

Full Length Research Paper

Appraising the role of information communication technology (ICT) as a change agent for higher education in Nigeria

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Information and communication technologies (ICTs) have become inseparable entities in all aspects of human life. The use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavour within business, governance and civil service. In education, ICT has begun to have a presence but the impact has not been as extensive as in other fields of endeavour. The moving of the world to digital media and information has made the role of ICT in education to become more important and this importance will continue to grow and develop in the 21st century. Information and communication technology (ICT) is an indispensable part of the contemporary world. Infact, culture and society have to be adjusted to meet the challenges of the knowledge age. Undoubtedly ICT has impacted on the quality and quantity of teaching, learning and research in tertiary educational institutions in Nigeria. The various constraints to ICT utilisation as a change agent for higher education must received prominent attention, for the ICT to continue playing its lofty role as a change agent for Nigerian tertiary institutions.

Key words: Information and communication technology (ICT), educational institutions, higher education in Nigeria.

INTRODUCTION

Education is one of the most important needs for the well being of individual and that of the society. Thus, education is a powerful instrument of social, political, and economic progress, without which neither an individual nor a society can attain professional growth.

Information and communication technology (ICT) is an indispensable part of the contemporary world. In fact, culture and society have to be adjusted to meet the challenges of the information age. Information and communication technology (ICT) is a force that has changed many aspects of people's ways of life. Considering such fields as medicine, tourism, travel, business, law, banking, engineering and architecture, the impact of ICT in the past two or three decades has been enormous. The way the fields operate today is vastly different from

the way they operated in the past. But if one looks at education sector, there seems to have a little impact of ICT utilization and far less change, than other fields have experienced. However, a lot of people have attempted to explore this lack of activity and influence (Soloway and Pryor, 1996; Collis, 2002). The pervasive influence of ICT has brought about a rapid technological, social, political and economic transformation, which has paved way to net work society, organised around ICT. The field of education has not been unaffected by the penetrating influence of information and communication technology. However, ICT has immensely contributed to the quality and quantity of teaching and learning and research in traditional and distance education institutions. ICT enhances teaching and learning through its dynamic

interactive and engaging content and provides real opportunities for individualization of instruction. Information and communication technology has the potential to accelerate, enrich and deepen skills, motivate and engage students learning, helps to relate school experience to work practice, helps to create economic viability for tomorrow's workers; contributes to the total development of the institution; strengthens teaching and learning and provides opportunities for connection between the school and the world (Davis and Tearle, 1999).

Kirschner and Weperies (2003) maintained that information and communication technology can make the school more efficient and productive, by organising a variety of tools to enhance and facilitate teachers' professional activities. Yusuf and Onasanya (2004) opined that ICT provides opportunities for school to communicate with one another through e-mail, mailing list, chat room and other facilities. It provides quicker and easier access to more extensive and current information. ICT can also be used to do complex tasks as it provides researchers with a steady avenue for the dissemination of research reports and findings. Honey and Mandinach (2003) advanced three major reasons for information and communication technology in education. They, however, suggested that it is a tool for addressing challenges in teaching and learning situation; a change agent; and central force in economic competitiveness. As a tool for addressing challenges in teaching and learning, technology has the capabilities for delivery, management and support of effective teaching and learning. As a change agent, it is capable of changing the content, methods and overall quality and quantity of teaching and learning, thereby reducing teachers' workload and ensuring constructivist inquiry-oriented classroom. Moreover, ICT a central force in economic and social shifts that has technology skill critical to future employment of today's students. Thierer (2000) pointed out that the role of technology in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy. Experts in the fields of education have agreed that, if ICT is properly used, it holds great promise to improve teaching and learning in addition to shaping work-force opportunities. Thus, this study set out to critically appraise the role of information communication technology as a change agent for higher education in Nigeria.

Statement of the problem

As Nigeria is striving hard to play a leadership role in Africa, particularly in the period of pragmatic and competitive science and technology, there is an urgent need to pay more prominent attention to the improvement of teaching and learning particularly in Nigerian tertiary institutions. This entails the adoption of information, communication technology (ICT) in the institution. The

ICT is an invaluable intervention of this modern time. Its inherent attributes such as accuracy, high speed performance, reliability and capability to store very large amount of data have made it possible for its applicability to all human endeavours including teaching, learning and research in educational institutions. This study is specifically set out to critically appraise the role of information, communication technology as a change agent for higher education in Nigeria. It also examines the implication and challenges of ICT on the development of higher education in Nigeria.

