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UNDERSTANDING OF BARRIERS OF ICT IN EDUCATION AND ITS EFFECTIVE USE

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ABSTRACT

Information Communication Technologies are the power that has changed many aspects of lives. The impact of the ICT on each sector of the life across the past two-three decades has been enormous. The education is a socially oriented activity. Using ICTs in education it moved to more student-centered learning. The aim of the study is to identify the effectiveness of using ICTs to promote teaching and learning and to study the obstacles faced during the use of ICT in education. The major barriers were lack of confidence, lack of competence, lack of access to resources and shortage of time. Since confidence, competence and accessibility have been found to be the critical components of technology integration in schools, ICT resources including software and hardware, effective professional development, sufficient time, and technical support need to be provided to teachers. No one component in itself is sufficient to provide good teaching. However, the presence of all components increases the possibility of excellent integration of ICT in learning and teaching opportunities. Generally, this paper provides information and recommendation to those responsible for the integration of new technologies into education and suggests stimulating factors such as motivation and attractiveness to design ICT based teaching learning.

KEY WORDS: Teaching, ICT, Integration, Barriers, Professional Development, Review.

INTRODUCTION

Information and communications technology (ICT) extended term for information

technology (IT) which stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information. The term ICT is also used to refer to the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system. The broadness of ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form, e.g. personal computers, digital television, email, robots.

In this 21st century, the term "technology" is an important issue in many fields including education. This is because technology has become the knowledge transfer highway in most countries. Technology integration nowadays has gone through innovations and transformed our societies that has totally changed the way people think, work and live (Grabe, 2007). The use of information and communication technologies in the educative process has been divided into two broad categories: ICTs for Education and ICTs in Education. ICTs for education refers to the development of information and communication technology specifically for teaching/learning purposes, while ICTs in education involves the adoption of general components of information and communication technologies in the teaching-learning process. Different teachers use different tools to improve their teaching skills.

Accordingly, teachers from all disciplines have widely integrated Information and Communication Technology (ICT) to improve their teaching styles (Liu, 2011; Liu and Velasquezbryant, 2003; Hew and Brush, 2007; Donnelly et al., 2011). Therefore, the effective use of ICT significantly contributes to emergence of reforms in teaching and learning processes in all sectors of education (Pulkkinen, 2007; Wood, 1995). Currently, ICT plays an important role in promoting new instructional methods for teaching and learning, such as: self-paced learning (Roberts, 2003),

network learning and online discussion. Moreover, effective use of ICT can facilitate student- centered active learning (Ellis et al., 2008), engage students in collaborative learning as well as enhance their social interaction (Dodge et al., 2003).

Technology can be applied for different uses, however, and not always for an academic purpose. For example, students might use ICT to prepare class materials or for personal use.

In higher education institutions, ICTs are used for various purposes ranging from the structuring of management-information systems to the course evaluation schemes. ICT integration can be defined as the process of using and spreading the Internet and computer applications in reaching information in in-class learning and in improving communication to develop learning (Van Melle, Cimellaro & Shulha, 2003). ICT integration is a multi-dimensional and comprehensive process that covers both the technological sources forming the infrastructure dimension and the stakeholders forming the human-force dimension. No one component in itself is sufficient to provide good teaching. However, the presence of all components increases the possibility of excellent integration of ICT in learning and teaching opportunities. In the comprehensive ICT integration process, any situation that prevents especially the instructors from benefitting from ICT opportunities in the teaching-learning process is defined as the barriers in ICT integration. In literature, a number of barriers influencing the ICT integration process are defined. According to teachers, the factors such as inappropriate teacher training, lack of motivation and confidence in using ICT and lack of ICT skills are regarded as barriers to ICT integration in teaching-learning processes. According to educational institutions, the absence and poor quality of ICT infrastructure, limited access to ICTs and lack of suitable educational software are all barriers in the ICT integration process. Furthermore, lack of experience in ICT-based projects in school strategies and lack of systematic planning and lack of ICT mainstreaming into schools' strategy are among other barriers in terms of schools. The rigid structure of traditional education systems,

traditional assessment, restrictive curriculum and restricted organizational structure are the barriers to the integration of ICT in education in terms of the system (European Schoolnet, 2006).

