Preeti et al. International Journal of Recent Research Aspects ISSN: 2349-7688, Vol. 9, Issue 2, June 2022, pp. 13-17

Integration of ICT in Teacher Education

Preeti & Dipti

Assistant professor, Tika Ram College of Education, Sonepat

Abstract: **Information Technology (IT) is the very essential for today as well as the tomorrow in education, economy, businesses etc. Education play the vital role in day today lifetime because it is the place that everyone's lifetime begins. Education is very efficient, valuable useful when it accumulated with information technology. Most of the schools around the world use Information Technology and Communication (ICT) integrated technologies in teaching and learning process such as video, audio and image projection, tablet usage, online learning, websites, mobile phone techniques etc. For identifying challenges, techniques, problems that arise with the new methodologies, most of the countries have conducted surveys and questionnaires. From that most of the countries give solutions for problems like IT centers, providing infrastructures, trainings for teachers, improving English capabilities. In Sri Lanka 400 IT centers are established for improving IT related education. The results of this study are to provide literature review under integration of ICT in teaching and learning in schools which are written in the area of topic. And this paper identifies the technologies that use by several different counties, challenges that they face and give the solutions for them. This will help for every future carrier to build their future valuably.**

Information Technology (IT) is critical for today's and tomorrow's education, economy, and enterprises, among other areas. Education is extremely important in today's world because it is where everyone's life begins. When education is combined with information technology, it becomes very efficient and useful. Most schools throughout the world employ ICT-integrated technology in their teaching and learning processes, such as video, audio, and image projection, tablet use, online learning, websites, and mobile phone approaches, among others. Most countries have done surveys and questionnaires to discover issues, strategies, and problems that develop with new methodologies. As a result, the majority of countries provide answers to concerns such as IT centres, infrastructure, teacher training, and English improvement.

Keywords: Sustainable education; computing for SDG: Education; ICT for sustainable Education; Sustainable Development Goals; Education for All.

I. INTRODUCTION

Education has a crucial part in the development of anything that is beneficial to individuals. Teaching and learning are two processes that are essential to education [1]. Information, communication, and technology are all integrated into education. It is one of the most important methods for transferring knowledge from one country to the next. Some schools continue to employ the traditional approach, but this does not improve education because the world's technology are always evolving, and students, as the next generation, must keep up [2]. Some argue that integrating ICT with education is for computer-assisted learning, while others argue that details are for processing, producing, and designing [3]. Instructors who are well-informed employ conventional books and libraries in their classrooms; consequently, teachers must be well-educated [4]. As a result, people are completely changed due to integration of ICT. ICT has become essential for modern or today's life of people with integration of ICT such as smartphones , tabs with internet .[5]. Main factors for effective ICT integration are leadership for education, school support, ICT infrastructures and Information Technology (IT) effectiveness [6]. The quality of the education depend mainly on two factors. Teacher's quality is the key factor of school education [1]. Teachers do their woks through the ICT using operational and socially way such as making presentations, files, animations, work files and digital things as well as the conferences reports and blogs [7]. Teachers can gain more benefits using Moodle for conferencing with students then they can upload essential materials and students can ask questionnaires [8]. Students who depend on education are the second part of the education. For this type of education, why it needs ICT integration because of building knowledge as demand one, developing new ideas, providing the valuable environment, discovering new ideas and building creativity, collaboratively among the learners and the teachers[5]. Leadership for education, school support, ICT infrastructures, and Information Technology (IT) efficacy are all important aspects for effective ICT integration [6]. The quality of education is mostly determined by two elements. The quality of a teacher is a critical aspect in school education [1]. Teachers use ICT to carry out their work in both operational and social ways, such as creating presentations, files, animations, work files, and digital items, as well as conference reports and blogs [7]. Teachers will gain greater benefits from using Moodle for conferencing with students since they will be able to post necessary materials and students will be able to ask questions [8]. The second part of education is students who are reliant on it. Why does this style of education require ICT integration? To establish knowledge as a demand, to generate new ideas, to provide a valuable environment, to discover new ideas, and to build creativity