In specific term, this study provides answers to the following research questions:

- i) How efficient is the Information, Communication Technology in performing its lofty role as a change agent for higher education in Nigeria?
- ii) What are the constraints to effective utilisation of Information, Communication Technology as a change agent for higher education in Nigeria?

Research hypotheses

The following null hypotheses were generated to guide the study.

Ho1: There is no significant relationship between the type of tertiary institutions of the academic staff and their level of awareness of the role of Information, Communication and Technology as a change agent for higher education in Nigeria.

Ho2: The gender of the academic staff is not significantly related to their perception of effectiveness of Information, communication Technology utilisation as a change agent for higher education in Nigeria.

RESEARCH METHOD

As the study specifically focuses on the critical appraisal of the role of Information Communication Technology as a change agent for higher education in Nigeria, a descriptive survey research design is adopted for the study. This research design entails collection of relevant data about the problem under investigation, with the aim of describing the nature of existing conditions or identifying the standards against which existing conditions can be compared or determining the relationships that exist between the identified variables in the study.

The study was carried out in six randomly selected tertiary educational institutions in South west, Nigeria. These include two Universities, two polytechnics and two Colleges of Education. A structured questionnaire titled Information Communication Technology as a change Agent Questionnaire was designed for the study. The reliability of the instrument was determined through test-retest method. A correlation coefficient of 0.87 was obtained, using Pearson Product Moment Correlation, indicating that the instrument was reliable. The questionnaires were administered to fifty members of academic staff in each of the six sampled tertiary institutions, making a total of three hundred questionnaire administered.

Table 1. Appraising the Role of Information, Communication Technology as a change agent for higher education in Nigeria.

The role of ICT as a change agent	Efficiently performed		Inefficiently performed	
		%		%
Providing opportunities for individualisation of instruction.	217	90.4	23	9.6
Relating school experience to work practice	126	52.5	114	47.5
Creating opportunities for the institutions to communicate with one another through e-mail, mailing list, chat room and so on.	240	100.0	0	0
Provides easier access to more extensive and current information	240	100.0	0	0
Provides researchers with evidence for the dissemination of research report and findings	231	96.2	9	3.8
Changing content, methods, and overall quality and quantity of teaching and learning.	180	75.0	60	25.0
Ensuring constructivist inquiry oriented lecture room.	156	65.0	84	35.0
Enhancing lecture delivery and scheme of work planning.	186	77.5	54	22.5
Keeping records of students grades.	240	100.0	0	0.0
Providing opportunities to work with interaction whiteboard in the lecture room.	190	79.2	50	20.8
Prompt computation of examination results	240	100.0	0	0.0
Ability to create, saves, edits, and change worksheets.	240	100.0	0	0.0

Table 2. Constraints to effective Utilisation of Information, Communication Technology as a change agent for higher education in Nigeria.

Constraints	Agree	%	Disagree	%
Inadequate computer trained and certificated teachers	232	96.7	8	3.3
Poor funding	240	100.0	0	0.0
Irregular power supply	215	89.6	25	10.4
Prohibitive cost of ICT equipment	221	92.1	19	7.9
Lack of relevant software	187	77.9	53	22.1
Low awareness of application of Information Communication Technology to teaching and learning	38	15.8	202	84.2
Alienating of the child from his socio-cultural background	24	10.0	216	90.0

However, only 240 representing 80% of the questionnaire were duly completed and returned and the data analysis was based on 240(80%) duly completed and returned questionnaires. These include 85 from the Universities, 75 from the Polytechnics and 80 from the Colleges of Education. The hypotheses raised to pilot the study were tested using chi-square at 0.05 level of significance.

RESULTS

Research question 1: How efficient is the Information Communication Technology in performing its lofty role as a change agent for higher education in Nigeria?

