



ABSTRACT

Information and communication technologies (ICT) have become commonplace entities in all aspects of life. Across the past years the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavour within business and governance. Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. The use of ICT in education lends itself to more

INFORMATION AND COMMUNICATION TECHNOLOGY: A PARADIGM SHIFT IN THE 21ST CENTURY TEACHER EDUCATION

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INTRODUCTION

The 21st century is the age of Information and Communication Technology. All over the globe, there is a trend to use ICT in the teaching learning process. The teacher and learner must gain access to technology for improving learning outcomes. Educational reforms include successful designing and implementation of ICT in teaching learning process, which is the key to success (Ajegbelen, 2016). It involves the use of computers, computer software and other devices to convert, store, and process, transmit and retrieve information and includes the services and application associated with them.

ICTs stand for Information and Communication Technologies and is defined by Awe (2021), as a “diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information.” These technologies include computers, the internet, broadcasting technologies (radio and television), and telephony (UNESCO, 2002).

The term, Information and Communication Technologies (ICTs) refers to forms of technologies that are used to create, store, share or transmit, exchange information. This broad definition of ICT includes such technologies as: radio, television, video, DVD, telephone, satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as videoconferencing and electronic mail (UNESCO, 2002).

Information and Communication Technology is a collective term for various technologies involved in processing and transmitting



student-centered learning settings. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century. ICT helps in improving the quality of education stating that information and communication technology is an important instrument that can transfer the present isolated, teacher- centered and book-centered learning environment into a student –centered environment. ICT can change the traditional concept of learning process and the components of ICT should be integrated in the education programme in such a way that teaching should be enabled to face the new demands and improve the efficiency and effectiveness of education at all levels in both formal and non-formal settings. Thus, we must accept the new paradigm and technology in teaching learning process. Educational institutions need to develop strategies, plan to improve teaching-learning process and ensure that all teachers are well prepared to use the new tools for learning. The emergence of the knowledge-based society is changing the global status of education. Now it is the time to develop a new knowledge-based global society. In developing countries like Nigeria, there are many untrained teachers in this area. The new ICT would be able to reach these teachers and can provide quality education all around the globe.

Keywords: Information, Communication, Technology, Teacher, Education, Paradigm, Shift

information. ICT has not only enabled us to work quickly, but also provides relevant and sufficient data for making appropriate decision. Thus, ICT can be defined as the use of hardware and software for efficient management of information, that is. storage, retrieval, processing, communication, diffusion and sharing of information

ICT in Teacher Education in the 21st Century

Technological advancement has contributed greatly to the acceleration of human progress in the recent past. Education systems around the world are under increasing pressure to use the new information and communication technologies to teach the students, the knowledge and the skills they need in the 21st century. With the emergence of new technologies, there is a paradigm shift in the present teaching profession, which is evolving from an emphasis on teacher centred and teacher-based instruction to student-centred, interaction learning (Folayan and Folayan, 2016). This is made possible through the role of ICT in education. Through the ongoing and effective use of technology in the schooling process, students have the opportunity to acquire important technology capabilities. The key individual in helping students develop those capabilities in the classroom is the teacher. Garba and Alademerin (2014) and Adu and Galloway (2015), asserts that the teacher is responsible for establishing the classroom environment and preparing the learning opportunities that facilitate students' use of technology to learn, and communicate. Consequently, it is critical that all classroom teachers are prepared to provide their students with these opportunities. Both professional development programs for teachers currently in the classroom



and programs for preparing future teachers should provide technology rich experiences throughout all aspects of the training. Today's classroom teachers need to be prepared to use technology and knowing how that technology can support student learning. Schools and classrooms, both real and virtual, must have teachers who are equipped with technology resources and skills and who can effectively teach the necessary subject matter content while incorporating technology concepts and skills. Interactive computer simulations, digital and open educational resources, and sophisticated data-gathering and analysis tools are only a few of the resources that enable teachers to provide qualitative learning (Maphalala and Adigun, 2020). ICTs are a major factor in shaping the new global economy and producing rapid changes in society. Within the past few decades, the new ICT tools have fundamentally changed the way people communicate and do business. They have produced significant transformations in the industry, agriculture, medicine, business, engineering and other fields. They also have the potential to transform the nature of education, that is, where and how learning takes place and the roles of students and teachers in the learning process. Teacher education institutions may either assume a leadership role in the transformation of education or be left behind in the swirl of rapid technological change. For education to reap the potential benefits of ICTs in learning, it is essential that pre-service and in-service teachers have basic ICT skills and competencies. Teacher education institutions and programmes must provide the leadership for pre-service and in-service teachers and model the new pedagogies and tools for learning. They must also provide the leadership in determining how the new technologies can best be used in the context of the culture, needs, and economic conditions within their localities. To accomplish these goals, teacher education institutions must work closely and effectively with Basic and Secondary School teachers and administrators, educationists, national or state agencies, teacher unions, business and community organizations, politicians and other important stakeholders in the educational system. Teacher education institutions also need to develop strategies and plans to enhance the teaching-learning process within teacher education programmes and to ensure that all future teachers are well prepared to use the new tools for learning.

