

## ICT implementation for Education and Learning

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**Abstract:** *Information and communication technologies (ICT) have become common place entities in all aspects of life. Integrating ICT into teaching and learning is a growing area that has attracted many educators' efforts in recent years. Across the past twenty 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 student-centred 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. Based on the scope of content covered, ICT integration can happen in three different areas: curriculum, topic, and lesson. This paper elaborates upon the concept of ICT integration, effective use of ICT for education with regard to the teaching learning process and ICT to enhance the scholastic performance.*

**Keywords:** *Information technology, Communications technology, Integration, Implementation.*

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### I. Introduction

During the past decade there has been an exponential growth in the use of information and communication technology (ICT) which has made pervasive impacts both on society and on our daily lives. The use of information and communication technology have caused many changes in society. These changes have not just been of a technical nature but more importantly of a structural nature. It is thus not surprising to find increasing interest, attention and investment being put into the use of ICT in education all over the world. According to Daniels (2002) ICTs have become within a very short time, one of the basic building blocks of modern society. In addition to efforts to employ ICT to improve learning, the emergence of the knowledge economy has also brought about a much greater emphasis on education. A number of master plans on ICT in education has been produced in many countries. Such plans reveal that educational innovations in ICT have been increasingly embedded within a broader framework of education reforms that aimed to develop students' capacities for self-learning, problem solving, information seeking and analysis, and critical thinking, as well as the ability to communicate, collaborate and learn, abilities that figured much less importantly in the curricula. The relatively recent introduction of new technology into mainstream schooling was widely expected to penetrate and transform teaching and learning across the curriculum.

Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. However, there appears to be a misconception that ICTs generally refers to 'computers and computing related activities'. This is fortunately not the case, although computers and their application play a significant role in modern information management, other technologies and/or systems also comprise of the phenomenon that is commonly regarded as ICTs. The term ICT encompasses the range of hardware (desktop and portable computers, projection technology, calculators, data logging and digital recording equipment), software applications (generic software, multimedia resources) and information systems (Intranet, Internet) available in the teaching Institutes. Specifically, we investigate how these forms of digital technology are being used to carry out already familiar activities more quickly, reliably, broadly, productively, interactively, and how such use may be reshaping these activities. According to a United Nations report (1999) ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services and other related information and communication activities.

The purpose of this paper aims to bring together the findings and key points from a review of significant part of the available literature associated with ICTs for Education and ICTs in Education.

### The Importance of ICT in Education

Information and Communication Technologies have recently gained groundswell of interest. It is a significant research area for many scholars around the globe. Their nature has highly changed the face of education over the last few decades.

ICT basically refers to use of technology in communication, data processing and data storage to impact the knowledge on learners. ICTs help to achieve the goals of educational programs for several reasons. The benefits of ICT seem suitable for coping with the issue of basic literacy and technological literacy, even among the poorest population sectors. Computer Based Learning (CBL) and teaching makes learning more efficient and more interesting to learners thus improving the quality of education. The knowledge deepening approach has a greater impact on learning. Its policy goal is to increase the ability of learners, to add value to education.

ICT offers increased possibilities for codification of knowledge about teaching and for innovation in teaching activities through being able to deliver learning and cognitive activities anytime and any where

By virtue of government interventions and training seminars organized in this regard, ICT tools stimulate teachers. Indeed, an absolute majority of teachers claim to use ICT to do tasks, such as preparing lessons, sequencing classroom activities, etc. Therefore, teachers plan their lessons more efficiently. ICT also help teachers to work in teams and share ideas related to schools curriculum. There is also evidence that broadband and interactive whiteboards play a central role in fostering teachers' communication and increasing collaboration between educators.

For most European countries, the use of ICT in education and training has become a priority during the last decade. However, very few have achieved progress. Indeed, a small percentage of schools in some countries achieved high levels of effective use of ICT to support and change the teaching and learning process in many subject areas. Others are still in the early phase of Information and Communication Technologies adoption.

