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Challenges and Issues to the Successful Execution of ICT in Teaching and Learning: A Review of the Literature

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Abstract—*ICT in teaching and learning is a new phenomenon that India is experiencing. With the integration of ICT in education system, it has enhanced the teaching-learning process in terms of incorporation of vivid facts and data and increased collaboration among the students and between teachers and students. Various issues and challenges to the implementation and incorporation of ICT has caused a great hinderance to the teaching and learning process. The aim of this paper is to produce a meta-analysis of the existing literature that will help to identify the factors on the general problems faced in the implementation of ICT. The review indicates major challenges and issues that subsist not only individually in teaching and learning but common to both. The study requires extended examination in order to find solutions and recommendations to the constraints of the use of ICT in teaching and learning.*

Keywords*: ICT in teaching and learning, challenges and issues, ICT in education system, implementation of ICT.*

1. INTRODUCTION

Information and communication technology (ICT) has become a crucial part of our daily lives in any organisations and institutes that we are in. [33]. In Dawes'[29] opinion, new technologies have the capacity to provide education across curriculum and give opportunities for effective communication between teachers and students, globally, which was not possible before. It has brought up new ways of teaching. Yet, the capacity is still not realised in the terms as Dawes expressed that "problems arise when teachers are expected to implement changes in what may well be adverse circumstances" (pg. 61). Nevertheless, [28] technology is made available in our society but the developing nations are far from procuring their benefits due to certain challenges and issues.

Technology should be used as a tool to support educational objectives such as skills for searching and assessing information, cooperation, communication and problem solving- which are important for the preparation of the children for the knowledge society [31].

ICT in teaching and learning enhances education in the following ways:

1. Promotes learning by doing approach
2. Enables self-paced learning
3. Provides access to wide range of up-to-date learning materials
4. Enriches learning through the combination of audio, video, images, text and animation
5. Enhances leaning through interaction and collaboration[41].

Many studies have been conducted but this is a meta-analysis of the existing papers to summarize and highlight the challenges and issues faced in the successful implementation of ICT in learning and teaching.

Studying the obstacles to the use of ICT in teaching and learning will provide a direction to lead on to the improvement and a successful use in the educational field. It is anticipated that this paper will be useful for educators, policymakers and other decision makers who are directly/indirectly involved in the implementation of ICT in education in India.

2. CHALLENGE AND ISSUES TO THE EXECUTION OF ICT IN EDUCATION

2.1 Lack of Time: The study indicates lack of time as the biggest constraint to the integration of ICT in teaching-learning situation. Teachers usually are burdened with heavy workload and need time to learn how to use hardware and software. They also need time to incorporate technology into their curriculum[36]. Some teachers are unable to effectively make use of ICT in their classrooms, while others are unwilling to try because of anxiety, lack of interest, or lack of motivation [11].

When there is less time and a lot of part of the syllabus needs to be covered, teachers use less technology as they think it's a waste of time. Teachers unanimously agree that using ICT in

teaching would be weak and unsuccessful due to insufficient time [20].

Abuhmaid[2] conducted a study on the effectiveness of ICT training courses within the Jordanian education system where the sample population was 115 teachers and 12 school principals. Various methods such as interview, classroom observations etc. were used in order to collect data. In the study, one principal stated that "teachers are already overloaded; they could not cope with the pressure and the pressure from ICT training" (pg. 12).

Samarawickremaand Stacy's [19] findings of their research found that increased workload coupled with teaching with technology was critical to the 22 participants of the study. Course maintenance and constant upgrades, student emails, the learning of new skills and the continuous search for sustainable strategies for teaching were the factors that contributed to the increase of workload of the teachers. Thus resulting to the lack of time for successful implementation of ICT in teaching.

