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## **Abstract**

Malaysian Higher Learning institutions have embraced ICT skills in teaching and learning to ensure career readiness among learners. Information Communication Technology tools provide the opportunity for educators to address problem-solving and project-based learning in both face-to-face and blended learning. However, there have been issues of educators' awareness and skills in utilizing the technology tools in the instructional processes. The purpose of the study was to establish the Outcomes of Technology Integration in Instruction by Higher Learning Institutions in Asia with a focus on Malaysia. The paper was a literature based in which comprehensive review of existing literature on technology integration in Education was interrogated to come up with study themes. The empirical literature was reviewed to identify main themes and conclusion drawn based on the reviewed literatures. The study found that factors that influenced integration of ICT in the primary teacher training colleges in Malaysia included: adequacy of internet connectivity, adequacy of computer hardware, adequacy of computer software, maintenance of ICT infrastructure, training of personnel in ICT, teacher workload, teacher gender, teacher age, presence of ICT policy and adequacy of fund. Additionally, lecturers were found to be aware of the relevance of Web 2.0 tools for instructional purposes. However, they highlighted low internet speed as the main challenge in their efforts to integrate technology into their instructional activities. This research contributes to the area of TPACK (Technology Pedagogical Content Knowledge) by highlighting the application of computer-related technologies into classroom instruction and how such technologies are matched with learner-centered instructional strategies to enhance learners' 21st century skills that are essential for career readiness. This paper concludes that integrating technology in instruction will serve as a strategy for leveraging education in Malaysia if first-order barriers such as insufficient ICT infrastructure, limited ICT competency among teachers and tutors and lack of comprehensive ICT training are addressed effectively. The study recommends that, the

managements of higher learning institutions in the country should provide teachers with regular trainings and seminars on how to adopt ICT in the teaching and learning process.

**Key words:** *Technology integration, higher learning institutions, ICT, Malaysia*

### 1.1 Background of the study

The first computer system in Malaysia was implemented in 1996 (Chan, 2017). Since then, the Government has introduced various initiatives to facilitate the greater adoption and diffusion of ICT to improve capacities in every field of business, industry, education, and life in general. These measures include the enhancement of education and training programmes, provision of an environment conducive to the development of ICT, provision of incentives for computerization and automation, and creation of venture capital funds. Currently, Malaysia is in full gear to steer the economy towards a knowledge-based one. The Ministry has formulated three main policies for ICT in education. Whereby, the second policy emphasizes on the role and function of ICT in education as a teaching and learning tool, as part of a subject, and as a subject by itself. Apart from using radio and television as a teaching and learning tool, this policy stresses the use of the computer for accessing information, communication, and as a productivity tool. ICT as part of a subject refers to the use of software (e.g. AutoCAD and SCAD) in subjects such as “Invention” and Engineering Drawing. ICT as a subject refers to the introduction of subjects such as Information Technology and Computerization.

In reality, most instructors have some familiarity with computers and are able to use a variety of computer software as found in one study done by the National Education Association. It was found out that 94% of all respondents in the survey are able to search the Internet. However, they do not know how to fuse computer skills into classroom instruction. As a study conducted by Cuban (1999) reported, out of every 10 teachers in U.S., fewer than two seriously are users of computers and other information technologies in their classrooms (several times a week); three to four are occasional users (about once a month); and the rest (4-5 teachers out of every 10) never use the machines at all. As another findings from a survey on Survey of ICT utilization in Philippines Public High School’ stated that 92% of the respondents who are teachers of the public school said that there is a need for more information given to them on how to use ICT to support the curriculum and 96% of the respondents need to develop skills to hands on activity to share with their students (Tinio, 2019).

