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ASSIMILATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN EDUCATION FOR IMPROVING TEACHING- LEARNING PROCESSES: A CRITICAL REVIEW OF LITERATURE

Showkat Ahmad Rather[1] and Salma Kuraishy[2]

[1]Research Scholar, Department of Education, Aligarh Muslim University, Aligarh.
[2]Associate Professor, Department of Education, Aligarh Muslim University, Aligarh, Educational Consultant, Member Affiliate with Institute for Learning, U.K. Associate Professor, Japanese Government Scholarship (Mombusho) Awardee Gold Medallist.

Abstract:

The development of Information and Communication Technology (ICT) has given a tremendous boost in supporting new modes of delivery in training, teaching and learning within the last thirty years (Samuel & Zaitun, 2005). Information and Communication Technologies (ICT's) are seen as improving learning in both schools and homes. The present study analyzes the integration of Information and Communication Technology in teaching and learning processes. Deployment of Information and Communication Technology (ICT) into teaching and learning is a growing area that has attracted the attention of teachers, administrators and policy makers in the recent years. Global investment in ICT to improve teaching and learning in schools have been initiated by many governments in developed and developing countries of the world. The investigator attempts to analyze the role of Information and Communication Technology (ICT) in enhancing teaching learning processes or the overall quality of education by reviewing the related literature. In the present study an attempt has been made to conduct review of related literature concerning the integration of Information and Communication Technology in education for improving teaching and learning processes. The purpose of the study is to critically appraise the findings of various important studies available on the assimilation of ICT in education for enhancing teaching and learning processes.

Keywords; ICT assimilation; Information and Communication Technologies; teaching and learning.

INTRODUCTION

Education all over the globe is considered to be a catalyst for social, economic and personal changes. It has been recognized as a critical tool for effecting national development. The development of any nation depends mainly on the quality of education. Science and

technology has revolutionized the whole world. The use of Information and Communication Technology in education has undoubtedly influenced and enhanced teaching and learning processes. ICT is expected to improve educational outcomes and improve the quality and effectiveness of teaching and learning (Jaffer, Ng'ambi & Czerniewicz, 2007).

ICTs have the potential to develop innovative skills in teachers that can be used to motivate the students and augment teaching and learning processes. Governments have been spending considerable resources on ICT gadgets to make them available for the schools. If schools have not the sufficient ICT equipment and if teachers do not have ICT skills, training and time, it would be impossible and difficult to achieve a meaningful integration of ICT in education. ICT is becoming increasingly important in our daily lives and in our educational system. It has brought remarkable changes in the twenty-first century all over the world. In fact, ICT has an exceptional and extraordinary place in the classroom as an educational innovation. Realizing the influence of ICT on the workplace and everyday life, today's educational institutions try to streamline their educational curricula and classroom facilities, in order to bridge the existing technology gap in teaching and learning. This restructuring process requires effective adoption of technologies into existing environment in order to provide learners with knowledge of specific subject areas, to promote meaningful learning and to enhance professional productivity (Tomei, 2005). Education is considered as the foundation stone in each and every society. The development of any country depends largely on the quality of education.

The inclusion of multimedia technologies into the classroom has changed the educational landscape, introduced important changes in the educational system and influences the way learners communicate information with each other (Muller, Lee & Sharma, 2008). *"Educational systems around the world are under increasing pressure to use the new Information and Communication Technologies (ICT's) to teach students the knowledge and skills they need in the 21st century"*(UNESCO 2002). The integration of ICT in teaching and learning processes is not a new concept. With the rapid development of emerging technology, ICT integration has increasingly attracted the attention of educators, administrators and policy makers. Normally, ICT is not a part of the curriculum; it is a separate subject. Because of this, pragmatic policies are very important for its integration in education. Despite some challenges, the integration of ICT in teaching and learning has been proven beneficial (Assan and Thomas, 2012). ICT integration is defined as a process of using any ICT tool (including information resources on the web, multimedia programs in CD-ROMs, learning objects, or other tools) in school to improve student learning ((Wang & Woo 2007). Information and Communication Technology (ICT) has been promoted as a platform for providing learners with opportunities in any field (King, 2002; Rovai, 2002) and many significant studies have been conducted on the integration of ICT into classroom teaching to complement and modify the pedagogical practice (Hennessy et al., 2005). Information and Communication Technology policies need to be formulated and planned to complement and support curricula with technologies infrastructures.

