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Redefining Education in the World of ICTs

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Abstract: *ICTs have the potential of enhancing wider accessibility to education, free from the time constraints of the traditional way of teaching-learning process. To make the best use of ICT possibilities, it is high time for the teachers to possess technology literacy that can help them adaptable with the changing trends. ICT helps improve the quality of education, and it can be used to create positive learning environment as envisaged by the modern educational theories. However, because of the barriers in its implementation stage, many educational institutions in the developing countries fail to effectively integrate ICT in education. Inadequate training in this area may lead to widening of the existing digital divide.*
Key words: ICT in education, learning environment

Introduction

It is widely acknowledged that Information and Communication Technologies (ICTs) have the potential for increasing access to education as well as improving the relevance and quality of education. They can facilitate the acquisition and dissemination of knowledge. Also, they offer wide opportunities to enhance educational systems in such a way that education is easily accessible to all sections of the society. ICTs have opened new promises in tackling some age old issues of education in many rural areas of the world where people are isolated from the urban developments. However, the issues of the Digital Divide, i.e., the gap between technological '*haves and have nots'*, has hindered the introduction and integration of ICTs in many parts of the world. Failure to meet the challenge would mean a further widening of the knowledge gap and the deepening of existing economic and social inequalities. This article deals with some of the promises of ICTs that can revolutionize the education system of many developing countries.

ICT and Access to Education

ICTs offer promises for extending educational opportunities. This is true with both formal and informal settings. ICT enhanced education is free from time constraints. It makes possible both synchronous and asynchronous learning. The capacity of ICT as a powerful source of educational materials is widely acknowledged by different authorities. The position paper on Educational Technology by NCERT reiterates this idea:

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In recent years, ICT and the Internet have emerged as dependable media of interaction. Unlike the broadcast media, the Internet can facilitate the participation of the periphery in an eminently democratic discourse, which can be empowering. And if properly deployed, quality concerns hitherto forced by economic and power considerations to be confined to the haves can now be within the reach of everyone. The need of the hour is, therefore, to recognise this potential, promote universal access, facilitate participatory forums, and develop communities and interest groups. Left to market forces alone, the reach is bound to remain limited. The Internet can be a sound investment for continuous on-demand teacher training and support, research and content repositories, value-added distance education, and online campuses aimed at increasing the access, equity, and quality of education (NCERT, 2006).

Workplace Skills Redefined

One of the most commonly cited reasons for using ICTs in the classroom has been to better prepare the current generation of students for a workplace where they have to use technology, with its latest developments. Technological literacy, or the ability to use ICTs effectively and efficiently, has become an essential requirement at any workplace of our time. 21st Century Skills has been redefined (EnGauge, 2003) as they can include digital age literacy (consisting of functional literacy, visual literacy, scientific literacy, technological literacy, information literacy, cultural literacy, and global awareness), inventive thinking, higher-order thinking and sound reasoning, effective communication, and high productivity. (See Table 1.1 for a brief explanation of each skill.)

Table 1.1 Skills Needed in the Workplace of the Future

Digital Age Literacy	
Functional literacy	*Ability to decipher meaning and express ideas in a range of media; this includes the use of images, graphics, video, charts and graphs or visual literacy*
Scientific literacy	*Understanding of both the theoretical and applied aspects of science and mathematics*
Technology literacy	*Competence in the use of information and communication technologies*
Information literacy	*Ability to find, evaluate and make appropriate use of information, including via the use of ICTs*
Cultural literacy	*Appreciation of the diversity of cultures*
Global awareness	*Understanding of how nations, corporations, and communities all over the world are interrelated*
Inventive Thinking	

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Adaptability	*Ability to adapt and manage in a complex, interdependent world*
Curiosity	*Desire to know*
Creative	*Ability to use imagination to create new things*
Risk-taking	*Ability to take risk*
Higher Order Thinking *Creative problem-solving and logical thinking that result in sound judgments*	
Effective Communication	
Teaming	*Ability to work in a team*
Collaboration and interpersonal skills	*Ability to interact smoothly and work effectively with others*
Personal and social responsibility	*Be accountable for the way they use ICTs and to learn to use ICTs for the public good*
Interactive communication	*Competence in conveying, transmitting, accessing and understanding information*
High productivity	*Ability to prioritize, plan, and manage programs and projects to achieve the desired results. Ability to apply what they learn in classroom to real-life context to create relevant, high-quality products.*

Source: Adapted from EnGauge (2003). North Central Regional Educational Laboratory

Enhancing the Quality of Education

Improving the quality of education and training is a critical issue, particularly at a time of educational expansion. ICTs can enhance the quality of education in several ways: by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment.