cooperatively among students and teachers.When comparing this traditional education with modern education,it is totally different, therefore it should be a fantastic and creative one . Therefore, integration with IT can be done with power point presentation which is a creative tool to transfer ideas and information's effectively and impactfully , computer labs, smart classes, online libraries and smart computers etc. [1]. From the waves that goes in sky digital things are implemented to technology tools [4]. In 1980 ICT began to engage with education. In USA very early time more than 100 schools connected with internet and started to work with ICT.It cannot happen with one single unit. Due to limited internet connections, facilities, time and the lack of ICT training to teachers, it would be challenge to the ICT integration in learning and teaching programme. Main barrier that identified by Malaysia is lack of technology usage and the lack of the teacher's training is another problem arises in Saudi Arabians [2]. Another important fact is most of them use this ICT for their controlling works more, not for education [9]. According to the survey that conducted by Owerri, it shows computers, CDs and DVDs are mostly used than the other technological tools [10]. In Owerri education area they use tools that not related with ICT than the ICT tools [10]. But the whole countries around the world started to build the ICT integrated education. It can be seen many older teachers are using and tending to use ICT related tools for teaching learning process [9]. In Belgium, iPads are used by every teachers and students for their educational purposes [11]. Korean government enacted some acts to develop the ICT education like "7th national process" [12]. It improves the teaching learning process in a very attractive way. Most of the counties tie up moneys for new technologies that used in schools [11]. In Japan, most schools use cameras, TVs, projectors, CDs, DVDs, radios, and other activities, etc. [13]. It shows the effectiveness of the use of ICT in their education. Most of the English and Japanese classes use ICT infrastructures [13]. ICT integrated education can also be referred to as e-learning. When we consider the e-classroom, it consists of computers, servers, projectors, and sound controllers. About 75% students were agree with ICT-integrated education according to survey report conducted with e- learning. [12]Teachers in every school should be trained to use modern IT tools/ equiippments . Government should provide the facilities and funds in order to established ICT centers. This is a most valuable suggestions to implement schools with ICT integration. Keep generators when power off times is the most important thing to develop [10]. In this independent study, I am going to describe critical review about how most of the countries use ICT integration in teaching and learning in schools and it would be more valuable and beneficial to the future development and search what are the newly discovered technologies that used in schools then provide guidance to future career.

II. BACKGROUND

Today's world is interacted with the ICT integrated in many ways not only in the education. But the education integrated with teaching and learning processes in schools is the major advantage to the future careers. Most of the countries are already using this valuable opportunity to the teachers and the students because of the technology-based processes have gone across innovations or research purposes. Changing of knowledge due to the ICT integration, world business economy also developed and rapidly changed. Ministry of Malaysia already provide free WI-FI areas to every institute[2]. Government in Malaysia has started the project related to the ICT in school called smart project. They were provided 8000 ICT equipments were to the schools in 2005, then at the end of the 2010, they have given facilities of 10000 equipment to the schools [2]. Malaysia has established three policies related to the ICT in schools. As discussed earlier most of the schools are fulfilled with internet, smart classes, boards, labs etc. [14]. When using these tools and medias teachers and learners must think about colors, animations, sounds, video, graphic and internet that could be used in ICT integration. Colors, sound and animations are very attractive way for humans therefore use of colors in right way and clear sound is also very important for our ICT integrated with education. Internet is also playing major role because all the details are allowing to the websites using internet as well as search engines. E-mails also helpful for collaboration in effectively way. Most of the high schools and universities like Colombo, Moratuwa and Peradeniya use video conferencing with same country as well as the outside countries [4]. In Pakistan ICT integrated teaching and learning process have been started in 2004 [15]. At the end of the 2006 government has found that the smart phone users are about 40 million and the 75% of teachers have used computer-based teaching processes [15]. In 2007 first policy for the ICT used in school was established in Tanzania [15].According to the available records in Tanzania, 5% of primary teachers and 17% of secondary teachers had well interested in microcomputers. It is used multi community centers as ICT integration [5]. 35000 of science and mathematics teachers are using ICT in teaching and learning. [3]. There is a high rate in using ICT for teaching in China because of the entertainment that it gains .After the analysis of survey , it has showed most of the student in china would like to use ICT for their subjects and they believe ICT can improve their levels of education. China has a idea to use big data for their educational process for gaining the valuable and effective outcome [16]. Korean government established some projects like "ICT Adopting for education" to gain flexibility, develop education effectively through the ICT integrated education. It carried out 30 year more because of the successful of that project. Government provide the plan like school computer plan. It is used for creating education efficiency with the increasing the computer usage of schools. Then the second part of the plan was established, and ICT