Several research studies have highlighted the importance of appropriate factors facilitating and influencing the use of ICT for teaching and learning in the classrooms. Structural and cultural (i.e., leadership) school characteristics contribute to ICT integration in the

classroom. According to policy makers, the integration of Information and Communication Technology (ICT) takes place when the teachers know how to incorporate and use Information and Communication Technology to teach in the classroom (Cuban, 2001; Ertmer, 1999).

PURPOSE OF THE STUDY

The purpose of the study is to understand the impact of Information and Communication Technology on teaching and learning processes by conducting the review of related literature. Although the huge number of studies in the literature explore this issue, the difficulties being experienced for improving the ICT integration, show that it is essential to continue to develop a better understanding of the problem. The study is further aimed at focusing the main factors that affect the integration of ICT in teaching learning processes.

The question is frequently asked as to know what factors and variables determine the integration of Information and Communication Technology in teaching and learning. An attempt has been made to know the variables that determine the integration of ICT in teaching learning process by drawing on worldwide knowledge, research and experience.

Information and Communication Technology (ICT) and quality of Education

Technology development has historically facilitated progressive human civilization, improved living environments, and increased human welfare (Shen, 2004). The researchers in the 21st century are more concerned about the significance of Information and Communication Technology (ICT) in teaching and learning (Chai *et al*., 2011). According to Dawes (2001) Information and Communication Technology has the power to support teaching and learning, and provide new enhanced approaches for doing the required tasks in ways that have not been possible before. Several researches have been conducted in India and abroad on the integration of ICT in education for improving the quality of teaching and learning. Some studies found the impact of ICT technology on teaching and learning in higher education institutions (Mijares and Chan, 2012); some have identified various prospects and problems in the integration of Information and Communication Technology (ICT) facilities for teaching and learning (Bingimlas, 2009; Chen *et al*., 2012). Different studies that were conducted either in India or abroad showed contrary or mixed results. According to Dede (1998), the use of ICT in education can help to improve memory, retention, increase motivation and generally deepen understanding. Haghighi and Eskandari (2012) believe that the use of Information and Communication Technology has fundamentally changed education industry and the way knowledge is being transmitted from teachers to students. ICT has the power to change the daily practices of teachers. The integration of Information and Communication Technology in teaching and learning can make classes more efficient, lectures more convincing, informative and diverse and assignment more extensive, interesting and accessible and make discussions more challenging, making student's papers more original and researched **(**Bowers, 2003). Information and

Communication Technologies improves the interaction between teachers and students. It can engage and inspire students. It also minimizes student's attentiveness to instruction (Inije, 2012). Information and Communication Technologies have the potential to accelerate, enrich, and deepen ICT skills to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Yusuf, 2005).

Again Wheeler (2000) suggests that computers enable the student to access, manipulate, modify, store and retrieve information. They also promote greater independence in learning, enabling students to put forth their choice to approach study, requiring less direction from teachers. He further concluded that students will be able to direct their own studies to a greater extent with the teacher acting as a guide or moderator rather than a director.

The domain of education is affected by Information and Communication Technology. It has certainly affected teaching, learning and research (Yousf, 2005). The World Wide Web affords a virtual international gallery for students' work (Loveless, 2003). Serhan (2009) has stated that Information and Communication Technology promotes autonomy by allowing teachers to design their own material and thereby having more control over subject matter than is possible in a traditional classroom setting. Once the students are more confident in using new technologies in learning processes, they can develop the capability to apply and transfer knowledge with competence and efficiency. The students' creativity can be enhanced by using Information and Communication Technology. According to Gee (2011), the students may discover new multimedia tools and create materials readily available to them through games, CD's, and television. The three attributes of the students i.e., Autonomy, Creativity and Capability and the use of Information and communication Technology can enhance both teaching and learning processes and thereby improving the quality of education.

