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Integrating Technology into Social Science Teacher Education in Nigeria

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Introduction

Technology is ubiquitous. It touches every aspect of human life including politics, economy, arts and culture, and education. From ticketing at train stations, operating a television set, reaching out through the general system of mobile communication (GSM), to booking and paying for an airline's flight, and many more, there is hardly any activity that can be accomplished in today's world where some level of technological know-how would not be required. The twenty first century is therefore justifiably described as 'the age of technology' in view of its increasing technological transformation of human life.

While advancement in Information and Communication Technology (ICT) continues to propel economic, political, social and educational reforms in many countries (Jhurree 2005; Ololube 2006), it is in the field of education that its integration is perhaps most challenging. In schools, colleges and universities, a major requirement for a facilitative academic environment today is digital presence. It is now realized that a technology-enriched learning environment is indispensable when trying to equip learners with the skills, ideas and information required for training them to become critical thinkers, collaborative peers and technology literates (Abdelraheem and Al-Rabane 2005; Angers and Matchmes 2006). For both teachers and learners, the digital revolution is transforming the traditional classroom from an uninspiring, laborious and tasking setting to a facilitative, expressive and collaborative teaching-learning environment. A teacher's role as the guide and stage-manager in the emerging digital context cannot therefore be overstressed. Indeed, effective integration of technology into teacher education is a critical variable in the production of competent and dynamic teachers of the twenty first century.

The challenge of technology integration is especially more pronounced in social science teacher education, in view of its philosophical and pedagogical foundations. At the school level, social science subjects (economics, geography, government, history, social studies) are designed to introduce the young minds to thought systems, events and activities which have immediate and remote implications for the quality of human life. Learners are to understand and appreciate some basic concepts and principles guiding human survival, such as alternative use of resources (economics); distribution and changing patterns of phenomena in space (geography); organized contest for power (government); perspectives to interpreting the past (history); and interdependence of human and natural elements of the environment (social studies). As a society-focused discipline, social science requires teachers who are not only skilled in accessing and using state-of-the-art technologies, but are sufficiently grounded to tap into the global reservoir of the dynamic knowledge society (Ogunyemi and Ifegbesan 2000; Ogunyemi and Ogunsanya 2005). The conventional setting for social science teacher education cannot meet this demand as it is dominated by the use of textbooks and teacher-talk.

Awareness for technology integration among social science teacher educators is rising and this has begun to translate into curricular review and improved context for pedagogical preparations of pre-service and in-service teachers. In particular, the college/university environment is being challenged to transform from the teacher-centred scenario to student-centred, participatory, interactive and collaborative learning situations (Erekson and Shumway 2006; Kainth and Kaur 2009). However, while the availability of computer technologies in schools and tertiary institutions is on the increase, both in developed and developing countries, many teachers and faculty members are yet to be fully empowered to adopt best practices in the technology-driven classroom environment.

As argued by Good, O'Connor, Greece and Luce (2005), social science teachers and teacher educators need to embrace the changing content and context of their practice in the digital age. But how can these be achieved through technology integration in teacher education? What is the state of teacher education, particularly in Nigeria today? What are the prospects and challenges of technology integration in social science teacher education? These are some of the questions addressed in this chapter. Our goal is to sensitize teachers (both pre-service and in-service) as well as teacher educators to the implications of the digital revolution for improved teaching and learning at the school and teacher education levels.

Teacher Education in Nigeria

Teacher education is a training process designed with the primary aim of providing requisite skills, knowledge, values and experiences that will produce highly motivated, conscientious and successful classroom teachers who can in turn

produce successful students for improved education quality and national development (Ololube 2006). It is a process that improves the quality of teachers for professional growth. It has therefore been argued that quality education is dependent on effective teacher education (Lawal 2003).