The use of ICT in education improves the teaching and learning process by providing support to teachers and students and connecting them to each other and to a wide range of information in an efficient way (Kreijns, Van Acker, Vermeulen & Van Buuren, 2013). There is increasing evidence with regards to the benefits of ICT usage in education (Blackwell, Lauricella, Wartella, Robb & Schomburg, 2013 and Tondeur, Van Braak, Ertmer & Ottenbreit-Leftwich, 2017). Perrotta (2013) observes that ICT usage in education assists teachers in carrying out various tasks which include: searching for information and preparing lesson materials; presenting information (e.g using power point presentations, interactive whiteboards and data projectors); collection and management of data about students’ activities; collaborating with colleagues; communicating with students and parents; and sharing resources to the wider education community. Similarly, Williams (2008) indicate that the use of ICT which include the use of electronic media, internet platform and advanced educational technologies results in several benefits: accessibility to a broader circle of learning materials; better clarifications and insights on the subject taught, by using a plethora of

presentation tools, thus fostering participatory pedagogies. Despite the proven positive educational outcomes associated with the use of ICT in education, teachers have been found to show reluctance to adopt ICT in the teaching and learning process (Ward, 2020). Indeed, while a few teachers seem to have no difficulties in integrating ICT in the educational process and have a largely positive opinion about the benefits of ICT in education, many educators do express some form of adverse reactions (Kreijns et al, 2019). Technology is even seen by some educators as being a source of threat to their traditional way of work (Williams, 2008). Consequently, it becomes important to identify the determinants of ICT adoption in education so as to increase its use in the teaching and learning process by teachers.

The intention of an individual to make use of a particular technology has been found to be highly associated with his or her actual usage of the technology and two main determinants of usage intention as suggested by the Technology Acceptance Model (TAM), are the user's ease of use and perceived usefulness of technology (Davis, 2017). Zhao and Cziko (2018) opine that three conditions are necessary for teachers to fully embrace ICT; the latter must have the belief that they have control over the technology used, its effectiveness and finally be assured that the medium used will not cause disturbances. The applicability of TAM to the education sector and the relevance of other determinants such as teacher self-efficacy and teacher ICT literacy are further discussed below. Technology can play various instructional roles and it is the responsibility of the instructors to decide how to best use technology to support student learning. Having a complete infrastructure of the ICT will go meaningless if it is not utilized to the fullest capacity. Meanwhile, Schwach (2019) and Demetriadis et. al (2018) argue that the effective use of technology in classroom is not only limited to the teachers' perceptions on how to use technology in class but also through professional development for teachers. Their study indicates that training is needed in order for teachers to be able to integrate computer in their classroom practice.

Information and Communication Technology (ICT) is recognized as an essential tool for improving the quality of education (Blackwell, Lauricella, Wartella, Robb and Schomburg, 2013). Governments all over the world have accepted the fact that ICT does play a significant role in improving education and massive investments have been made in this area since a while (Vongkulluksn, Xie & Bowman, 2018; Prasad, Lalitha & Srikar, 2015; Dalby, & Swan, 2019; Sharma, 2015 and Kangro and Kangro, 2014). Inevitably, the adoption and effective use of ICT in the teaching and learning process is one of the most discussed issues in the contemporary education policy making process (Baturay, Gökçearslan and Ke, 2017). The knowledge and skills required to embrace the emergence of ICT is also a priority for all education authorities worldwide (Hordern & Tatto, 2018). The importance of ICT in education has been supported by several researchers who found that the proper use of ICT as a facilitator in the teaching process do have positive effects and help in students' attaining better results (Shemroske, Burnett & Khayum, 2016; Teeroovengadum, Heeraman & Jugurnath, 2017; Ding, Ottenbreit-Leftwich, Lu & Glazewski, 2019 and Noor-Ul-Amin, 2013). Indeed, findings from the extant literature demonstrate that ICT has the ability to support education and provide opportunities for effective communication among educators and students across the curriculum in ways that have not been possible before (Tondeur, Aesaert, Pynoo, Braak, Fraeyman and Erstad, 2017).

Gil-Flores, Rodríguez-Santero and Torres-Gordillo (2017) points out that some factors influence the likelihood that ICT will be integrated in schools include access to ICT facilities, teachers' expertise, ICT resourcing or cost, ICT leadership and general teaching. On teachers' ICT expertise,

there is growing and widespread awareness that the pedagogical and technical expertise of the teacher is absolutely critical in the teaching and learning (Bingimlas, 2009). This has made governments in Asia, as elsewhere to emphasize on teacher development as the key to effectively implementing policy and curricular, to using ICT to enhance teaching and teaching to raising educational standards. Information and communication technology integration is primarily an individualized approach to teaching which allows students to work independently developing self-independence which encourages mastery of content thus aiding mastery of learning in school (Ghavifekr, Razak, Ghani, Ran, Meixi, & Tengyue, 2014). Effective introduction of ICT technology into schools is also largely dependent upon the availability and accessibility of ICT resources that is, hardware, software, and communication infrastructure (Liverpool, 2002). Bransford & Brown, (2000) in their study noted that, the situation has been improving in the last few years. Schools are increasingly being equipped with computers for teaching, learning and administrative purposes; connectivity is improving and the students are enthusiastic about using computers for learning despite inadequate computers in the institutions (Lynch, & Weycker, 2018).