2.2 Lack of Positive Attitude and Acceptance: In order to successfully implement ICT in teaching and learning it is important for a teacher to have a strong and supportive attitude. It is perceived that if teachers believe that technology is neither fulfilling their needs nor students' needs then it is likely that they will not integrate ICT in teaching and learning processes. [24]26].A study conducted by Demirci[6] on teacher's attitudes towards Geographic Information Systems (GIS) in Turkey stated that although lack of hardware and software existed but teachers' positive attitude was an important element in the successful integration of GIS in geography lessons. The study used questionnaire method to collect data from 79 geography teachers teaching in 55 various high schools.

In Australia, for example, the integration of new technology in the educational set up was handled differently by every teacher which showed vivid attitudes of teachers' towards acceptance and their beliefs influenced their teachings in the classroom [18]. Empirica[15] stated that teachers had unclear benefits or no benefits to the use of ICT in their classrooms such as computers.

Schoepp[27], in his study, found that teachers were neither rewarded nor appreciated for integrating ICT into their lessons which resulted in the change of their attitudes.

In order to be successful in ICT in teaching and learning, teachers need to "engage in conceptual change regarding their beliefs about the nature of learning, the role of the student, and their role as teacher" [14] (pg. 157).

According to Moseley and Higgins [13] study revealed that the teachers who had less technical knowledge yet possessed positive attitudes towards ICT required less effort and encouragement to learn the skills that were necessary to the successful implementation of the ICT in teaching and learning. Whereas, Teachers with negative attitudes who possessed less skill knowledge about the computers were less likely to accept and adapt technology as compared to those with positive attitudes. So, their study indicated that it is important to replace the negative attitudes of teachers with the positive one in order to increase their computer skills, resulting in the successful use of technology in their classrooms.

According to Bingimlas [25], "resistance to change seems not to be a barrier itself; instead, it is an indication that something is wrong" (pg. 238). There are several reasons as to why resistance to change may occur.

2.3 Lack of Administration Support: According to Sife, Lowga and Sanga [7], in order to implement ICT successfully into our teaching and learning, it is very important that there is administrative support like the top management and other leaders at every level.

Yuen, Law and Chan [22]conducted a case study of 18 schools in Hong Kong where they found that the principal played a great role in exhibiting visionary leadership in technology which influence the successful use of ICT in classrooms.

Dwyer, Ringstaff and Sandholtz[12] stated that if our administrators become competent in the use of technology by broadly understanding the technical, pedagogical, administrative, financial and social dimension of the ICT then there can be effective and sustainable integration of ICTs.

Another study was conducted in Hong Kong as well as in Singapore schools by Wong and Li [16] where the results suggested that proper support by the administrators and leaders of the school can influence the effective ICT transformation.

2.4 Lack of Technical Support: One of the top issues to ICT that primary and secondary teachers face was the lack of technical assistance [40]. "Technical barriers impeded the smooth delivery of the lesson or the natural flow of the classroom activity" [10] (pg. 43). In her study, technical issues included waiting for websites to open, failing to connect to the internet, printers not printing, malfunctioning computers, and teachers having to work on old computers.

The Becta[8] report stated that "if there is lack of technical support available in the school, then it is likely that technical maintenance will not be carried out regularly, resulting in higher risk of technological breakdown" (pg. 16). The participants of her report stated that they were scared to use ICT in their classrooms because of sudden breakdown of the hardware during the lessons [8].

In Ireland, NCTE [23] (National Council for Technology in Education)census on ICT infrastructure (as cited in ICT strategy group report 2008-2013) found that about 85.3% of schools reported technical support and maintenance as a 'high' or 'very high' priority and claimed that it should be an important element of the school ICT environment with proper technical support being made available to maintain hardware

and infrastructure. Providing, in Yilmaz's [32] report, schools with hardware and internet connection for assessing technological integration processes in Turskish education system along with proper repair and maintenance for the continue use of ICT in schools.

Jones [3] stated that the breakdown of the computer causes disruption and if there is lack of technical assistance, then it is likely that regular repairs of the computer will not be carried out which will result in teachers not using computers in teaching.