The world over, teacher education is witnessing serious overhaul as part of the general reform process dictated by the increasingly changing educational environment. The transition from military dictatorship to representative democracy, as from the 1990s, has particularly changed the face of the African society in general and African education in particular. Within this context, innovative dimensions are increasingly being introduced into educational programmes at the pre-primary, primary, secondary and tertiary levels. National policies on education are consistently being reviewed to further articulate the desired innovations governments would want implemented.

In Nigeria, the foundation for teacher education reform is located in the numerous changes and innovations that are taking place in the country. According to the National Policy on Education (NPE), such changes include the lifting of the suspension order on Open and Distance Learning; introduction of Information and Communication Technology into the school system; prescription of the minimum number of subjects to be taken by the Senior Secondary School Certificate Examination (SSCE) candidates; and general contextual change to reflect the state of the professional practice in education (Federal Republic of Nigeria 2004). Within this broad context, the emphasis placed on teacher education derives its basis from the unassailable fact that 'no educational system may rise above the quality of its teachers' (Federal Republic of Nigeria 2004). As part of this quality enhancement process, the Nigerian Government, as from the 1980s, started phasing out teacher education programmes such as Grade III/II certificates and Associateship Certificate of Education in favour of the Nigeria Certificate in Education (NCE) as the minimum qualification for practice.

Teacher education in Nigeria is provided by faculties and institutes of education of various universities, schools of education in the polytechnics, the National Teachers' Institute, National Institute for Nigerian Languages (NINLAN), National Mathematical Centre and the colleges of education, the National Commission for Colleges of Education (NCCE), the National Universities Commission (NUC), and the National Board for Technical Education (NBTE) are coordinating bodies that accredit teacher-education programmes in Nigerian institutions (Abolade and Yusuf 2005; Ololube 2006). Against the backdrop of the ongoing educational reforms, the Nigerian Government states the goals of teacher education as to:

a. Produce highly motivated, conscientious and efficient classroom teachers for all levels of our education system;

b. Encourage further the spirit of enquiry and creativity in teachers;
c. Help teachers to fit into social life of the community and the society at large and enhance their commitment to national goals;
d. Provide teachers with the intellectual and professional background adequate for their assignment and make them adaptable to changing situations;
e. Enhance teachers' commitment to the teaching profession (Federal Republic of Nigeria 2004: 39).

In addition to the above-highlighted goals, the NPE states: 'Teacher education shall continue to take cognizance of changes in methodology and in the curriculum. Teachers shall be regularly exposed to innovations in their profession' (Federal Republic of Nigeria 2004). The import of this official position is that teacher educators across the disciplinary divides must constantly reflect modern trends in their training and re-training of teachers if they are to operate within the national framework. Kainth and Kaur (2009) reiterate that the issue of ICT integration in teacher education is gaining attention because of the pressure on institutions of learning in developed and developing countries to adopt effective use of technology so as to meet the needs of the twenty-first century learners. Iyamu and Aduwa-Ogiegbaen (n.d.) indicate that the Nigerian Government has made concerted efforts to initiate internet connectivity in institutions of learning, as well as engage teacher educators in series of training in order to broaden their knowledge and skills in the effective use of computer technologies for instructional purposes. UNESCO (2002) reports that teacher education institutions are currently under pressure and face the challenge of preparing a new breed of teachers to effectively use technological innovations in their teaching practices. Consequently, curricular policies, professional development, workshops and seminars are designed by the various arms of government to improve teachers' disposition towards technology use in schools. The extent and impact of these efforts are yet to be fully determined, with respect to technology integration into the social science classrooms in the Nigerian environment.

Technology in the Social Sciences

Social sciences deal with social phenomena that are sometimes difficult to express, explain and describe effectively without the support of pictorial, graphic, audio and audio-visuals (Abdelraheem and Al-Rabane 2005). In view of the limitations of the traditional method of teaching social science subjects which leaves no opportunity for learners' active participation in the classrooms, social science educators and researchers are deeply concerned about producing teachers who are inadequately prepared for challenging integrative and active teaching (Thornton 2001). VanHover, Berson and Swan (2006) remark that social science educators tend to use the same teaching technique (textbooks, lecture method and body

language) over the years and yet expect to experience unprecedented positive changes in learning outcomes, whereas the input has not changed to ensure improvement in such expected output.