The integration of Information and Communication Technologies into learning interaction may bring about a new era in the educational practice (Tsikalaki & Valatidis, 2010). Technology has played a central role in improving teaching and learning in light of educational reforms around the globe (Kahveci, Sahin and Genc, 2011). However certain attributes or characteristics are the prerequisites for proper integration and execution of technology in education system. Lowther et al. (2008) have reported three important characteristics that are needed to develop good quality of teaching and learning with Information and Communication Technology. These features are: autonomy, capability, and creativity. The students become the independent learners and they control their learning through the use of Information and Communication Technology. The students have more opportunity to build the new knowledge and become more confident to take risks and learn from their mistakes.

Papaioannon & Charalambous (2011) stressed that Information and Communication Technology in school can motivate students, stimulate their interest, increase their self-esteem and self-confidence, increase their creativity, allow greater inter-activity, enhance their critical thinking and increase their attainments among other benefits. Information and Communication Technology has the power and the ability to enhance and develop teaching and learning processes. It gives teaching faculty a wealth of knowledge and a wide number of options to

facilitate the process of learning; thus enabling students to gain more control over their learning process and enhance their abilities to be lifelong learners (Ouzts and Palombo 2004).

Factors influencing effective integration of Information and Communication Technology

The quality of teaching and learning can be greatly enhanced through the integration of Information and Communication Technology in teaching and learning processes. However, there are several factors which inhibits the integration of ICT into teaching have been identified by researchers. Different investigators advocated different factors that affect the integration of Information and Communication Technology in education. Rogers (2003) identified five technological characteristics or attributes that influence the decision to integrate an innovation. Balanskat, Blamire & Kefalla (2007) identified the factors as teacher-level, school-level and system-level. Sherry & Gibson (2002) claim that technological, individual, organizational, and institutional factors should be considered when examining ICT adoption and integration. In the present study the main factors that affect the integration of ICT in teaching and learning processes are briefly discussed hereunder.

- **Personal Characteristics**
- **Lack of ICT Equipment in Classrooms**
- **Lack of Time**
- **Professional development**
- **Administrative support**
- **Teachers attitude**

1.Personal Characteristics

Personal characteristics become a contributory factor in the integration of ICT in teaching learning processes. Several personal attributes such educational level, age, gender, teaching experience, and attitude towards computers can influence the adoption of a technology, Schiller (2003). Cheng (2006) in his research found that demographical variables such as gender, computer skills and school system remained insignificant. Sadik (2006) investigated and reported that the more positive teachers' attitudes were toward technology the more likely they were to integrate it in classroom. Thus teachers' attitude towards the integration of ICT in education plays a crucial role in the use of ICT by them.

2.Lack of ICT Infrastructure in Schools

Lack of ICT infrastructure in schools hampers teachers to integrate ICT in teaching. The facilities of ICT equipment in classrooms environment encourages teachers to implement and integrate ICT in teaching. Availability of access of ICT infrastructure and resources in schools is a necessary condition to the integration of ICT in education (Plomp, Anderson, Law, & Quale,

2009). The results of several studies conducted on implementation of ICT revealed that the main challenges faced during its implementation is the degree of disparity in infrastructure and limited access, especially telecommunications and electricity that exists between rural and urban areas (Makhonu, 2010, Manduku et al, Laaria, 2013). According to Yildirmin (2007) technical problems in the classroom also affects the effective integration of technology in the school.

3. Lack of Time

The important factor that hampers the teachers to integrate the Information and Communication Technology in education was the lack of time. Lack of time was identified as a barrier to ICT integration (Dias, 1999; Wang & Chan, 1995). According to Vannatta & Fordham (2004), teacher's time committed to teaching and amount of technology training are reliable factors of technology use in classroom. Ertmer (1999) was of the opinion that teachers' perception of lack of time for them to learn and integrate technology into the classroom is a contributing factor that inhibited ICT integration.

4. Professional development

A vital factor that encourages teachers to integrate Information and Communication Technology in teaching is their professional development. Teachers' professional development is a key factor to the successful integration of ICT in teaching. Research has indicated that teachers needed organizational support to integrate ICT in the curriculum (Yee, 2000).