Abdi (2018) posit that Information and Communications Technology (ICT) has undergone innovations and transformed the society that has totally changed the way people think, work and live as part of this, schools and other educational institutions which are supposed to prepare students to live in a knowledge society need to consider ICT integration in their curriculum (Ghavifekr, Razak, Ghani, Ran, Meixi & Tengyue, 2014). In conjunction with preparing students for the current digital era, teachers are seen as the key players in using ICT in their daily classrooms. This is due to the capability of ICT in providing dynamic and proactive teaching-learning environment (Arnseth & Hatlevik, 2012). According to Zinger, Tat and Warschauer (2018), both students and teachers need to learn to trust the technology for technological performance as well as enhance the uptake and reduce resistance to technology. Teachers need to be confident and competent in using various ICT tools to build their trust in the technology. Without teachers' competency and mastery skills of ICT integration which is appropriate to their needs, ICT could not be put into good use for instructional delivery.

Teachers should have a range of different technical and communication skills which include using chat rooms, word processing skills, web page authoring and using various kinds of ICT tools such as File Transfer Protocol (FTP), compress and decompress of files, e.g., Win zip and so forth (Uerz, Volman & Kral, 2018). Grabe and Stoller (2013) suggest that, before attempting to address integration of technology in learning, it should be first pointed out that in the current information society a country could choose to be an e-tiger (a country determined to take radical policy decisions to be a front runner), e-floater (a country trying to keep pace with the most dynamic countries), e-follower (a country that makes the best use of what reaches it in due course), or e-skeptic (a country which does not believe in the transformation and development potential of ICT and does not take any active step). So only the first two can stay networked. The best will receive residual e-fallout (willing in the case of e-follower and unwilling in the case of e-skeptic). ICTs are transforming schools and classrooms by bringing in new curricula based on real world problems, providing scaffolds and tools to enhance learning, giving students and teachers more opportunities for feedback and reflection, and building local and global communities that include students, teachers, parents, practicing scientists, and other interested parties (Francis, Ngugi & Kinzi, 2017).

In Saudi Arabia, Alwani and Soomro (2010) found out that some barriers that prevented effective use of IT in science teaching included the fact that poor consistency and compatibility existed between teacher training, available software, and hardware in schools. It was revealed that most efforts undertaken were to supply hardware; however, the hardware that was delivered to Saudi schools was very limited; consisting of older and limited versions. The hardware installed supported very limited software applications produced by the hardware company. Often, this software did not serve the needs of the science teachers. There were also the issues of a lack of availability of Arabic computer software for science and what was available was very expensive.

In Malaysia, there have been moves to adopting technologies in many schools, more significantly in higher education 15 institutions (Malaysia National ICT Policy of 2013). Some of these institutions of higher learning have introduced new technology, especially computer science and information technology, into their curriculum. For example, in 1995, the University of Dar-es-Salaam approved an Information and Communication Technology (ICT) policy plan, which was geared towards overseeing and implementing ICT programs in improving technology use at the university (Lwoga, Sife, Busagala & Chilimo, 2016). According to the university website (<http://www.udsm.ac.tz/>), all academic buildings were networked and this enabled all teaching staff to have access to computers. To facilitate the implementation of ICT in carrying out its primary activities of teaching, learning, research, and service to the community, the Instructional Technology Resource Unit (ITRU) was established in Malaysia from a project proposal submitted to the Carnegie Corporation for funding in 2001. This plus other moves in different faculties and institutes at the university suggest that there are efforts to put technology integration in place. However, challenges in the use of technology, specifically in the context of higher education in developing countries, have been identified. For example, Sife, Lwoga, and Sanga (2007) argue that the ICTs have not permeated to a great extent in many higher learning institutions, not only in Malaysia but in many developing countries, due to many socioeconomic and technological circumstances. In their article, they observe that despite the achievements that the institutions of higher education in Malaysia have accomplished, they still face many challenges in undertaking the ICT integration process. The challenges include lack of a system approach to learning, awareness and attitudes towards ICTs, administrative and technical support, staff development, lack of ownership, inadequate funds, and transforming higher education.