Technology-driven social science classrooms have great potential of exposing students to a myriad of academic opportunities. Technologies that have been made available in recent times are capable of offering students unlimited opportunities to global connection and networking, as well as engage them in actively 'doing' the social science from the analytical perspective and disciplinary knowledge orientation (Barton and Levstik 2004; Sexas 2000; VanHover, Berson and Swan 2006). Similarly, for quality instruction in social science subjects like geography and social studies, geographical features and data could be better and more meaningfully presented using PowerPoint to stimulate students' understanding and improve their experience.

Hofer and Swan (2008) have reported that social science education witnessed an era of restricted access to geo-spatial data on traffic and weather, purely because instructional processes were based on didactic teaching approach. They remark that the advent and use of Geographic Information System (an information software that enables storage, retrieval, manipulation and display of geographical data such as aerial photographs and satellite images) gives teachers and students the opportunity to analyze and address a series of educational inquiry (environmental challenges, hazards, crimes, etc.) in schools. The transformative effects of such innovative teaching at the teacher education level cannot be quantified.

Teachers' Place in Technology Integration

Social science educators have advocated the integration of ICT within the spectrum of social science instruction (Keegwe 2007). The idea of technology integration has been misconstrued by lots of people as teachers' ability to use technology. Angers and Matchmes (2005) indicate that to 'integrate' implies incorporating technology into the instructional process so as to engender effective teachers' teaching and learners' learning. Dockstader (1999) remarks that technology integration does not imply having the technology drive the curriculum; rather, it indicates situations that are having the curriculum drive technology usage. Painter (2001), however, notes that technology integration requires teachers' readiness and flexible ability to incorporate technology into teaching activities with a high level of teaching skills based on curriculum knowledge, knowledge of students' abilities, students' needs and reasonable level of technology literacy. The International Society for Technology in Education (1999) identifies three primary principles of infusing Information and Communication Technology into teacher education. These are:

1. ICT should be holistically infused into teacher education programme;
2. ICT should be introduced in context; and
3. Learners should be exposed to innovative technology support in teacher education programme.

It is obvious from the above principles that teachers are not expected to be seen within the education system as knowledge dispensers or repositories of knowledge, but rather as facilitators of learning. The role of the teacher in integrating technology into the teacher education programme goes beyond merely having knowledge about the computer technologies and software, but having the required and well-thought-about information, skills, ideas to construct new knowledge and ability to effectively infuse technology into the instructional process (Kainth and Kaur 2009; Morehead and La Beau 2005). Technology integration thus becomes a reality only with teachers' ability to effectively use the technology technically and pedagogically (Achcoso 2003). The presence of technology in the school will not automatically enhance teaching and learning without teachers' necessary input. Angers and Machtmes (2005) emphasize that teachers' adjustment of mind-set, readiness, positive disposition to technology use and reasonable level of competence in technology use for instructional purpose should be part of the basic elements of the teacher education programme.

Need for Technology Integration into Teacher Education

Schools, colleges and universities in Africa are just beginning to explore the potentials computer-technologies offer teachers and learners. Technology integration into classroom instruction goes beyond mere teaching and learning of basic computer skills and software programmes in a separate computer class. Mason et al (2000) opine that social studies teacher educators who infuse technology into the teaching and learning process offer learners ample opportunities to explore the potentials of technology and expose them to the various dimensions of changes technology brings to the teaching profession and all facets of life. Specifically, technology integration should be directed towards supporting learners' active engagement, participation in groups, integrated interaction and immediate classroom feedback. In other words, technology in the classrooms makes the learning environment and instructional process more student-centred; hence students are engaged in high-order thinking because of practical exposure to the societal 'real world' (Alexiou-Ray, Wilson, Wright and Peirano 2003; Friedman and Heafner 2007).