As clearly indicated in Table 1, all the respondents 240 (100%) affirmed that ICT has effectively performed its lofty role as a change agent for higher education in Nigeria by creating opportunities for the institutions to communicate with one another through e-mail, mailing list, chat room; providing easier access to more extensive and current information; keeping records of student grades; ensuring prompt computation of examination

results through the use of spread sheets and providing opportunities to create, edit, save and change worksheets, lecture plans and other computerised resources. Moreover, over 65.0% of the academic staff declare that the ICT has been efficiently performing the role of creating opportunities for individualisation of instruction; serving as an avenue for the dissemination of research reports and findings; capable of changing the content, method and overall quality and quantity of teaching and learning; ensuring constructivist inquiry-oriented lecture room; enhancing lecture delivery and scheme of work planning; and providing opportunities to work with interaction white board in the lecture room.

Research Question 2: what are the constraints to effective utilisation of information, Communication Technology as a change agent for higher education in Nigeria?

As clearly indicated in Table 2, effective utilisation of Information, Communication Technology as a change agent for higher education in Nigeria is being beset with a

Table 3. The institutions of the academic staff and their level of awareness of the role of Information Communication and Technology as a change agent for higher education in Nigeria.

Higher institutions	Level of awareness of ICT Role			Total	Degree of freedom	Calculated chi-square	Chi-square table	Level of significance	Remark
	High awareness	Low awareness	Unaware						
Universities, polytechnics and colleges of education	68*(64)	12(14)	5(7)	85					Not sig.
		12(12)	8(7)	75					
	55*(56)								
	57*(60)	15(13)	8(7)	80	4	1.87	9.49	0.05	
Total	180	39	21	240					

*Figures in parentheses are the expected values.

Table 4. The gender of the academic staff and their perception of effectiveness of Information, Communication Technology utilisation as a change agent for Higher Education in Nigeria.

Gender	Staff perception of effectiveness of ICT utilisation			Total	Degree of freedom	Calculated Chi-square	Chi-square table	Level of significant	Remark
	Highly effective	Just effective	Not effective						
Male Academic Staff	72*(83)	68*(57)	8*(8)	148	2	9.32	5.99	0.05	Significant
Female	62*(51)	25(36)	5(5)	92					
Total	139	93	13	240					

*figure in parentheses are the expected values.

myriads of constraints. Such constraints include inadequate computer trained and certificated teachers with 96.7% positive response; irregular power supply with 89.6% positive response; prohibitive cost of ICT equipment (92.1%) and lack of relevant software (77.9%). while all the respondents 240 (100%) declared that poor financial support for computer education in the institutions has been a serious constraint to effective utilisation of Information Communication Technology as a change agent for higher education in Nigeria. However, the minority of the respondents held the view that low awareness of application of Information Communication Technology to teaching and learning and possibility of ICT utilisation, alienating the child from his socio-cultural background are not constraints to effective utilisation of ICT as a change agent for higher education in Nigeria.

Ho1: There is no significant relationship between the type of tertiary institutions of the academic staff and their level of awareness of the role of Information, Communication and Technology as a change agent for higher education in Nigeria.

In Table 3, the calculated chi-square value obtained was 1.87, while the Chi-square table value was 9.47 at 0.05 level of significance and with four degrees of freedom. The result indicates that there is no significant relationship between the type of tertiary institutions of the academic staff and their level of awareness of the role of ICT as a change agent for higher education in Nigeria.

Hence the null hypothesis is therefore retained. It is quite obvious in Table 3 that over 73.0% in each of the tertiary institutions indicated high awareness of the role of ICT as a change agent for higher education in Nigeria.

Ho2: The gender of the academic staff is not significantly related to their perception of effectiveness of Information, communication Technology utilisation as a change agent for higher education in Nigeria.

In Table 4, the calculated Chi-square value obtained was 9.32, while the Chi-square table value was 5.99 at 0.05 level of significance and with two degrees of freedom. The result indicates that there is a significant difference in the gender of the academic staff and their perception of effectiveness of ICT utilisation as a change agent for higher education in Nigeria. Hence the null hypothesis is therefore not retained. It is quite obvious in Table 4 that 62 representing 67.4% of the entire female academic staff declared that ICT utilisation has been highly effective as a change agent for higher education in Nigeria. While 72 (48.6%) of the male academic staff affirmed that ICT utilisation has been highly effective as a change agent for higher education in Nigeria.

