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The Need for Integration of Information and Communication Technology (ICT) into Teacher Training Programmes in Nigeria

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Abstract

Information and Communication Technology (ICT) is a major factor in shaping a new global economy and producing rapid changes in society. In order to function in this new world economy, students and their teachers have to learn to deal with large amount of information. This entails the analysis of such information and making decisions based on the result of the analysis. In order to help students achieve these capabilities, the classroom teacher must be knowledgeable in the use of ICT tools. The teacher is

responsible for creating a conducive classroom environment and preparing the learning opportunities that facilitate students' use of technology to learn, communicate and develop knowledge product. It is therefore, critical that all classroom teachers are prepared to provide their students with these opportunities. This paper therefore, sets out to highlight the importance of ICT and the need to integrate same into the teacher training programmes in Nigeria.

Key words: Information and Communication Technology (ICT), Integration, Teacher training programmes and Classroom environment.

Introduction
In recent times, ICT tools have basically changed the way people communicate and do business. They have caused great transformation in several sectors of the society, such as agriculture, industry, business, medicine, engineering and so on. There is also the prospect of ICT transforming the nature of education, that is, where and how learning takes place and the roles of both students and teachers in the learning process. Student teachers should experience the use of ICT in their programme because the brightest promise of technology in education is as a support for new, innovative and creative forms of teaching and learning (International Society for Technology in Education (ISTE), 2000). Learning is a social process. The communal content of knowledge and learning is beginning to be rediscovered, as evidenced by the rapid growth of quality circles and computer-supported collaborative work in business, government, medicine and higher education. Therefore, Nikolov (2007) identified an urgent need for development of new ICT-enhanced competences for teachers. As computer hardware and software become available to an increasing number of schools, more attention needs to be given to the capacity building of the key transformers in this process, namely, teachers.

As Vygotsky (1978) noted, students learn best in collaboration with peers, teachers, parents and others when they are actively engaged in meaningful, interesting tasks. ICT provides opportunities for teachers and students to collaborate with others across the country and across the globe. ICT also provides new tools to support this collaborative learning in the classroom and online (Rasku-Puttonen, Etelapelto, Arvaja and Hakkinen, 2003).

ICT places on educational institutions a responsibility to play an important role in the transformation of education otherwise, the nation will be left behind in the rapid technological change in the world. To obtain the full

benefits of learning, it is necessary that pre-service and in-service teachers have basic ICT skills and competencies.

The need for ICT in teacher training programmes

From experience, much of our present learning enterprise remains "information-oriented", emphasizing that students reproduce knowledge rather than produce their own knowledge. It also remains teacher-centred. Many still see the role of the teacher as a dispenser of information and the role of a student as a passive receiver, storage and repeater of the transmitted information. Teachers continue to rely on old lecture notes, textbook readings and fill-in-the worksheet practices that reduce students to passive recipients of information and fail to develop their thinking skills. However, as observed by Sandholtz, Ringstaff, and Dwyer (1997), a shift from teacher-centred instruction to learner-centred instruction is needed to enable students acquire the new 21st century knowledge and skills. On their part, Newby, Stepich, Lahman and Russel (2000) observe that the role of the teacher will change from knowledge transmitter to that of learning facilitator, knowledge guide, knowledge navigator and co-learner with the students. They further observe that the new role does not diminish the importance of the teacher but requires new knowledge and skills. Students will have greater responsibility for their own learning in this environment as they seek out, find, synthesize and share their knowledge with others. ICTs provide powerful tools to support the shift to student-centred learning and the new roles of teachers and students.

As noted in the UNESCO World Education Report (1998), the young generation is entering a world that is changing in all spheres; scientific and technological, political, economic, social and cultural. The emergence of the knowledge based society is changing the global economy and the status of education. There is growing awareness among policy makers, business leaders and educators that the educational system designed to prepare learners for an agrarian or industrially-based economy will not provide students with the knowledge and skills they will need to thrive in the 21st Century's knowledge-based economy and society. The report further noted that the new knowledge based global society is one in which the world's knowledge-base doubles every two to three years; seven thousand scientific and technical articles are published each day; and data sent from satellites orbiting the earth transmit enough data to fill 19 million volumes every two weeks.

Kopper (2004) observed that the need for ICT can be seen from the fact that the quality of information available in the world, much of it relevant to survival and basic well-being, is exponentially greater than that available only a few years ago, and the rate of its growth is accelerating. The resultant effect is the need to sieve such a large amount of information in order to communicate effectively in the modern world. As is the case for the other sectors of the wider economy and society, education will need to come to terms with the new technology. This could require substantial public and private sector investments in software research and development, purchase of hardware and refurbishment of schools.