Blanskat, Blamire, Kefala (2006) conducted a study carried out in national, international, and European schools. With the aim to draw evidences regarding the advantages and benefits of ICT in schools achievements. It seeks to measure the impact of ICT on students' outcomes. The study also tried to establish a link between the use of ICT and students' results in exams. The findings are interesting: ICT has positive impact on students' performances in primary schools particularly in English language and less in science. Schools with higher level of e-maturity show a rapid increase in performances in scores compared to those with lower level.

In addition, schools with sufficient ICT resources achieved better results than those that are not well-equipped. There is a significant improvement on learners' performances. Finally, teachers become more convinced that educational achievements of pupils are due to good ICT use. In fact, high percentage of teachers in Europe (86%) states that pupils are more motivated when computers and Internet are being used in class.

Therefore, ICT can improve teaching by enhancing an already practiced knowledge and introducing new ways of teaching and learning. Transforming teaching is more difficult to achieve. "Changes that take full advantage of ICT will only happen slowly over time, and only if teachers continue to experiment with new approaches."

### **The Concept of ICT Integration**

Integration has a sense of completeness or wholeness by which all essential elements of a system are seamlessly combined together to make a whole. In education, simply handing out to students a collection of websites or CD-ROM programs is certainly not ICT integration. In a properly crafted ICT integrated lesson, ICT and other crucial educational components such as content and pedagogy are moulded into one entity. As a result, the quality of the lesson would somehow be diminished if the ICT ingredient were taken away from the ICT-integrated lesson. Numerous studies comparing traditional classroom-based instruction with technology-enhanced instruction have found insignificant differences in student satisfaction, attitudes, and learning outcomes. Effective ICT integration into the learning process has the potential to engage learners. For instance, using multimedia to present authentic and ill-structured problems in problem-based learning can motivate and challenge students and hence develop their problem-solving skills.

ICT can support various types of interaction: learner-content, learner-learner, learner-teacher, and learner-interface. These types of interaction make the learning process more interactive and learners more active and engaged. The primary factor that influences the effectiveness of learning is not the availability of technology, but the pedagogical design for effective use of ICT. The computer should be fitted into the curriculum, not the curriculum into the computer. Therefore, effective ICT integration should focus on pedagogy design by justifying how the technology is used in such a way and why. The introduction of ICT has the potential to change the system of constraints and affordances which frame activities such as writing, mathematical problem solving and scientific enquiry. The latter are considered to be situated within a social and cultural system, rather than as isolated skills. It is acknowledged that Information Communication Technologies (ICTs) are revolutionizing the teaching and learning process in universities. ICT is "certainly a useful tool that enables us to link various learning communities together in new and different ways". Museveni (2006) observed that ICT is no longer a matter of choice it is a necessity in today's world which is driven by technology and knowledge. Many Universities have seen the importance of integrating Information and Communication Technologies (ICTs) in their teaching process as reported by UNDP (2001) that: Across a range of educational

applications, ICT is being harnessed to improve the efficiency, accessibility and quality of the learning process in developing countries.

It is a proven fact that ICT does improve the teaching and learning process, however, there is always a problem when it comes to the acquisition of the necessary infrastructure from administrations who are the financial controllers and decision makers of any organization. Emans (2002) noted that for many teachers and learning institutions, the use of computers for educational purposes might be a threatening step because there is often little expertise, and teachers and administration are reluctant to take the first step. Jaway (2003) observed that many governments are now facing challenges to adopt their higher education system to the demands of a rapidly changing social, economic and technological order in line with.

The implications for the traditional academic curriculum of introducing a powerful set of cross-curricular tools and resources are considered, along with the influences of established curriculum practice and policy upon teachers' willingness to develop new forms of activity and pedagogy. This includes a set of strategies for mediating pupils' interactions with ICT which teachers employ in order to overcome some of the obstructive features of certain forms of use.