DISCUSSION OF FINDINGS

For many years courses were being written around

textbooks, teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the contents. Conventional teaching has emphasised content and contemporary settings are now favouring curricula that promote competency and better performance. The curricula now place high premium on capabilities and how the information and communication technology could be used than what the information and communication technology is. Moreover, the moves to competency and performance-based curricula are well supported and encouraged by emerging instructional technologies (Stephenson, 2001). He went further to say that such curricula tend to require; access to a variety of information sources; access to a variety of information forms and types; student-centred learning setting based on information accessed; learning environment centred; problem centred and inquiry-based activities; authentic settings and teachers as coaches and mentors rather than content experts. ICT is able to provide strong support for all these requirements and there are now many outstanding examples of world class settings for competency and performance-based curricula that make use of the affordance of these technologies (Oliver, 2000).

Oliver (2000) stressed that another way in which emerging ICTs are impacting on the contents of education curricular, stems from the ways in which ICTs are dominating so much of contemporary life and work. Mccausland et al. (1999) affirmed that there has emerged a need for educational institutions to ensure that graduates are able to display appropriate level of information literacy, the capacity to identify, locate and evaluate relevant information in order to engage with it or to solve a problem arising from it. The drive to promote such development stems from the general movement among institutions to ensure that their graduates demonstrate not only skills and knowledge in their subject domains, but also general attitude, and generic skills. However, the growing use of ICTs as tools of everyday life has seen that pool of generic skills expanded in recent years to include information literacy and it is highly imperative that future development and technology applications will ensure that this set of skills are steadily.

The impact of ICT on students' learning and supporting what is being learnt in schools and universities cannot be over-emphasised. ICT is supporting changes to the way students are learning as they move from content-centred curricula to competency-based curricula; associated with the move from teacher-centred form of delivery to students centred forms. Through the use of ICT, facilitated approaches, competency learning setting now encourage students to take responsibility of their own learning. However, in the past students had become very comfortable to learning through transmissive modes. Students have been trained to let others present to them the information that forms the curriculum. Moreover, with the emerging of ICT as an instructional medium many of the

strategies employed by both teachers and students in the learning process would be susceptible to rapid changes.

Technology has the capacity to promote and encourage the information of education from a very teacher directed enterprise to one which supports more student centred models. Jonassen and Reevegan (1996) support this assertion by saying that students using ICTs for learning purpose become immersed in the process of learning. The influence of the technology on supporting how students learn will continue to increase. Shavinina (2001) maintained that ICT developed human mental resources, which allow people to both successfully apply the existing knowledge and produce new knowledge. Oliver (2000) stressed that in the past, educational institutions have provided little choice for students in terms of the methods and manner in which programmes have been delivered to them. With the application of ICT, many options and choices are being provided as many institutions and students are creating competitive devices for themselves through the choice adopted by them. These choices now extend from when students can choose to learn to where they can learn.

Many educational institutions have been offering programmes at a distance for many years. Also there has been a vast amount of research and development associated with establishing effective practices and procedures in off-campus teaching and learning. Distance learning is a method of learning at a distance rather than in a classroom situation.

The use of ICT has extended the scope of this activity, as the off-campus delivery has been an option for students who could not afford regular programmes. Today, many more students are able to make this choice through technology-facilitated learning setting. More and Kearsley (1996) stressed that the scope and extent of this activity is demonstrated in the following ways:

- i) That in many instances traditional classroom learning has given way to learning in work-based setting with students able to access courses and programmes from their work place.
- ii) That the communication capabilities of ICT provide opportunities for many learners to enrol in courses offered by external institutions, rather than those situated locally.
- iii) That the freedoms of choice provided by programmes that can be accessed at any place are also supporting the delivery of programmes with units and courses from a variety of institutions. There are now countless ways for students completing undergraduate degree programmes.

Furthermore, in the year of computers and web networks the pace of impacting knowledge is very fast and one can easily be educated. One can study whenever he wishes irrespective of whether it is day or night and irrespective of being in Nigeria or in Canada because of the emergence of ICT. Students are starting to appreciate the

capability to undertake education anywhere, anytime and anyplace. Supporting this development Young (2002) stressed that the flexibility in the use of ICT has heightened the availability of just-in-time learning and provided learning opportunities for many more learner who previously were constrained by other commitments.