2.5 Lack of Accessibility: Adequate resources for the use of ICT is a necessary condition to support the successful use of ICT in the classrooms [38]. ICT in teaching and learning can be fully adopted by having the resources such as hardware and software which are the necessary and the primary source otherwise teachers can't use them (Andoh, 2012).

Albirini[4] conducted a quantitative study on teachers' views on computer attributes, cultural perceptions, computer competence, computer access and personal characteristics. The participants of the study were 63 males and 251 female teachers. The results indicated that 57% of the participants had computers at home whereas 33.4% had access to computers at school. This revealed the teachers' inadequate access to computers.

According to the National Centre for Education Statistics [30] report revealed that over 50% of the participants used computers for research and lesson preparation in their schools. About 78% of the participants complained of the inadequate access to computers in the classrooms. 38%, of this percentage, of the participants stated that inadequate computers were not great barriers to ICT use in their teaching.

According to the study by Dexter and Reidel[34] ,they revealed that 37.4% of the teachers had access to computers and 14.4% of the students had access to computers indicating that computers are more available to teachers than students. It is obvious that in order to encourage student centred technology, it is necessary that learners have access to quality technology resource.

Pelgrum[40] concluded in his study that four out of the top ten barriers were related to insufficient numbers of computers, insufficient peripherals, insufficient numbers of copies of software and insufficient simultaneous Internet access.

In their research, Balanskat, Blamire and Kefala [5] found that even the accessibility of ICT resources does not guarantee successful implementation in teaching, and this is not merely because of lack of ICT infrastructure but also because of other issues such as lack of high quality hardware, suitable educational software etc.

Teachers complained about how difficult it was to always have access to computers. The author gave reasons like "computers had to be booked in advance and the teachers would forget to do so, or they could not book them for several periods in a row when they wanted to work on several projects with the students" [10] (pg. 50).

2.6 Lack of Funds: Financial resources are the key factor to the successful implementation of the integration of ICT in education. Countries with good financial conditions are considered to have proper reach of hardware and software as to implement ICT in their classrooms [7].

Lack of funds to obtain the basic hardware and software is one of the reasons teachers do no use ICT in their classrooms, study conducted by Mumtaz [37].

2.7 Lack of Skills: Knezek and Christensen [17], in their study, reported that the teachers' competence with the computer technology is the key factor for the effective use of ICT in teaching. So, those teachers who do not have the skill, could not integrate the ICT tools in their teaching.

Similarly, Peralta and Costa [21] found in their multiple case-study research, conducted in five European countries) that technical competence influenced Italian teachers' use of ICT into their lessons. In Portugal, they experience that the new teachers stressed on the need for technical skills and attitude in order to improve and effectively use ICT in their classrooms.

According to Divaharan and Koh [35], professional development of teachers when they are provided with ICT skills training and strategies to implement ICT into their lessons.

To conclude, Jones [3] stated that the teachers' skill to use ICT in the classrooms is directly related to their attitude and confidence.

3. DISCUSSION

Various studies have been conducted and several challenges and issues have been identified by the authors in their papers like lack of computers, lack of quality software, lack of time, technical problems, teachers' attitude towards computers, poor funding, poor training, lack of skills in integration of ICT in teaching and learning etc.

Limitation

The purpose of this paper was to determine the challenges and issues from the existing relevant literature. No data or sample had been collected as a primary data, it's merely a secondary data that address the problems.

It only emphasis on one technology that is computers and ignore the other technology that can be used as ICT tool such as CDs, DVDs, radios, televisions, mobile phones etc.

It cannot be ignored that the need for collection of primary data is required along with further investigationto directly address the problems and present implications for the successful use of ICT in teaching and learning.

4. CONCLUSION

The aim of this paper was to highlight the problems related to ICT in teaching and learning. The major challenges and issues are lack of time, lack of positive attitude and acceptance, lack of administration support and lack of confidence, lack of accessibility, lack of funds, lack of awareness and lack of skills are constraints in the teaching and learning processes to use ICT successfully. The paper does not provide any kind of solutions or recommendations rather has left it for further examination by the readers and the concerned people of the society.

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