5. Administrative support

Administrative assistance is a key factor that is necessary to implement and integrate any innovation in the overall educational system and without this nothing is impossible and nothing can be achieved. According to Anderson & Dexter (2005), administrative support and principal leadership are key factors for successful integration of ICT in schools. Makhonu, (2010) suggested that implementation of ICT can be achieved in schools if principals and teachers are fully committed in its implementation over a period of time. Pelgrum and Law (2009) revealed that effective integration of Information and Communication Technology depends on the perceptions and vision of school leaders rather than teachers' ICT skills. Sharma (2003) indicated that the use of ICT can improve performance, teaching, administration.

6. Teachers attitude

Teachers' attitude also affects the integration of ICT in education. The findings of several studies revealed that teachers were not making effective use of ICT in their lessons. Bingimlas (2009) and Jamieson-Proctor et. al. (2006) indicated that teachers are reluctant to use ICT in their teaching activities and they pointed out that this is one of the main barriers to the integration of

Information and Communication Technology. Lau & Sim (2008) advocated a teacher with ICT capabilities be chosen in each school to coordinate implementation and provide technical support to teachers.

CONCLUSIONS AND RECOMMENDATIONS

The current study was intended at critically evaluating the previous studies conducted on the amalgamation of ICT in education for enhancing the overall practices (teaching and learning processes) of education and providing an estimation of the challenges encountered and possible factors that hinders the integration of Information and Communication Technology in education. It revealed the findings of research studies which attempted to integrate ICT in education for the enhancement of teaching learning processes. The results obtained from reviewing the literature exposed various factors that hamper the integration of ICT in teaching learning processes. While integrating the Information and Communication Technology in teaching and learning processes, the administrators, Principals and teachers should be given ample opportunities and encouraged to reflect on, and make decisions about the integration of Information and Communication Technology in education. In short, it can be concluded that the administrators, school Principals and teachers are facing numerous challenges during the integration of Information and Communication Technology in schools, in spite of the fact that all of them are having positive attitude towards ICT.

The findings of most of the studies revealed that most of the respondents i.e., administrators. Principals and teachers are willing to know more about ICT for educational purposes. Thus stipulation for in-service training should be made for the teachers and Principals to overcome the possible threats in the integration of Information and Communication Technology in education. The involvement of teachers and principals in the policies and programmes, in-service training opportunity for integration of ICT in education could make a sound base for the implementation of ICT in education and its usage for enhancing the quality of teaching learning processes. The teachers must familiarize themselves with the alterations that occur in the curriculum from time to time and acclimatize to the needs and requirements of innovative trends in subject teaching. Information and Communication Technology specialists must be engaged to assist teachers to effectively integrate Information and Communication Technology in education with the purpose of improving quality of education. This can be done by replacing traditional approaches of teaching by the innovative pedagogies. Appropriate measures must be taken to utilize the available resources as much as possible by incorporating adequate changes in their delivery of education.

REFERENCE

1. Anderson, R. E. & Dexter, S. (2005). School technology leadership: An empirical investigation of prevalence and effect. *Educational Administration Quarterly,* 41(1), 49-82.