education promotion plan (2001) also was established by government [12]. USA, Australia, UK use effective ICT tools like video chatting, online learning, video and images projecting etc. Another new method is LiveText and mobile technologies. In 1980 , Sri Lanka started integration of ICT in higher schools then some of the projects that conducted by other countries supported to increase the use of ICT in Sri Lanka year between 2001 to 2004. General Education Project 2 (GEP 2) project is another method that use for Sri Lankan education. It has established 400 IT centers for schools. Other methodologies that used in Sri Lanka is network internet facilities for schools, providing multimedia rooms, hardware software methodologies for schools and websites for supporting to the education [6]. Before conducting and using ICT facilities for education, Japan was introduced ICT for their education in 1985. Then they became the ICT related education. According to the survey, students who having 3.17 of average rate would like to use IT integrated education life [13].Many teachers are trending to create functions using ICT such as creating and showing video, images and graphics [13]. Most of the European countries confirm their schools mostly use laptops, tabs and mobiles (95%) for their educational purposes [7]. As well as Philippines use mentoring scholarship programs for teachers to improve the technology knowledge and adopting tools and technology for their educational process through the computer literacy association so that they can provide better and impactful teaching way to students to get better results. It improves the functional and professional experienced of teacher's knowledge [3]. As above countries developing ICT in teaching and learning became an essential method in one of the process in countries. Most important thing is used these valuable opportunities in right way and get valuable advantages and then provide values and best experiences for developing countries..

III. DESCRIPTION

Information and Communication Technology (ICT) is defined by Kent and Facer (2004) as the use of the internet, computers, and other electronic delivery mechanisms such as radios and televisions. According to Kent and Facer, the education system has been an important determinant in children's computer exposure since they use computers more actively to participate in a variety of activities (2004). ICT is becoming a more effective tool in the education sector for teaching, learning, and assessing students; as a result, modifications and reforms are required to ensure that all students receive a quality education.

According to Fu (2013), appropriate use of ICT would efficiently raise a said people's educational quality. Education does not have to be carried out in an enclosed space or a classroom as it is the norm. Still, it is a continuous process that is lifelong in which the learner will continue seeking knowledge through various sources. This means that ICT skills are increasingly being indispensable to them. ICT has been seen as a critical factor that expands access to education because, with it, education can occur at any time and anywhere. Most education material is available online at any time. Technologies such as teleconferencing allow students and instructors to interact simultaneously, efficiently, and conveniently. There is a myriad of resources on a particular subject matter available on the internet today; these resources are of various materials: videos, audio podcasts, 3d visual representation, and etcetera. The main task in achieving sustainable education for all by 2030 has been converting the education environment into more learner-centered (Sánchez et al., 2011). This will enable them to be more decisive planners and thinkers (Lu, 2010).

According to Brush (2008), ICT for education sustainability has helped students and learners across the world access educational material more effectively and efficiently. ICT has been a tool that has enabled them to discover new areas of interest, solve problems, and discover new perspectives.

According to Chai et al. (2010), through ICT, students' understanding and knowledge in several areas have been increased, thus creating an environment where creative learning has been taught. This is mainly through applications that have been designed purposefully to meet a variety of needs. There are some main characteristics that we will have to look into creativity, capability, and autonomy (Lowther, 2008). Autonomy dictates that students take control of their learning. They tend to become used to working by themselves and in conjunction with others without necessarily having a teacher's input. Through this, students can then develop confidence in specific disciples hence nurturing their capabilities.

Special requirements, anxiety related to the use of electronic devices, and students' capacity to travel from one area to the next are among the challenges facing the implementation of ICT standards and protocols to meet sustainable education for all by 2030, as identified by Frederick et al (2006). To achieve this goal, governments have been required to prioritise curriculum creation, infrastructure, capacity building, policy stipulation, and assistance.

According to a United Nations report (2010) from the Department for Economic and Social Affairs, the European region population has increased by 800 million people in 18 years between 2000 and 2018. An estimated 400 million will be added to this number to bring the total population to 4.9 billion people by 2030. Paying attention to this, the school-age population contributes to 20.9% of the total population on average, that is, the ages of 5-17. With most of these countries having a high fertility rate, the number of children is continually increasing, putting pressure on the public system to provide efficient and effective services that touch on essential factors like health and education. Of the allocated budgets, an increase is expected from year to year because the number of students enrolling in schools for education keeps on increasing.

According to Shaikh (2011), most of these countries will be forced to inject tremendous resources into the educational sector to achieve sustainable education for all. There have

been notable changes in improving educational standards, and ICT is one of them. With this, most countries aim to deliver lifelong learning efforts to tuck on the various educational areas ranging from technical to vocational education and training. ICT has been deemed ineffective in achieving this goal due to the following factors: it spreads quickly, as evidenced by the current number of mobile phones in this region. ICT significantly reduces expenses, which is a significant benefit for the education industry. Students may get an education no matter where they are thanks to low-cost internet platforms.