The learning environment complemented by the use technology facilitates social interactivity and reflective community practice. This strategy fosters learners' self-regulated learning while teachers mostly act as facilitators, monitors, coordinators or classroom referees (Kozma 2003; Ryba and Brown 2000). In essence, the role of the teacher in the classroom is being modified from being a dispenser of knowledge to being a partner in the learning process. Technology

therefore provides opportunities for learners' connections because social science subjects cannot be taught in isolation (Erekson and Shumway 2006).

The presence of technology in the classroom, however, is not a direct replacement of teachers' roles in the instructional process, but rather a means to supporting the instructional process to attain objectives that would not have been possible without technology (Jhurree 2005). Technology in the teacher education programme is a powerful tool for teacher educators to stimulate students' interest in the field of social science. Lessons can be made more understandable and explanatory to students, thereby promoting learners' inquisitiveness. The integration of technology into the teacher education programme allows teachers and pre-service teachers to organize teaching in a way that is more efficient and easy to follow. Teachers also have the opportunity to network with colleagues from different parts of the country and the world so as to have their experiences and skills shared (Marwan 2008).

Newhouse (2002), cited in Ololube (2006), argues that if technology has been developed to improve living standards and increase productivity, it follows that educational technology has been developed to cause such effects in the education sector. This implies that teachers' choice of appropriate technology for the instructional process has greater opportunity of optimizing students' learning with increased valued outcomes. One of the greatest benefits of technology in teacher education is that it activates learners' senses during the instructional process. Learners in a technology-oriented learning environment have the opportunity to make use of their senses in such a way that they develop their personal, intellectual and creative abilities (Iyamu and Aduwa-Ogiegbaen n.d.).

Approaches to Technology Integration

Technology integration into teacher education could be approached from different perspectives (Kainth and Kaur 2009). Some of these approaches are discussed below:

ICT Pedagogy Approach: This is an approach that is directed towards broadening the knowledge and understanding of pre-service teachers on effective technology integration methods so as to boost their computer self-efficacy and competence. The main target of this approach is to expose the pre-service teachers to a degree of understanding about the 'why' and 'how' to integrate technology skills in school subject teaching and learning, thereby exploring the potentials of constructivism principles.

Practice-driven Approach: The focus of this approach is not mere theoretical use of ICT but rather practical exposure to ICT use and realistic exploration of technology potentials. With this, social science teacher educators have wide opportunities to access technology facilities available at workplaces, demonstrate effective use of the facilities and improve on personal skill activities designed in conjunction with the cooperating teacher or tutor-teacher and eventual management of such activities within the classroom settings.

ICT Skills Development Approach: The objective of this approach is mainly to equip the pre-service teachers with skills, information and training about the general use of both software and hardware to facilitate effectiveness in the educational process and context.

Subject-Specified Approach: Technology can be infused into specific subjects. Through this approach, the social science educator introduces learners to a new method of learning and an exposure to active, practical-oriented and experiential learning via technological devices. This type of approach gives the teacher and students access to technology during the instructional process. The summary of these models or approaches is presented in Table 12.1.

Components and Principles of Effective Technology in Teacher Education

To effectively integrate technology into the teacher education programme, there is the need for a practicable implementation plan that puts into consideration the actual institutional needs. According to Levine (1998), cited in Jhurree (2005), the major components of the technology integration plan within the education system include: formulating a planning team; collecting and analyzing data; formulating the visions and objectives; and, exploring available technology. Others include determining training and staffing needs; determining budget and funding sources; developing an action plan; implementing the plan; and, evaluation. In order to effectively integrate technology into the social science teacher education programme, Mason et al (2000) propose the following principles:

Extend teaching beyond what could be done without technology

The conventional learning environment is becoming insufficient to meet the needs of learners and educational goals. Social science teacher educators can explore the potentials of technologies by exposing learners to activities and tasks that require more of learners' active participation and a more meaningful learning situation which are absolutely missing without technology. For instance, historical digital archives can be developed at the state and federal levels while schools, colleges, universities, libraries and the general public are given access to the digital archives. Information, materials, ideas and skills are also made available to students via the World Wide Web. Furthermore, the digital archives can contain past newspapers, letters, diaries, photographs, military records, historical data, census electoral and immigration documents and information.