Mooij and Smeets (2001) suggested five successive phases of ICT implementation, representing different levels of ICT transformation of the educational and learning processes. These include:

- (1) the incidental and isolated use of ICT by one or more teachers
- (2) increasing awareness of ICT relevance at all levels
- (3) emphasis on ICT co-ordination and hardware
- (4) emphasis on didactic innovation and ICT support
- (5) use of ICT-integrated teaching and learning that is independent of time and place

Many pupils consider ICT tools very helpful in that it helps them to do assignments teachers see that ICT enables students with special needs or difficulties. It also helps to reduce the social disparities between pupils, since they work in teams in order to achieve a given task. Students also assume responsibilities when they use ICT to organize their work through digital portfolios or projects. In addition, the study showed that ICT has significant impact on teachers and teaching processes.

### **Effective Use of ICT in education**

Many teachers use ICT to support traditional learning methods, for example, information retrieval in which students are 'passive learners of knowledge instead of 'active producers able to take part in the learning process. In a document entitled teaching and learning with ICT, G. Galea (2002) explains how ICT can promote teaching and learning. According to her there are two main reasons behind increasing the use of ICT in education in UK. Firstly, ICT can change the lessons' pace: she stated that children in modern society need to develop sufficient potentials and skills that enable them to take full advantage from the new opportunities that ICT offer. Second, there are groundswells of interest of academic researches in UK in how technological tools can enhance the quality of teaching and learning in schools, and so help learners to achieve better outcomes.

The evaluation came from a teacher training seminar in IT during the ITMF project, showed that teachers have not fully changed their use of ICT in education; however, most of them changed their way of thinking about the application of ICT in education. Teachers have increased their use of ICT in lessons where students look for information on the net and use it afterwards for subject specific areas, but hardly any use of ICT for class presentations. Nonetheless, teachers do not make use of ICT to engage students more actively to produce knowledge. Similarly, the e-learning Nordic study shows an increase in the use of ICT to teach but not to innovate teaching methods: "ICT generally has a positive impact on teaching and learning situations, but compared with the ideal expectations; the impact of ICT on teaching and learning must still be considered to be limited".

Furthermore, it has been proved that new technologies have lots of benefits on the students. ICT allow for a higher quality lessons through collaboration with teachers in planning and preparing resources. Students learn new skills: analytical, including improvements in reading comprehension. ICT also develop some writing skills: spelling, grammar, punctuation, editing and re-drafting. Still new technologies encourage independent and active learning, and students' responsibility for their own learning. ICT proves that students who used educational technology felt more successful in school they are more motivated to learn more and have increased self- confidence and self-esteem. It is also confirmed that many students found learning in a technology-enhanced setting more stimulating and much better than in a traditional classroom environment.

Modern developments in information and communication technologies (ICT) provide exciting possibilities to enhance the quality of education.

1. Interactive education software, open access digital libraries, and cheaper and more intuitive technology may facilitate new forms of interaction between students, teachers, education employees and the community and enhance the quality of education by making it more accessible.

2. Education may be enriched by integrating such technologies into traditional educational activities. However, it must be recognised that ITC may never displace the relationship between teacher and learner which is crucial to the learning and development process.
3. ICT has the capacity to enhance the learning process and facilitate communications within education institutions and between educators and learners but it must be used in education institutions under the supervision of qualified well-trained professionals with the expertise in pedagogy and in education to ensure that its impact does not damage or undermine the learning process or the development of learners.
4. Education unions should (i) support the use of ICT as an integral part of the provision of quality education for all. They should advocate for the use of ICT in education as a key modern aid to teaching and learning; (ii) advocate for free access for all teachers and learners, support professionals and administrators in education, to high quality dedicated ICT; (iii) insist that ICT in education is appropriate to the learning requirements in the curriculum in each subject, is supportive of the work of teachers and learners, and of administrative and professional staff in education; (iv) insist that educators are consulted about the introduction of ICT into education institutions and involved in the design and development of appropriate ICT for education purposes; (v) monitor the implementation of any agreements entered into by governments, national education or school authorities for the provision of ICT by commercial companies.
5. Governments and national education authorities should (i) develop national plans for the use and promotion of ICT in education in consultation with education unions and education community interests and others with relevant expertise; (ii) allocate the necessary funds to develop appropriate ICT for schools and education institutions and ensure that the outcome of such development work is available freely to all; (iii) allocate the necessary funds to ensure that every education institution has access to high quality ITC, both hardware and software, irrespective of where it is situated; (iv) allocate the necessary funds to provide continuous professional development in the use of ICT for teachers and other education professionals; (v) ensure that high quality internet access is available to all schools and education institutions.
6. Where commercial ICT companies are engaged by Governments or national education or school authorities to contribute to the provision of ICT in education or become voluntarily involved in such provision, that engagement should be subject to agreements which (i) recognise the professional integrity and independence of the education institutions and personnel who are affected; (ii) ensure that the primary purpose of the engagement is to provide support for teaching and learning; (iii) ensure that consultative processes with professional education staff are an essential element in the development of the software and hardware provided; (iv) include provision for monitoring mechanisms for the implementation of any such agreements which include professional education staff.