2. Assan, T. and R. Thomas, 2012. *Information and communication technology Integration into teaching and learning: Opportunities and challenges for commerce educators in South Africa*. International Journal Education Development Information Communication Technology.
3. Bingimlas, K.A., 2009. *Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature*. Eurasia J. Math. Sci. Technol. Educ., 5: 235-245.
4. Bowers, C.A. (1998: 113). The Paradox of Technology: What's Gained and Lost? *The NEA Higher Education Journal, Spring, 1998, 113.*
   Chai, C.S., J.H.L. Koh, C.C. Tsai and L.L.W. Tan, 2011. Modeling primary school pre-service teachers' Technological Pedagogical Content Knowledge (TPACK) for meaningful learning with Information and Communication Technology (ICT). Computer Education, 57: 1184-1193. DOI: 10.1016/j.compedu.2011.01.007
5. Cheng, K. (2006) "A Research Study on Students" Level of Acceptance in Applying E-learning for Business Course: A Case Study on a Technical College in Taiwan", Journal of American Academy of Business, 8(2), 265-272
6. Cuban, L. (1993). Computers meet classroom: Classroom wins. *Teachers College Record*, 95, 185-210.
7. Davis, N.E., & Tearle, P. (Eds.). (1999). A core curriculum for telematics in teacher training. Available at: *www.ex.ac.uk/telematics.T3/corecurr/tteach98.htm*
8. Dawes, L. (2001). *What stops teachers using new technology*? In M. Leask (Ed.), Issues in Teaching using ICT, 61-79. London: Routledge.
9. Dede, C. (1998). Learning about Teaching and Vice Versa. Paper Presented at *the Conference of Society for Information Technology in Education*. Washington D.C: USA.
10. Dias, L. B. (1999). Integrating technology. *Learning & Leading with Technology,* 27(3), 10-21.
11. Ertmer, P. A. (1999). Addressing first-and second-order barriers to change: Strategies for technology integration. *Educational Technology Research & Development*, 47(4), 47-61.
12. Gee, J. P. 2011. Language and learning in the digital age. New York: Routledge.
13. Haghighi, S. & Eskandari, M. (2012). A study on barriers of using information technology on learning and teaching in elementary Schools, *Management Science Letters*, 2, 417–424.
14. Hennessy, S., Ruthven, K., & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: Commitment, constraints, caution, and change. *Curriculum Studies,* 37 (2), 155–192.
15. Inije, G. O. (2012). Strategies for Upgrading the Use of ICT in Business Education, Association of Business Educators of Nigeria. *Book of Readings*, *2*(1), 163-169.
16. Jaffer, S., Ng'ambi, D. & Czerniewicz 2007. The role of ICT in higher education in South Africa: One strategy for addressing teaching and learning challenges. *International journal of Education and Development using ICT, 3(4).* Available at: http://ijedict.dec.uwi.edu/viewarticle.php?id=421&layout=html.

17. King, J., Bond, T., & Blandford, S. (2002). An investigation of computer anxiety by gender and grade. *Computers in Human Behavior*, 18, 69–84.
18. Jamieson-Proctor, R.M., P.C. Burnett, G. Finger and G. Watson, 2006. ICT integration and teachers' confidence in using ICT for teaching and learning in Queensland state schools. *Australasian Journal of Educational Technology*, 22:511-530. Available at: http://www.ascilite.org.au/ajet/ajet22/jamiesonin proctor.html.
19. Kahveci, Ajda; Sahin, Nese & Genc, Sebnem (2011). *Computer Perceptions of Secondary School Teachers and Impacting Demographics*: A Turkish Perspective.TOJET: The Turkish Online Journal of Educational Technology, *10*(1), 71-80.
20. Laaria, M. (2013) Leadership challenges in the implementation of ICT in public secondary schools, Kenya, *Journal of Education and Learning* 2 (1) 32-43 Available at: http://dx.doi.org/10.5539/jel.v2n1p32
21. Lau, B. & Sim, C. (2008) Exploring the extent of ICT adoption among secondary school teachers in Malaysia, *International Journal of Computing and ICT research* 2(2) 19-36 Available at: http://www.ijcir.org/volume2- number2/article 3.pdf.
22. Loveless, A. (2003), "Making a difference? An evaluation of professional knowledge and pedagogy in art and ICT". Journal of Art and Design Education, Vol**.** 22, No. (2), Pp145154,
23. Lowther, D. L., Inan, F. A., Strahl, J. D. and Ross, S. M., 2008. Does technology integration work when key barriers are removed? *Educational Media International*, vol. 45, 195-213.
24. Mijares, I. and D. Chan, 2012. Information and communication technologies for the teaching and learning processes in the online modalities of higher education. University of British Columbia.
25. Makhanu, E (2010) Principals' literacy in ICT: towards improving secondary school performance in Kenya. PhD thesis, University of South Africa
26. Muller, D.A., Lee, K. and Sharma, M.D. (2008). Coherence or interest: Which is most important in online multimedia learning? Australasian Journal of Educational Technology (AJET), 24(2), 211-221.
27. Ouzts, D. & Palombo, M. (2004). Technology in higher education: A study of perceptions of college professors. *TechTrends*, 48(5), 17-22.
28. Papoioannon, P & Charalambous, K (2011) Principals' attitudes towards ICT and their perceptions about the factors that facilitate or inhibit ICT integration in primary schools of Cyprus, *journal of Information Technology Education* 10(1) 349-369
29. Pelgrum, W. J. and Law, N., 2009, ICT in Education around the world: Trends, problems and prospects. International Institute for Educational Planning. Available at: <http://unesdoc.unesco.org/images/0013/001362/136281e.pdf>.
30. Plomp, T., Anderson, R. E., Law, N., & Quale, A. (Eds.). (2009). *Cross-national information and communication technology: policies and practices in education*. Charlotte, N.C.: Information Age Publishing.