The UNESCO World Education Report (1998) notes that the new technology challenge traditional conceptions of both teaching and learning and by reconfiguring how teachers and learners gain access to knowledge, have the potential to transform teaching and learning processes. ICT provides an array of powerful tools that may help in transforming the present isolated, teacher-centred and text-bound classrooms into rich, student-focused, interactive knowledge environment. To meet these challenges, schools must embrace the new technology and appropriate the new ICT tools for learning. To accomplish this goal requires both a change in the traditional view of the learning process and an understanding that the new digital technologies can create new learning environments in which students are engaged learners, able to take greater responsibility for their own learning and constructing their own knowledge.

According to Hsiao (1999), it is clear that ICTs can provide powerful tools to help learners access vast knowledge resources, collaborate with others, consult with experts, share knowledge, and solve complex problems using cognitive tools. He further observes that ICTs also provide learners with powerful new tools to represent their knowledge with text, images, graphics and video. ICT tools can also be used to make students' tacit knowledge public and to help them develop meta-cognitive skills and become more reflective and self-regulated learners (Schoenfeld, 1987). When ICT is positively and consciously designed and integrated into the teacher training programmes, it will contribute to meeting defined global learning needs. Research has shown that success in the use of ICT in education depends largely on the ability of teachers to integrate ICT into the teaching process. Therefore, training teachers to be able to use ICT is crucial for achieving improved educational outcomes with ICT (Belawati, 2004).

For ICT to be integrated into teacher training programmes, policy makers must find the necessary resources no matter how expensive. However, in poor countries like ours, international cooperation is needed if the stage for ICT must be set. When the importance of ICT in the developmental push of a nation is realized, it will be difficult for educational policy makers to resist finding the necessary resources needed for its introduction into the educational system. According to UNESCO World Education Report (1998), locating and making available such resources may involve the cooperation of international communities, otherwise, the poorest countries of the world (including Nigeria) will fall further behind the developed countries. The report therefore observed that if this situation continues even parents and the public may not accept the fact that our education should be less well equipped with the new technologies as obtained in other areas of social and economic activities.

The need for integration of ICT into teacher training programmes in Nigeria cannot be over emphasized. As observed by the National School Board Association (2002), the challenge confronting our educational systems is how to transform the curriculum and teaching-learning process to provide students with the skills to function effectively in this dynamic, information-rich and continuously changing environment. According to their report, we should not forget that graduates of secondary schools in industrialized nations have been exposed to more information than their grandparents were in a life time and that there will be as much change in the next three decades as there was in the last three centuries. The needed change cannot be achieved without a similar transformation in teacher training programmes in Nigeria.

Planning the integration of ICTS into teacher training programmes
Curriculum content
For effective integration of ICTs into teacher training programmes, the International Society for Technology in Education, ISTE (2000) requires that such programmes should aim at preparing classroom teachers to-

- demonstrate introductory knowledge, skills and understanding of concepts related to technology.
- demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.
- design developmentally, appropriate learning opportunities that apply technology enhanced instructional strategies to support the diverse needs of learners.

- apply current research on teaching and learning with technology when planning learning environment and experiences.
- identify and locate technology resources and evaluate them for accuracy and suitability.
- plan for the management of technology resources within the content of learning activities.
- plan strategies to manage student learning in technology enhanced environment.
- facilitate technology enhanced experiences that address content standards and students technology standards.
- use technology to support learner-centered strategies that address the diverse needs of students.
- apply technology to develop students' higher order skills and creativity.
- manage student learning activities in a technology enhanced environment.
- apply technology in assessing student learning of subject matter using a variety of assessment techniques.
- use technology resources to collect and analyze data, interpret results and communicate findings to improve instructional practice and maximize student learning.
- apply multiple methods of evaluation to determine student's appropriate use of technology resources for learning, communication and productivity.
- use technology resources to engage in on-going professional development and life long learning.
- continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.
- apply technology to increase technology, use technology to communicate and collaborate with peers, parents and the larger community in order to nurture students' learning.
- model and teach legal and ethical practice related to technology use.
- Identify and use technology resources that affirm diversity.
- Promote safe and healthy use of technology resources.
- Facilitate equitable access to technology resources for all students.

Jung (2000) suggests the following programme formats as keys to the success of ICTs integration:

- provide a short foundation course that focuses on hands-on information technology experience as the initial stage of pre-service training (such a course should focus on applying information technology skills to achieve pedagogical objectives rather than teaching information technology skills in isolation)
- provide more advanced information technology courses as elective for students who need or want to develop more advanced information technology-based pedagogical skills.
- integrate information technology components into all of the subject matter areas such as mathematics, social studies, english, and so on, that students have a role-model for information technology-integrated teaching and learning.
- design information technology courses in such a way that students have the opportunity to produce information technology-based instructional learning materials themselves and share outcomes of the course with others.