The basic factors influencing ICT use in the teaching-learning process are defined by Williams, Coles, Wilson, Richardson and Tuson (2000) as lack of information, skills and support and access to technology. According to the results of research conducted in 26 countries, the basic problem encountered in ICT integration is stated to be the deficient number of computers and the lack of teachers' knowledge (Pelgrum, 2001). Ertmer (1999) categorized the factors - which prevent teachers from using ICT in their classes – in two groups: the factors out of teachers' control such as access to technology, time, technical support, sources, content and education, and the factors due to the teachers themselves such as attitudes, beliefs, application and consistency. It is stated that factors that prevent the teachers from integrating ICTs into their teaching were lack of time and lack of education (Rheaume, 2001). It was also found out that lack of infrastructure and the limited access to the software and hardware constituted the most significant barriers in ICT integration (Brill & Galloway, 2007). In a study conducted by Robertson, Grady, Fluck and Webb (2006), lack of time, lack of convenient place, intensive curriculum, lack of source management and the busy working-schedule of teachers were determined as the barriers for ICT integration.

In another study that aimed determining the institutional, environmental and professional development factors influencing the integration of ICTs into the school environment, it was found out that lack of time was the most important barrier that created worried teachers and prevented them from integrating ICTs into their courses. Some teachers reported that there should be someone who coordinates ICT use in every school. These teachers also stated that in this way, the possible problems could be solved and that teachers would avoid wasting time. Lack of directives regarding the use of the computer room leads to the fact that students play

computer games or use only the educational software, which results in competition among students. Many of the projects developed regarding ICTs in schools were not successful or completed. Lack of successful projects influences teachers' attitudes towards ICT use. As a result, few teachers use ICTs in the teaching-learning process. It was also revealed via research that there is a need for teachers trained not only in technical but also in instructional aspects regarding ICTs (Puga, 2006).

Since various barriers are likely to occur at any time of the integration process, educational institutions should develop strategies to cope with various types of barriers for the purpose of supporting the instructors in the integration process. Therefore, before developing action plans for effective ICT integration, it is important to determine and overcome the barriers encountered in the process.

THE PURPOSE OF THIS PAPER

The paper focuses on studying the findings and key points from review of significant part of available literature associated with teachers' integration of ICT into their teaching from effectiveness of ICT in teaching and perceived barriers of ICT in teaching for the purpose of removing those barriers for successful ICT integration in teaching. Based on this analysis, the paper provides recommendations on improving ICT in teaching.

EFFECTIVENESS OF ICT IN TEACHING

ICT has so many advantages in the learning and teaching process. Classroom management is one of them that gained benefits from ICT. According to experienced teachers who use ICT in their classrooms that ICT may make the classroom controlling more effortless because ICT provides materials that make the class more interesting and easy to control. The existence of several sorts of ICT tools gives the class other support of learning especially in terms of visual and auditory learning. ICT provides benefits in education in following ways:

- Motivation Factor: The ICT in teaching can act as a motivating tool for many students. Young people are very captivated with technology. Educators must

capitalize on this interest, excitement, and enthusiasm about the Internet for the purpose of enhancing learning. For already enthusiastic learners, the Internet allows you to provide them with additional learning activities not readily available in the classroom.