Capacity Building of Teachers in the 21st Century

Teaching is becoming one of the most challenging professions in the 21st century where knowledge is expanding rapidly. As new concepts of learning have evolved, teachers are expected to facilitate learning and make it meaningful to individual learners (Adu & Galloway, 2015). Therefore, the challenge for higher education institutions, particularly teacher education, has been to create a new generation of teachers capable of employing a variety of technology tools into all phases of academic, administrative, research and extension activities. A teacher being a pivot in the teaching-learning process has gained immense importance. A teacher is expected to know successful integration of ICT in his subject area to make learning more interesting. In this regard therefore according to Khan (2019), capacity building of teachers refers to the set of knowledge, abilities and skills possessed by the teacher related to Information and Communication Technology and brings it to the teaching-learning situation. Today teachers need to be adequately prepared to implements a state-of-the-art ICT curriculum. Indeed, introducing any new curriculum calls for careful preparation, management resourcing, and continuing support. In the case of an ICT



curriculum, even more concerns have to be considered. Educational research studies show that programmes of professional development for teachers are most effective if directed to the stage of ICT development reached by schools (Khan, 2019). The implications of these research findings are that teacher development is best conceived as an ongoing process, with many professional development activities conducted in schools. New technologies require new teacher roles, new pedagogies, and new approaches to teacher training. According to Apagu and Wakili (2015), the successful integration of ICT into the classroom will depend on the ability of teachers to structure the learning environment in non-traditional ways, to merge new technology with new pedagogy, to develop socially active classrooms, encouraging cooperative interaction, collaborative learning, and group work. This requires different set of classroom management skills to be developed. The key skills of the future will include the ability to develop innovative ways of using technology to enhance the learning environment, and to encourage technology literacy, knowledge deepening and knowledge creation

Capacity Building Approaches

The capacity building within teacher training programmes around the world is being approached in a number of ways with varying degrees of success. These approaches are subsequently described, refined and merged into four primary approaches, which are outline below:

1. ICT skills development approach: In this approach, importance is given to provide training to use information and communication technologies. Students' teachers are expected to be skilled users of ICT in their day-to-day activities. Knowledge about various software, hardware and their use in educational process is provided.
2. ICT pedagogy approach: This approach emphasizes on integrating ICT skills in respective pedagogy drawing on the principle of constructivism. This approach is useful to enhance ICT skills and the pedagogy allows students to further develop and maintain these skills in the context of designing classroom-based resources.
3. Subject-specified approach: Here ICT is embedded into one's own subject area. In this approach teachers not only expose students to new and innovative ways of learning, but also provide them with a practical understanding of what learning and teaching with ICT looks and feels like.
4. Practice-driven approach: Here the emphasis is on providing exposure to use of ICTs in practical aspects of teacher-training course. Importance is on developing lessons, assignments, preparing charts, models using ICT and implementing these in their practical work experience. The students are provided with an opportunity to assess the facilities available at work place and effectively use their own skills to manipulate these facilities.

Ideally an integrated approach is to be followed for capacity building in teacher education. An integrated approach should develop confidence among student-teachers to use ICT in their day-to-day instructional activities.

Conclusion

Rapid changes in technology will ensure that ICT will proliferate in the classroom. It is predicted that there will be many benefits for both the learner and the teacher, including the promotion of



shared working space and resources, better access to information, the promotion of collaborative learning and radical new ways of teaching and learning. ICT will also require a modification of the role of the teacher, who in addition to classroom teaching will have other skills and responsibilities. Teacher training institutions, professional development, schools, societies and public educational institutions must continue to identify, study and disseminate examples of effective technology integration that answer professional development needs. Many will become specialists in the use of distributed learning techniques, the design and development of shared working spaces and resources, and virtual guides for students who use electronic media. Ultimately, the use of ICT will enhance the learning experiences for children, helping them to think and communicate creatively. ICT will also prepare our children for successful lives and careers in an increasingly technological world.

Recommendation

The paper wishes to make the following recommendations for the actualization of this paradigm shift in the 21st century teacher education programmes:

1. The agencies of government across all tiers should ensure the provision of adequate supply of ICT infrastructures in the nation.
2. Teacher training institutions should encourage compulsory integration of practical ICT across all teacher education programmes
3. Teacher educators should key into various government and institutions' schemes that will enable them own personal computers for constant and consistence practice and usage, and,
4. Student teachers should be motivated to actively embrace the use of computers, Internet and other ICT facilities and technological tools during their training programme
5. Teacher educators should take advantage of various ICT conferences and workshops to boast their skills

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TIMBOU-AFRICA ACADEMIC PUBLICATIONS
MAY, 2023 EDITIONS, INTERNATIONAL JOURNAL OF:
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