31. Rogers, E.M. (2003). *Diffusion of innovations*. New York: Free Press
32. Rovai, A. P. (2002). Building sense of community at a distance. *International Review of Research in Open and Distance Learning*, 3(1), 1−16.
33. Samuel R. J., Zaitun A. Bakar (2007) Do teachers have adequate ICT resources and the right ICT skills in integrating ICT tools in the teaching and learning of English language in Malaysian schools? The Electronic Journal of Information Systems in Developing Countries, Vol 29.
    Schiler, J. (2003). Working with ICT: Perceptions of Australian principals, Journal of Educational Administration, vol. 41, no. 3, pp. 171-185.
34. Serhan, D., 2009. Preparing pre-service teachers for computer technology integration. *International Journal of Instructional Media*, vol. 36, pp.439-447.
35. Sharma, R. (2003), 'Barriers in Using Technology for Education in Developing Countries', IEEE 0-7803-7724-9103.
36. Shen, C. (2004). *Technology and learning: Theory and practice*, Taipei: Psychology Press.
37. Sherry, L., & Gibson, D. (2002). The path to teacher leadership in educational technology. *Contemporary issues in technology and teacher education*, vol. 2, no. 2, pp. 178-203.
38. Tomei, L. A. (2005). *Taxonomy for the technology domain*. USA: Information Science Publishing.
39. Tsikalaki. K. and Valatidis, E. (2010). *The role of Information and Communication Technologies in society, our life and education*. In *Epistimoniko Vima*, Issue 13 (pp. 133-140). Athens: PRESS-LINE.
40. Wang, Q. & Woo, H. L. (2007). Systematic planning for ICT integration in topic learning. *Educational Technology & Society*, 10(1), 148-156.
41. Wheeler, S. (2000). The Role of the Teacher in the Use of ICT Learning Technology Research. Keynote Address Delivered at *the National Teachers Conference, University of Western Bohamia*, May 20.
42. UNESCO. Information and Communication Technologies in Teacher Education (2002). UNESCO, Paris.
43. Vannatta, R. & Fordham, N. (2004). Teacher dispositions as predictors of classroom technology use, *Journal of Research on Technology in Education*, vol. 36, no. 3, pp. 253-271.
44. Wang, P., & Chan, P. S. (1995). Advantages, disadvantages, facilitators and inhibitors of computer-aided instruction in Singapore's secondary schools. *Computers & Education*, 25(3), 151-162.
45. Yee, D. L. (2000). Images of school principals' information and communication technology leadership. *Technology, Pedagogy and Education*, 9(3).
46. Yildirim, S., 2007. Current utilization of ICT in Turkish basic education schools: A review of teachers' ICT use and barriers to integration, *International Journal of Instructional Media*, vol. 34, pp.171-186.

47. Yusuf, M.O. (2005). Information and communication education: Analyzing the Nigerian national policy for information technology. *International Education Journal* Vol. 6 No. (3), Pp; 316-321.

Showkat Ahmad Rather
Research Scholar, Department of Education, Aligarh Muslim University, Aligarh.

Salma Kuraishy
Associate Professor, Department of Education, Aligarh Muslim University, Aligarh, Educational Consultant, Member Affiliate with Institute for Learning, U.K. Associate Professor, Japanese Government Scholarship (Mombusho) Awardee Gold Medallist.