- Fast Communication: The ICT promotes fast communication across geographical barriers. Your students can join collaborative projects that involve students from different states, countries or continents. This type of learning experience was not possible before the Internet. This is a unique learning experience very essential for each of our students, as the world is becoming one big community.
- Cooperative Learning: The ICT facilitates cooperative learning, encourages dialogue, and creates a more engaging classroom. For example, a LISTSER V for our class will allow your students to get involved in class discussions through e-mails in a way not possible within the four walls of the classroom.
- Locating Research Material: Apart from communication, research is what takes many people to the Internet. There are many more resources on the Internet than the school library can provide. We can encourage students to take advantage of this wealth of resources on the Internet for their research.
- Acquiring Varied Writing Skills: If students are required to publish their work on the Internet, they have to develop hypertext skills. These skills help students gain experience in non-sequential writings. Moreover, and since the Internet is open to all with access, students publishing their work on the Internet are forced to be mindful of their language and to write to non-expert audience.

BARRIERS TO INTEGRATION OF ICT INTO EDUCATION

One of the most important trends in the present education system is the change and restructurisation in the teaching/learning process integrating technological innovations. It is difficult for teachers to change according to the requirements (teachers should know and be able to use models of ICT skill acquisition, teacher

should be acquainted with virtual environments, he/she should be able to integrate ICT in the curriculum, teacher should know main functions of operation systems etc.) of the documents which regulate ICT integration because they do not have enough ICT competency, therefore, resistance to change conducted by ICT integration in the teaching and learning process emerges and barriers to the integration of information and communication technologies into the teaching/learning process appear.

Barriers faced during integration are cited below:-

- Lack of confidence & competencies
- Limited accessibility
- Lack of support
- Shortage of time
- Change process:

1. Entry;
2. Adoption;
3. Adaptation;
4. Appropriation;
5. Invention.

Further are given more detailed descriptions of every stage of barriers to the ICT integration into the teaching/learning process:

- Lack of confidence & competencies; several researchers indicate that one barrier that prevents teachers from using ICT in their teaching is lack of confidence. Teachers fear to use ICT in classroom due to lack of knowledge and proper competency.
- Limited accessibility: Lack of qualification development is not the only barrier to the integration of technologies into the teaching/learning process. Lawton (1994) notes that accessibility is one of a number of problems. If the teachers are required to

use such resources as information and communication technologies, they must have access to these technologies. It is also very important that these technologies function in an indefectible way, i.e., it is important to make overall technical provision (Lai 2001).

- Lack of support: Means and Olson (1995) assert that easily accessible technical support (maintenance of computer hardware and intranet infrastructure) is an important factor in the school change, integrating constructivist education and information and communication technologies at school. The authors remark that teachers will have no intention to use technologies if they feel they can encounter technical problems (not working software, hardware problems etc.) that can only be repaired in several days.

However, teachers need not only technical support to be able to use information technologies in the teaching/learning process. According to the research data by Ringstaff (1995), teachers, supported and motivated by the school principal, used information and communication technologies more during their lessons in comparison with those who did not receive support from the school administration.

 Shortage of time: A number of researchers (Cook, 1997, Ang 1998, Glennan and Melmad 1996), and also National Education Association (NEA, 1999-2000) claim that shortage of time is the major and crucial barrier to change in the school culture and integrating ICT into the school and teaching/learning process.

Time is the major factor which is necessary if teachers intend to develop their professional qualification, participating in various courses. Teachers are suggested spending half of the time for contact hours with students and the other half for carrying out professional responsibilities - teaching. Teachers need time to reflect upon what they have learnt and to plan how to apply the newly acquired knowledge in class.

Whereas Hargreaves (1994) asserts that additional time does not guarantee the change of the teaching/learning process. It is how the time is planned and used that is most important.