IV. CHALLENGES

Integration in ICT does not consider all over the world simply because every county has their own different cultures, facilities and economical background. Therefore, there will be many challenges to establish ICT integrated technologies for teaching and learning processes in all schools. Main barrier that identified by china is lack of effective attention to the ICT integration from schools as well as the teachers. If government do their responsibilities for IT related education, the problem is not using it by schools and teachers [16]. There are many areas in Sri Lanka that does not have availability of good facilities. It can be seen from many countries in the world like poor economic counties, therefore they still following the traditional way. We can identify main three factors that affect to the ICT challenge. They are teacher's challenges, school challenges and system challenges. Lack of training, lack of knowledge in IT are the factors affected to the teachers. Non- availability of internet, non-availability of effective tools are school challenges etc. English language is the major supporting tool for ICT integration. For teachers and leaners should understand English is mandatory and it leads to challenge for ICT integration [6]. Most of the European countries identifies that it is hard to move to the laptops in classroom extent to whiteboard.And another big problem analysed by survey report is by European countries is that teachers claimed about a smaller number of providing of infrastructures and tools as well as the non- availability of training regarding the new technologies. Poland, Italy, Greece and most of European countries still do not use digitally enabled education. Usage of digitally enabled education is about 15% [7]. Internet, online tools and infrastructures also play a major role. Therefore , lack of those things is leading to challenges for ICT integration. Toyoma schools also had that problem [13]. Most of the students still do not close with the digitally enabled education because they would like to work with ICT integrated education not only in school but also in home [7]. Some countries like Philippines conducted programs like mentoring the teacher for ICT integrated education. In that program challengers are identified as lack of electricity, lack of time and lack of technology and tools infrastructures [3]. There are many more challenges faced in many ways in many countries. It should be needed to identify those challenges that it is very important and give solutions for them immediately..

V. CONCLUSION

The paper reviewed that technologies and tools that most of the countries use. From that they gain valuable opportunities. According to the survey, it was analysed that Most of the students and teachers also very happy with ICT in education system.But challenges and problems can be seen in several countries such as lack of infrastructures, lack of training, lack of funds for E-education etc. Most of the organizations has provided projects for improving these concepts for poor and rural schools. It is necessary for providing financial support for better infrastructures, conducting training programs for teachers and improving leadership etc. There are most of positive results from ICT integration in schools for teaching and learning process rather than the negative results that can be seen from this paper.. They are helping to develop student interaction, communication and organization and to check the progress of learners as well as multiple subject can be handled at same time by instructors of education as I have said above. Negative results are the disruption of education,the reduction of extra child activities, the reduction of social interaction that affect social behaviour of students etc. The main target of this research paper is to provide motivation to the students and teachers who are not using ICT integrated study in their education in different countries.

References

[1]. Kent, N., & Facer, K. (2004). Different worlds? A comparison of young people's home and school ICT use. Journal of computer-assisted learning, 20(6), 440-455.

[2]. Fu, J. (2013). The complexity of ICT in education: A critical literature review and its implications. International Journal of Education and Development using ICT, 9(1), 112-125.

[3]. Sánchez, J. J. C., & Alemán, E. C. (2011). Teachers' opinion survey on the use of ICT tools to support attendance-based teaching. Computers & Education, 56(3), 911-915.

[4]. Lu, Z., Hou, L., & Huang, X. (2010). Research on a student-centered teaching model in an ICT-based English audio-video speaking class. International Journal of Education and Development Using ICT, 6(3), 101-123.

[5]. Brush, T., Glazewski, K. D., & Hew, K. F. (2008). Development of an instrument to measure preservice teachers' technology skills, technology beliefs, and technology barriers. Computers in the Schools, 25(1-2), 112-125.

[6]. Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2010). Facilitating preservice teachers' development of technological, pedagogical, and content knowledge (TPACK). Journal of Educational Technology & Society, 13(4), 63-73.

[7]. Lowther, D. L., Inan, F. A., Daniel Strahl, J., & Ross, S. M. (2008). Does technology integration "work"

when key barriers are removed? Educational Media International, 45(3), 195-213.

[8]. Frederick, G. R., Schweizer, H., & Lowe, R. (2006). After the in-service course: Challenges of technology integration. Computers in the Schools, 23(1-2), 73-84.