ICTs have a pivotal role in raising the quality of teacher training. Many institutions are taking advantage of the Internet to provide effective teacher professional development opportunities to in-service teachers. Therefore, teacher education students must be given the opportunities and experience to integrate ICT in teaching. One of the opportunities is to integrate ICT during micro-teaching exercises (Baker and Mohamed, 2008). Anticipating the future challenges of technology in education, some colleges of teacher education in India has incorporated ICT in teacher education curriculum. The Draft for National Curriculum Framework for Teacher Education (2009) by National Council for Teacher Education (NCTE) emphasizes this fact as it comments:

> With the onset and proliferation of ((Information and Communication Technology) (ICT), there is a growing demand that it be included in school education. It has become more of a fashion statement to have computers or

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multimedia in schools, the result being that in spite of its potential to make learning liberative, its implementation is often not more than cosmetic. It is often also touted as a panacea for shortage of teachers. These are detrimental to the learning of the child. Teacher education needs to orient and sensitize the teacher to distinguish between developmentally appropriate and detrimental uses of ICT. It needs to also equip teachers with competence to use ICT for their own professional development (NCTE, 2009).

ICT and Learning Environment

Modern constructivist educational theory emphasizes critical thinking, problem solving, "authentic" learning experiences, social negotiation of knowledge, and collaboration. These pedagogical methods change the role of the teacher from disseminator of information to learning facilitator, helping students as they actively engage with information and materials to construct their own understandings. That is, students learn *how* to learn, not just *what* to learn. ICT has the potential to be used in support of these new educational methods, as tools enabling students' learning by doing. ICT can make it possible for teachers to engage students in self-paced, self-directed problem-based or constructivist learning experiences; and also test student learning in new, interactive, and engaging ways that may better assess deep understanding of content and processes. Therefore, constructivist approach is an important dimension of technology integration. It is suggested that teachers should be trained to accept and use constructivist pedagogy (Summak and Samancıoğlu, 2011). The learner friendly environment supported by ICT makes learning active, collaborative, creative, integrative, and evaluative (Tinio, 2003).

Collaboration is among the most useful ways in which learners acquire skills at the computer. It is a process in which two or more learners need to work together to achieve a common goal, usually the completion of a task or the answering of a question (Beatty, 2003). It is manifested in the actions a learner takes when working with others. Learners often collaborate, either on their own initiative or as an assigned activity. Collaboration is an important activity in the class-room because it encourages social skills and thinking skills and mirrors the way in which learners often need to work once they leave an academic setting.

Challenges in ICT Integration

Though the rationale of ICT integration has been widely acknowledged, many institutions in the developing countries fail to meet the basic requirements. Teachers and schools face a range of challenges, including infrastructural issues such as lack of power, telephone and Internet access, which hinder the effective use of ICT in teaching and learning. Schools also struggle to optimize use of the technology, due to a lack of appropriate professional development. While many teachers have developed basic computer skills, they have not yet become confident in using the technology to improve their own productivity and bring about pedagogical change. At

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the same time, ICT administrators and principals are requesting more support in technology management and organizational integration of ICT (UNESCO, 2008). Overall, there is reason to believe that if such considerations and lessons learned are taken into account, necessary steps undertaken, and appropriate interventions put in place, ICT can prove to be a valuable tool for improving access to, and the quality of, education in developing countries. Research suggests that pre-service teachers may need more guidance, modeling and collaboration to develop a better understanding of technology based pedagogy from their own practice so that they can synthesize their constructivist orientation, student centred teaching approaches, and effective use of ICT (Gao, 2009).

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