• Change process: The highest barrier to integration of information and communication technologies into the teaching/learning process is the change as such. CEO (1999) discerns five stages of integration and overcoming difficulties:

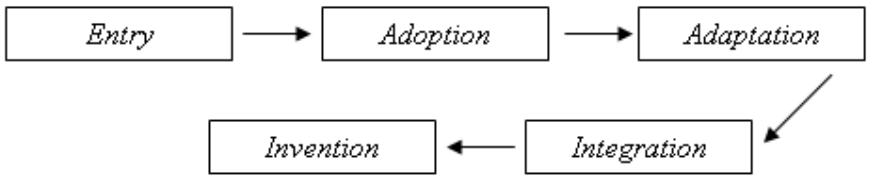

Fig. 1. Five stages of technology integration

- In stage one (Entry) learners, not the teacher, gets acquainted with information technologies. Technologies are treated as a problem and inconvenience.
- In stage two (Adoption) technologies are treated as a useful but limited phenomenon. Teachers use technologies to expand their personal tasks, such as administration of tasks, organizing schedules etc. In this stage teacher gives students examples and encourages learner use of technologies.
- In stage three (Adaptation) technologies are used in class work. Teachers use information technologies to add variety to the teaching content but do not change their teaching style. Teachers use compact discs, Internet, electronic encyclopedia to obtain information more often than traditional teaching/learning means books. In this stage teachers do not change the teaching form and it remains teacher-centered.
- In stage four (Appropriation) teachers begin to perceive the opportunities provided by information and communication technologies and start creating tasks that are pre-eminent in their possibilities. Learners start guiding their own learning and use technologies for their learning aims to achieve their higher order thinking objectives. Technologies are perceived as a useful tool.
- In stage five (Invention) teachers start changing the class and teaching/learning setting to improve the use of technologies during lessons. Students use technologies to achieve basic and higher order thinking skills. Invention occurs when the teachers create tasks and even change class environment to take advantage

of the opportunities provided by technologies. To successfully integrate technologies teachers have to change even their teaching style and their approach to teaching.

VARIOUS MEASURES TO OVERCOME ICT INTEGRATION BARRIERS:

Studies have highlighted various following measures to overcome ICT integration barriers into education:-

- Political decisions: Using information and communication technologies in the process of teaching/learning, i.e., in class, their integration into the present curriculum aiming at improvement of teaching/learning is the most difficult process. This attempt to integrate information and communication technologies can be fruitless and inefficient unless HRD plans and provides educational institutions with proper resources.
- Educational Institution Management: Management of Educational Institution can play a very important role in integrating ICT into the system of education. It is worth mentioning that not only ministries should tale how the process of integration should be organized, but also institutions could give feedback on difficulties they are facing integrating ICT into curriculum and suggesting what could be done differently.
- Teacher as learner: Teachers have to experience learner position. In the learner position teacher models a positive situation for learners and shows learners a different perspective, which makes the perception of new subjects easier. Teacher has to feel free and without any restrictions in the teaching environment. Only these feelings will foster the teacher to learn and develop further.
- Barriers as opportunities: The emerged difficulties should be viewed as opportunities to develop. It should not decrease motivation but should be transformed into the constructive process of teaching/learning, which could support ICT integration in a more efficient way.
- Peer support: Reliable colleagues can become internal "technology" teachers who could teach in small and convenient groups. Teachers can be provided help by

sharing best practices of the same school teachers or analyzing the benchmarking projects.

- Time Issue: If the school intends to achieve good results in the area of ICT integration, then reasonable time in a year should be devoted to teacher activities outside the class. During these events teachers should be acquainted with innovations in information and communication technology area, and should be explained in detail how to use these innovations and integrate them into the process of teaching/learning.

CONCLUSION:

The new era of ICT in education should be developed rapidly to appropriate extent in order to matching the capability of students as well as teachers in educational experience due to the development of new information technology. It enhances students thinking and enables them to think out of the box and make the best use of their learning process. But a lot of barriers are faced during the successful integration of ICT in education. To create an environment of effective ICT integration, the education program must focus on eliminating these barriers. The major barriers were lack of confidence, lack of competence and lack of access to resources. For successful implementation of ICT in teaching, technological planning supported by administration with overall motivation to existing teaching faculty should be implemented. Teaching faculty should be timely updated about the new updates of ICT for successful implementation into teaching. Using ICT tools and equipment will prepare an active learning environment that is more interesting and effective for both teachers and students.

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