[9]. Shaikh, Z., A., & Khoja, S. A. (2011). Role of ICT in Shaping the Future of the Pakistani Higher Education System. Turkish Online Journal of Educational Technology-TOJET, 10(1), 149-161.

[10]. Dalal, S., Agrawal, A., Dahiya, N., Verma, J. (2020). Software Process Improvement Assessment for Cloud Application Based on Fuzzy Analytical Hierarchy Process Method. In: , et al. Computational Science and Its Applications – ICCSA 2020. ICCSA 2020. Lecture Notes in Computer Science(), vol 12252. Springer, Cham. https://doi.org/10.1007/978-3-030-58811-3_70

[11]. Dalal, S., Jaglan, V., & Sharma, K. (2014). Designing architecture of demand forecasting tool using multi-agent system. International Journal of Advanced Research in Engineering and Applied Sciences, 3(1), 11–20.

[12]. Sikri, A., Dalal, S., Singh, N., & Le, D.N. (2019). MAPPING OF E-WALLETS WITH. Cyber Security in Parallel and Distributed Computing: Concepts, Techniques, Applications and Case Studies, 245.

[13]. Dalal, S., Dahiya, N., Jaglan, V. (2018). Efficient Tuning of COCOMO Model Cost Drivers Through Generalized Reduced Gradient (GRG) Nonlinear Optimization with Best-Fit Analysis. In: Saeed, K., Chaki, N., Pati, B., Bakshi, S., Mohapatra, D. (eds) Progress in Advanced Computing and Intelligent Engineering. Advances in Intelligent Systems and Computing, vol 563. Springer, Singapore. https://doi.org/10.1007/978-981-10-6872-0_32

[14]. Sharma, D., Sharma, K., & Dalal, S. (2014). Optimized load balancing in grid computing using tentative ant colony algorithm. International Journal of Recent Research Aspects, 1(1), 35–39

[15]. Kumar, S., & Dalal, S. (2014). Optimizing Intrusion Detection System using Genetic Algorithm. International Journal of Research Aspects of Engineering and Management ISSN, 2348–6627.

[16]. Meenakshi Malik, D.N. (2021). Driving Pattern Profiling and Classification Using Deep Learning. Intelligent Automation & Soft Computing, 28(3), 887–906.

[17]. Gil-Flores, J., Rodríguez-Santero, J., & Torres-Gordillo, J. J. (2017). Factors that explain the use of ICT in secondary-education classrooms: The role of teacher characteristics and school infrastructure. Computers in Human Behavior, 68, 441-449.

[18]. Arora, S., & Dalal, S. (2019). Trust Evaluation Factors in Cloud Computing with Open Stack. Journal of Computational and Theoretical Nanoscience, 16(12), 5073–5077

[19]. Kubler, S., Robert, J., Derigent, W., Voisin, A., & Le Traon, Y. (2016). A state-of-the-art survey & testbed of Fuzzy AHP (FAHP) applications. Expert Systems with Applications, 65, 398-422.

[20]. Nishant Kumar, N. (2018). Approach of Lion Optimization Algorithm for Efficient Load Balancing in Cloud Computing. International Journal of Management, IT and Engineering (IJMIE), 8(8(1)), 59–72.

[21]. Fu, J. (2013). The complexity of ICT in education: A critical literature review and its implications. International Journal of Education and Development using ICT, 9(1), 112-125.

[22]. Sheikh, M., Sharma, K., & Dalal, S. (2014). Efficient method for WiMAX soft handover in VOIP and IPTV. International Journal of Research Aspects of Engineering & Management, 1(2), 5–48.

[23]. Remenyi, D., Money, A., & Bannister, F. (2007). The useful measurement and management of ICT costs and benefits. Elsevier.

[24]. Dalal, S., & Athavale, V. (2012). Challenging Bullwhip Effect of Supply Chain Through Case Based Multi Agent System: A Review. International Journal of Advanced Research in Computer Science and Software Engineering, 2(12), 267–272.

[25]. Fleming, S., & Hynes, J. (2014). Attitudinal and behavioral barriers of technology adoption by teachers. OF TEACHER EDUCATION, 85.

[26]. Dalal, S., Agrawal, A., Dahiya, N., Verma, J. (2020). Software Process Improvement Assessment for Cloud Application Based on Fuzzy Analytical Hierarchy Process Method. In: , et al. Computational Science and Its Applications – ICCSA 2020. ICCSA 2020. Lecture Notes in Computer Science(), vol 12252. Springer, Cham. https://doi.org/10.1007/978-3-030-58811-3_70