According to Plomp, ten Brummelhuis, and Pelgrum (1997), the use of ICTs as part of the learning process can be subdivided into three different forms: as object, aspect, or medium

- **As object,** one refers to learning about ICTs as specific courses such as 'computer education'. Learners familiarize themselves with hardware and software including packages such as Microsoft Word, Microsoft Excel and others. The aim is computer literacy.
- **As aspect,** one refers to applications of ICTs in education similar to what obtains in industry. The use of ICTs in education, such as in computer-aided design and computer-aided manufacturing, are examples.
- ICTs are considered as a **medium** whenever they are used to support teaching and learning. The use of ICT as a medium, though rare because of availability of resources, is what this paper advocates.

Pedagogy
Another important aspect of integrating technology in the curriculum is pedagogy. When implementing the pedagogical competencies for infusing technology, the local context within which the teacher operates, his individual approach to teaching and his knowledge of the subject discipline must be paramount. Teachers move through stages as they adopt ICTs. Initially, the teacher adopting technology applies it simply as a substitute for

current teaching practice where technology is not used. The adaptation of ICTs by teachers should challenge and support changes in teaching practice, building upon individual pedagogic expertise. As teachers' pedagogic practices with new technologies continue to develop, and organizational support and access to ICT grows, it becomes possible to move beyond the adaptation of ICTs applications that fit with existing practice. Transformation of the educational process will start to emerge and may move toward more student-centred learning environments.

Technical issues

As stated by ISTE (2000), the technical issues regarding integration of ICTs into the curriculum include the technical competencies and provision of both technical infrastructure and technical support for technology use throughout the curriculum. Technical competencies of the individual teachers are perhaps the most obvious but perhaps the least important in the long-term because the use of technology should ultimately become transparent. When technology is robust and used competently, it moves from the foreground to the background and remains essential. However, there is the realization that the lack of technology competence, infrastructure and technical support can create barriers to access the reliability resulting in diminished support for the curriculum. A modern teacher should therefore be able to use and select from a range of ICT resources to enhance personal and professional effectiveness; and be willing to update skills and knowledge in the light of new developments.

Recommendations

Thus far, the need for integration of ICT into teacher training programmes has been highlighted the principles and process enumerated. In this section we give our views on what should be done in the short and long term to further enhance the integration of ICT into teacher training programmes.

> ➢ Simply providing the technology for learners and teachers is not enough. The type and level of access is also important. ICT will improve learning very little if teachers and students have only rare and occasional access to the tools for learning. Reasonable access to ICT has been shown to be important for the acquisition of competence with hardware and software, especially for teachers. For example, provision of portable computers (Laptops) is an important strategy for ICT teacher education. Teachers with portable computers can use them for both teaching in school and for other

professional activities elsewhere. This is an area that needs to be considered seriously if ICT must thrive successfully in the educational system of our nation.

➢ We are of the same opinion with the UNESCO document, Teacher Education Through Distance Learning (UNESCO, 2001), that there should be interactive radio for a professional development model in which radio programmes provide daily half-hour lessons introducing teachers and pupils to ICT support teaching and learning. This model will reach a wide audience of both teachers and students at the same time.

➢ One approach that encourages collaboration between the teacher preparation programme and the community is the formation of computer clubs for students interested in computers and education. This approach works well where computing resources are limited. Care must however be taken to ensure that the emphasis is on education rather than on games or competitions.

➢ Government should offer ICT professional development services to subject teachers rather than concentrating on the hiring of ICT teachers only. The focus should not be solely on technology skills but on how to apply these skills into the teaching learning situations.

➢ We consider leadership as one of the most important factors in the successful integration of ICTs into the school's instructional practices and curriculum. Without effective supportive leadership, changes in the teaching-learning process and widespread effective uses of technology in learning are not likely to occur. The government should therefore play leadership role and make provision for all resources needed for this great transformation.

➢ To accomplish its goals, teacher education institutions must collaborate with primary and secondary teachers and administrators, national or state educational agencies, teacher unions, business and community organizations, politicians and other stake holders in the educational system.

Conclusion

For an educational system to cope with modern technological advancement, schools and classrooms must have teachers who are well equipped with technology resources and skills and who can effectively teach the necessary subject matter content while incorporating technology concepts and skills into the learning process. Information and Communication Technologies

(ICTs) in education can only be transformative if teachers can use technology to improve students' learning. It is, therefore, necessary that teacher preparation programmes should provide technology-rich experiences during teacher training programmes. To achieve this, the professional development of teacher educators in the area of ICT integration is essential. Unless teacher educators are able to effectively integrate ICT in their own classes, it will be difficulty prepare a new generation of teachers who will effectively use the new tools for teaching and learning.

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