Thus, the continued and increase use of ICTs in education in years to come, will serve to increase the temporal and geographical opportunities that are being currently experienced.

Constraints to effective utilisation of ICT as a change Agent for Higher education in Nigeria

There have been a number of factors affecting the utilisation of ICT in education across the nations. Such factors include inadequate funding to support the purchase of the ICT facilities, lack of training in the use of ICT facilities, teaching personnel's lack of motivation and the need among teachers to adopt ICT as teaching tools (Starr, 2001). However, in Nigeria, the political conditions in the past thirty years give no room for continuity in ICT utilisation in schools. Over the years, political situations in Nigeria have been used to entrench mediocrity, corruption in high places, misplace of priority and poor consumer culture have affected the use of ICT in the education sector. Oliver and Short (1997) maintained that efforts have been strengthened to adopt ICT into classroom and learning settings. Such concerted efforts include a growing need to explore efficiencies in terms of programme delivery; the opportunity for flexible delivery provided by ICTs; the capacity of technology to provide support for customized educational programmes to meet the needs of individual learners and growing use of the internet of World Wide Web (www) as a tool for information access and communication. The various constraints to ICT utilisation as a change agent for higher education in Nigeria are discussed as follows:

- (i) **Inadequate computer trained and certificates teachers:** The absence of trained teachers in computer to teach practical aspects of computer skills militate against proper utilization of ICT in Nigerian higher institutions. Large number of lecturers is computer illiterates; and such lecturers would find it extremely difficult to deliver the appropriate education and training required by the information age of the 21st century for their students.
- (ii) **Poor funding:** The overall educational system in the country is underfunded. Therefore, available funds are used to solve more urgent and important needs of the institutions. Low level of funding has resulted into inadequate ICT facilities in schools. This situation has been a major constraint to making Nigerian educational institutions ICT compliance.
- (iii) **Irregular power supply:** Power supply all over the country is epileptic. If electricity supply is not stable and

constant, it is difficult to keep ICT equipment and facilities such as computers and their accessories functioning properly. This problem also denies the rural dwellers the benefit of using ICT.

(iv) **Cost of equipment:** The cost of equipment in a country like Nigeria with a battered economy is very high. Apart from the basic computers, other cost associated with peripherals such as printers, monitors, papers, modem, extra disk drives, and other softwares are beyond the reach of most higher institutions in Nigeria. Also most of these institutions cannot avoid the exorbitant internet connection fees.

(v) **Lack of Relevant Software:** Teaching with ICT facilities is a onerous task without up-to-date equipment and supplementary materials. According to Salomon (1989), there are clear indications from many countries that the supply of relevant and appropriate software is a major obstacle obstructing wider application of the computer.

Conclusion

This study has sought to appraise the role of ICT as a change agent for higher education in Nigeria. The findings indicated that ICTs have significantly impacted on educational practice in Nigeria, and such impact would grow considerably in years to come, if the various problems hindering effective utilisation of ICT as a change agent for tertiary education are properly ameliorated. Undoubtedly, ICT would become a strong agent for change in many tertiary educational institutions in Nigeria.

RECOMMENDATIONS

Learning should become more relevant to stakeholders' needs, learning outcomes should become more deliberate and targeted. While learning opportunities should be diversified in terms of what is learnt and who should learn. Also the quality of programmes as measured by fitness for purpose should continue to grow, if the stakeholders perceive the various educational programmes as meeting their needs and expectations. Moreover, ICTs serve to provide the means for activities to realize the potentials in human resources. Furthermore, adequate funds must be provided to initiate, develop, promote, review and implement ICT policies in the educational sector to bring about an improvement on ICT utilisation, through computer apprentices courses taught in Nigerian tertiary institutions.

In this period of economic recession, the price of ICT equipment and materials will continue to be astronomical. It becomes highly imperative for all stakeholders of education to entice industrial establishments, companies, politicians, big businessmen and entrepreneurs, non-governmental organisations and the community at large to assist the institutions in the provision of ICT equipment

and materials and well-furnished computer laboratories.

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