Introduce technology in context

There is a difference between acquiring technology competence skills and possessing the skills that allow effective use of technology to enhance the instructional process. Social science teacher educators must realize that pre-service instruction that will empower teachers to effectively infuse technology into lessons is more beneficial

Table 12.1: Approaches to Technology Integration

Integration Approach	Format	Features	Limitations
Skill Development Approach	One or more unit dedicated to relevant ICT skills and competencies	• Opportunities for students to gain ICT skills regardless of their past experience. • Potential to transfer to the classroom • Emphasis on basic computer operations and programmes	ICT units and skills are viewed by students as discrete components of their programs • ICT skills are perceived as targeted learning outcomes without any emphasis on their applied values to the classroom • Research does not indicate any evidence of skill transfer to classrooms
Pedagogy Approach	Inclusion of one unit or more to teach students how to integrate ICT into their teaching	Opportunities to learn ICT skills as well as how to implement them in the classroom • Potential to transfer to the Classroom	ICT skills are perceived as targeted learning outcomes without any emphasis on their applied values to the classroom - Research does not indicate any evidence of skill transfer to classrooms
Curriculum Units Approach	Inclusion of specialized software within the curriculum unit Classroom	Opportunities to model to participating students actual integration within authentic settings • Potential to transfer to the	Use of software as tools forlearning rather than as medium of learning • Confining the use of the specialized software to particular curriculum areas rather than the classroom as a whole
Practice-driven Approach	Inclusion of the design ICT resources to be used in their practicum experience	Opportunities to the student-teachers to monitor their own learning through the use of tools such as digital portifolios	Limited to student-teacher professional learning • Dependent upon student teacher's prior ICT experience

(Synthesized from: Albion 2000; McNair and Galanouli 2002; Watson, Proctor, Finger and Lang 2004; Karagiorigi and Charalambous 2006)

than teaching the teachers how to use some specific computer skills. For instance, it is far better for social science teacher educators to be equipped with skills needed to effectively create and use PowerPoint presentations to enhance effective teaching and learning of topics than just knowing how to create PowerPoint.

Include opportunities for students to study the relationship between science and technology, and society

Interactive technology such as the internet has greatly increased individuals' access to information online. It has clearly established a strong relationship between science and technology, and society. Lots of developed and resource-rich countries have wide access to knowledge while the developing countries are poorly connected as a result of the impact of low internet access rate. Despite the convincing benefits of the internet in education, there are still some inherent dangers and risks attached to the young people's use of the World Wide Web. Anti-social information based on issues like gun crime, pornography, drugs, alcohol, e-fraud, illegalities and some other criminal information are available online for youths to access. Unfortunately, many of these youths are not adequately equipped to differentiate between right and wrong information. There are therefore great concerns as to how young people will be able to manage the risks they access online in order to exhibit reasonable level of societal moral conduct. It must constantly be stressed that students' global connectivity should not be celebrated at the expense of the cherished community values and peaceful human interrelationships.

Foster the development of the skills and knowledge to participate as good citizens in a democratic society

One of the main goals of social studies and social sciences is preparing students to take on the role of effective citizenship. To a large extent, the misconceptions about citizenship education are best clarified and revitalized within the school setting by exploring the potentials of various interactive technologies. Unfortunately, many social science teacher educators have been found to underutilize technology, even in their classrooms. There is therefore the need to demonstrate the power of technology to social science teachers, especially on how technology can effectively support citizenship development activities. Mason et al (2000) summarize these activities as 'development of personal and civic beliefs; capacity for social and public actions; development of ties to their localities and the world outside; and awareness of past, present and future'.

