching method. To harness all these, the place of the teacher becomes imperative.

The Imperatives: The Dilemma of the Teacher

It is un-debatable that technology has made an inroad into primary education. For us to effectively enjoy the dividends of ICT devices regarding their impacts on the teaching/ learning process, the inevitability of ensuring that our primary school teachers are trained in ICT applications become compelling. We must meet the challenges of the new technologies as it relates to our primary school teachers. This is because primary schools are the base on which Nigeria's technological emancipation and advancement anchor.

One of the major problems militating against the effective use of some of these technologies in teaching and learning in our primary schools is theteachers' incompetence in ICT skills. Most primary school teachers are computer illiterates. Teachers are indispensable in successful ICT learning. Primary school teachers' incompetence in the use of ICT has made them unwilling to use ICT and integrate it into their teaching programmes. Every primary school teacher should undergo training programmes which complement their performance.

Other areas for competence among primary school teachers are acquisition of in-depth knowledge of the subject matter, enviable personality, sound leadership,

resourcefulness, good class control and management.

Obviously, new technologies have immense force or ability to transform learning within and without the learning environment. For this purpose, primary school teachers need to understand and redefine the intercourse between technologies and improved learning conditions so that bidders of education will not exploit the advantages only for commercial gains.It is instructive to note that technologies build barriers between,and among nations. In some developed countries, schools are supplied with Softwares that develop the generations of illiterate learners, highly advantaged in the technological innovation. But in most developing countries such as Nigeria, it is possible to see primary school administrators with teachers and learners who do not have personal laptops. So, it is expedient to set-up educational priorities for the use of ICT devices with their proven efficacy in teaching and learning subjects like the English Language, Cultural &Creative Arts, and monitortheir implementations. The relevance of introducing technologies in primary schools cannot be underscored. The reason is thatinnovations can in certain situations transcend previous limitations of space and time; increase productivity, enhance special need both remedial learning and extension.

ICT compliance by both the teachers and the learners will have tremendous impact on our learning culture. The new learning habits of young children, shaped by technologies will of necessity be incorporated into new ways of teaching, writing and choosing reading texts.

The efficacy of innovative devices and their applications will gain currency if the primary school teachers as the facilitators of learning are cognisant with their usesfor knowledge impartation.The essence of teaching with ICT devices will solely depend on the teaching methodologies which include:

i. ICT devices allowing the facilitator to focus on the process rather than the product.

ii. They afford learners opportunity for academic excellence.

iii. Teachers have access to internet facilities which enrich their knowledge of subject matters and the pupils gain thereby.

Notwithstanding, mention needs to be made of some factors that hinder the use of ICT devices in most primary schools.

Most primary schools in the urban areas have ICT devices but irregular electricity supply has robbed them the opportunity of utilizing them and so those devices are packed up as decorations.

Majority of teachers in urban and rural areas are not computer literate. Therefore, it becomes impossible for them to use computer either in teaching especially language or cultural and creative arts among others.

iv. Computer and other ICT devices for effective teaching/learning are expensive. So most schools or even their teachers cannot afford them.

Nevertheless, the application of ICT devices does not guarantee or ensure a remedy for all educational challenges.

Poor installation and management can jeopardize the school's resources and desired expectations.

Language learners particularly at early stage of acquiring fluency in the speaking and reading skills, and understandinginnovations in curriculum can prove difficult to convey if taught in a de-contextualized manner.Like all school subjects, ICT has its fair share of technical vocabulary that can be a barrier to learning for some pupils.

ICTs have cultural implications. For instance, language is one of the major factors that hinder the easy assimilation of ICTs by many developing nations. Different texts and programmes are printed and packaged in different countries bearing cultural backgrounds.This can hinder technology because what is prevalent in such countries may not be culturally relevant in Nigeria.Threats to language, traditions and cultural value system as the learners assimilate global ways with other cultures using the communication features all are associated with ICT.

Other limitations of ICT access to both primary school teachers and their pupils apart from cost are licensing and broadband transmission. This is linked directly to social and developmental contexts of the prevalent culture. To this effect, Okoro, Maduwuike and Jaja (2012) recommend Bates (2001) educational criteria for media selections (ACTIONS).