## **II. Findings of ICT**

1. *Changing Teaching:* Teachers could give many different and specific examples of how technology had changed their work. A number of things were being done with Web sites, from giving students notes which one teacher described as a "low end thing," to getting students to create their own Web pages.
2. *Changing the Teaching / Learning Relationship:* The relationship between teacher and learner is sometimes reversed with regards to information technology. Some teachers went as far as to use terms like "co-learners" to describe the new relationship between teacher and student.
3. *Administration and Expanding Professional Networks:* The use of information technology has changed institute administration in several ways. Teachers are expected to check their e-mail, and a lot of things that used to be done at a staff meeting are now done via e-mail. Also, e-mail is becoming an important communication tool between parents and teachers. In addition most of the teachers use e-mail to keep in touch with other teachers and friends.
4. *Concerns Teachers have about the use of Technology:* While recognizing that there were some concerns and problems with integrating the use of information and communication technology, teachers thought it was beneficial to the educational process and should be continued.
5. *Inequalities:* Another frequently mentioned problem was the disparities between students who have access to computers at home and those who do not.

## **III. Discussion**

The use of ICT is changing teaching in several ways. With ICT, teachers are able to create their own material and thus have more control over the material used in the classroom than they have had in the past. Rather than deskilling teachers as some scholars claim, it seems that technology is requiring teachers to be more creative in customizing their own material. Also, using Web pages to enhance an activity demonstrates that technology can be used to complement other aspects of good teaching rather than replace them. It is evident that involving students in the creation of useful material as a part of a learning exercise is a way to make school more meaningful for students. While the use of Power Point presentations have been criticized by some,

teachers at this school provide examples of how it helps them with their teaching. The use of peripheral devices on computers to help with physics experiments again shows how ICT can be used to aid the learning process and help students focus on higher level concepts rather than less meaningful tasks.

The changes caused by the introduction of information technology into learning environments, are not without some potential problems which must be considered by administrators. The information from this school indicates that some fundamental rethinking of the education process may be necessary because of the use of ICT. This will also put pressure on the school system to restructure the way education is organized.

#### **IV. Conclusion**

There is need to change the attitude of the people in the institutions when you change the peoples' attitude the institutions will change automatically. This can be achieved through intensive and continuous in-service training of teachers in order to enable them keep abreast with the changing technology. Computers should be availed to all staff or enable the staff have access to them such that they become a personal affairs, an instrument to be used to broaden the mind, to cultivate one's interests, to interact with others. At that point it can and will naturally become a teaching resource for the individual teacher. This can be achieved by providing an annual budget for each department for the development of ICT facilities. Provision of computers, the Internet and e-mail accounts to staff and students should be emphasized as these provide the basic foundation for the use of ICTs in Universities. The establishment of an effective ICT unit and support structure as a driver for the integration of ICTs in the teaching and learning process should be adopted. This is because central units offering professional support and guidance concerning ICT are of key importance. Universities should move towards the provision of e-learning. E-learning offers enormous facilitation to teaching and learning and this will reduce crowding in classes and better facility utilization will be realized. There should be a move to carry out curriculum review in order to incorporate ICTs and this should also involve the development of a joint curriculum in order to cater for quality control and standardization.

A positive attitude facilitates fast and smooth integration of ICTs in the teaching and learning process in institutions of higher studies. The provision of the necessary facilities allows the integration of ICTs in the teaching and learning process to take place.

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