Conditions and Challenges for Promoting Successful Technology Integration

Successful integration of technology is guaranteed if teachers perceive technology as relevant in teaching and learning (Angers and Matchmes 2005). Skill development in technology usage requires commitment and the courage to adopt innovations.

Alexiou-Ray, Wilson, Wright and Peirano (2003) remark that for technology to be successfully integrated into the curriculum, teachers must be fully equipped with the necessary tools and skills required to make them functional in technology-oriented classrooms. Jegede (2009) reiterates that teachers' training in technology usage should go beyond mastering computer hardware, basic software and keyboard practice; such training should be extended to web and e-learning skill, computer-assisted instruction and computer-managed learning, among others. Hence, teacher educators should be moved from 'learning to use technology' to such essential and needed stage of 'using technology to learn'.

Titterington (2000) emphasizes that 'integrating technology into teaching is more or less like leaving the comfort zone, based on personal or individual commitment'. Successful integration of technology happens when teachers are prepared for it (Jegede 2009). Social change is neither a sudden nor a drastic event, but rather a gradual process. Therefore, teachers need ample time to learn the techniques of new technologies and the processes involved in integrating such technologies into the instructional process. Teachers should be given the opportunity to develop and implement activities that are driven by technology during the instructional process to allow for proper technology integration (Gulbahar 2008).

Several challenges could hinder teacher educators from effectively integrating technology into the teacher education programme. As a matter of fact, social science educators are lagging behind in utilizing technological innovations for instructional purposes (Anderson 2001; Becker and Wong 2000). Many teachers are hesitant to use technology during teaching and learning because of the teachers' low level of computer competence, and lack of computer experience and technology integration still within the educational setting. When teachers are trained, they develop technical expertise and improve in experience as they infuse technology into their classrooms. The horizon of teachers is widened as they are exposed to a wide variety of software programmes that are useful in enhancing effective teaching and learning (Zhao and Hoge 2004). Teachers are inhibited from effectively integrating technology into the teacher education programme when they lack easy and frequent access to technology equipment (Friedman 2006; McGlinn 2007; Norrris, Sullivan, Poirot and Solway 2003). This is a major source of hindrance in the Nigerian environment.

Angers and Matchmes (2005) argue that leadership is a significant factor that influences effective integration of technology in teaching and learning. Administrative heads of schools need to be committed to discussing how technology can be effectively used in their schools to achieve improved learning. Hofer and Swan (2008) recall that few teachers are familiar with many of the available technology hardware and software, while many teachers do not have sufficient time to develop technology-based lessons. Furthermore, Morehead and La Beau (2005) report that some teachers are myopic about the relevance of

technology to education and this is a great obstacle to effective integration of technology into teacher education. Teachers sometimes view technology as disconnected from the curriculum because of the popularity, high level of acceptance and use of textbooks in the education sector. Jegede (2009) remarks that though considerable training is given to teacher educators with the primary aim of equipping them with the necessary ICT skills for personal and professional practices, many of them still find themselves wanting in teaching with ICT in schools because they were not exposed to an ICT-immersed curriculum in their professional preparation.

Conclusion

In summary, it can be seen that technology integration is indispensable to meaningful social science education in the twenty-first century which is widely regarded as the digital age. The increasing popularity of technology in education worldwide places a lot of challenges on the Nigerian nation. As the country aspires to become one of the 20 leading world economies by the year 2020, she must borrow from and adapt best practices from around the globe and intensify efforts at integrating ICT into her teacher education programmes. With increased funding, judicious utilization of resources, capacity building for teacher educators and proper monitoring and evaluation, the initial problems can be reduced to a tolerable minimum to usher in an improved regime of technologically-enriched social science education in Nigerian schools, colleges and universities.

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