Bates Educational Criteria for Media Selection

A – Access to media

C – Cost of the proposed media

T – Teaching functions of the media in relation to learners goals

I – Interactiveness and user-friendliness

O – Organisational issue

N – Novelty of the media

S – Speed with which changes can be brought about in the media

From Bates' educational criteria for media selection, we rationalize that, rather than being guided by the novelty of the media, technological devices should always be selected on the basis of their end result.

One of the primary roles of education is to help in developing cultures. However, education seeks to change old cultures and to adapt new conditions so that individuals in the society would keep abreast of the social, economic and technical advancement.Some cultures form the basis for education of their nation; therefore, education for cultural development means that education should serve as the formal process of transmitting the culture. This takes place through the process of preservation, dissemination and innovation. For the sustenance of cultural values, the Nigerian policy on education has enshrined mandatory subjects (Cultural and Creative Arts, National Values (Social Studies, Civic Education and Security Education)) in our basic education in which primary education is for the lower and intermediate basic education.

ICT as an Instrument of Enhancing Creative Art

Effectiveness in teaching, learning and creativity depend on how the method and material involved are able to stimulate, motivate and reinforce the learner's natural creative attitude to learning. When a teacher exposes the learner to experiences that will involve more than one sense organ at a time, the learner learns easily. Unless the use of multimedia (ICT) is planned and objectively carried out in the teaching and learning, creativity and divergent thinking may not be enhanced. Teachers in the primary schools should follow this stage for proper integration of technologies into teaching and learning in order to improve creatively in the children.

The Way Forward

Since the primary education is part and parcel of an ICT driven globe, it will be made to really permeate the heart of Nigeria's primary education process. We should undertake a holistic view of ICT, understand its mission and the fact that effective primary schools will serve as its agent of propagation and institutionalization as our way of technological life.

Government should in a transformational spirit, concertedly deal with all bottlenecks such as lack of ICT facilities, epileptic power supply, regular network failures, low internet connectivity, lip service support of ICT, if any etc. that emasculate effective use of innovations in teaching training institutions. Equipping the primary schools including teacher education institutions with ICT centres, well equipped ICT tools and resources including ICT experts will be the educational miracle of the century.

Other constraints that affect the ICT use in the teaching and learning in the primary schools should be taken care of such as inadequate computers and allied accessories for practical classes, unavailability of softwares for practical classes, poor maintenance culture, lack of computer laboratories, and lack of installation of relevant equipment for new technologies.

Government should grant loans to primary school teachers in order to enable them get their personal laptops for researches at home for practice and planning of lessons. They should finance and support in service training of primary school teachers on the use of computers and their components in teaching and learning. There should be regular training, seminars and workshops for primary school teachers on ICT skills acquisition. Primary school teachers should be ready to adopt the new trends as a necessity in carrying out their daily activities as teachers.

Emphasis on capacity building in the use of innovation in language teaching and imparting cultural norms and values call for a paradigm shift in the way contents are designed and delivered. Innovations cannot be imposed or thrive without enabling environment, enabling the teacher and the learners to understand these paradigm shifts. It is imperative to focus on capacity building of teachers so that they can function maximally in the use of innovations.

Conclusions

Information and Communication Technology (ICT) is a generic term that encompasses the processing, storage and transmission of information with the aid of modern technologies (combination of computers, telecommunication accessories and microelectronics). Although, the paper identified some 21st century teaching methods and ICT devices as innovations in the primary schools, it is however disheartening to observe that in spite of the numerous opportunities ICT afford, many teachers and their pupils in the primary schools are still ignorant of computer devices and their applications as well as the 21st century teaching methods. Novelty apart, the end-result should form the basis of consideration in selecting educational goals and their implementation strategies, a priority.The implication of the above is that any nation that succeeds in harnessing the potentials of innovations in research and primary education can expect unprecedented dividends in the future regarding its socio-economic, socio-linguistic, socio-cultural and human development.

It is in this platform, that recent reform programme being implemented in different parts of the world such as Needs' Educational Reform Program (NERP) identifies the place of innovation and research in achieving stated goals of education. ICT has opened new ways of research and human development in educational system of which the primary education is not left out. With the integration of ICT into primary education, the new avenues provided by 21st century technology will be utilized by both educators and learners in their personal research work and group research. Summarily, if some of these technological advances are properly applied in research during planning and delivery of lessons in the classroom, primary school teachers automatically will become constructivists as divergent thinking and collaborative pedagogy that change the role of the teachers from disseminators of information to active learning facilitators will no longer be a mirage but, a reality.

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