## **1.2 Statement of the Problem**

Despite of the efforts carried out by the Malaysian government on ICT, according to Schank (2007), modern technology has had very little effect on educators' conceptions of teaching and learning. Besides that, institution authorities have spent millions of ringgit in investment to equip their centres with educational technologies such as computer lab, LCD projector, networking or other computer peripherals like printers and modems to assist teaching and preparations of teaching materials. Moreover, some have engaged professionals to give computer courses to their academic staff in preparation to step up as world-class university. As indicated and found in a few studies cited below, this survey would like to look into the Malaysian Higher Institution scenario of ICT utilization among their educators. The use of technology in education is considered one of the major trends in educational reforms in Malaysia. Integrating technology into the learning and teaching processes is widely perceived as a great assert in those reforms. However, the implementation process of technology integration by universities in Malaysia has been surrounded by skepticism concerning its effectiveness (Mtebe & Raphael, 2017). Challenges to and gaps in

technology integration have been identified and discussed by scholars based on different contexts. In the context of higher education in developing countries, despite notable progress, many challenges loom concerning the use of technology.

There is a necessity to ensure that there are initiatives to monitor the adoption and the effective use of technology to meet the desired goals. Monitoring the effectiveness of technology in education is a necessity, given the observations of some scholars that schools have mainly concentrated on the placement of technology in classrooms without authentic utility in the process of learning and teaching. Furthermore, monitoring may prevent the wasting of resources invested in acquisition of that technology. In that context, the researcher has the perception that despite the fact that the Universities in Malaysia reflects efforts to adopt and use technology, the information provided about technology use does not indicate vivid details of the nature of implementation of technology integration into the university curriculum or the presence of technology plans to guide implementation. The researcher feels that there is a gap in research indicating that the University is on the right track in implementing the requirement of the Vision 2025; therefore, there is a need to conduct a study to reveal the antecedents and consequences of technology integration in instruction by higher learning institutions in Malaysia.

### **1.3 Study Objective**

To establish the Outcomes of Technology Integration in Instruction by Higher Learning Institutions in Asia with a focus on Malaysia.

### **1.4 Research Questions**

What are the outcomes of technology integration in instruction by higher learning institutions in Asia with a focus on Malaysia?

## **2.1 Theoretical Review**

### **Diffusion of Innovation Theory**

The theory was founded by Everett Rogers (1962). The theory explains the user adoption of new technologies and how, why, and at what rate new ideas and technology spread. Diffusion of Innovations Theory (DOI) is a set of generalizations regarding the typical spread of innovations and trends within a social system and therefore explains why some innovations are adopted while others are ignored at various levels of analysis. According to Rogers (2003), diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system while an innovation is an idea, process, practice or device perceived as new by an individual or social unit of adoption. Diffusion is a social process that involves and occurs through the mass media, interpersonal communications and other social networks. According to this theory, the four factors that influence the adoption of an innovation include: the innovation itself, the communication channels used to spread information about the innovation, time, and finally, the nature of the society to which it is introduced.

Kaminski (2011) categorizes adopters of innovation as: innovators, early adopters, early majority, late majority adopters and laggards. The innovators are risk-takers and pioneers in trying out the innovation. The early adopters train early and help spread the word about the innovation to others. The early majority are convinced by the innovation. The late majority wait to make sure that adoption of any innovation will only take place if it is in their best interest. The final group is the

laggards. These are individuals who are highly skeptical and resist adopting innovations until it is absolutely necessary for them to do so. In many cases, the laggards never adopt the innovation. Bateman and Snell (2004) identify five attributes of innovations that help to explain different rates of adoption. First, the innovation must have some relative advantage over an existing innovation or the status quo. Therefore, if an individual perceives that the innovation has greater advantages, then its adoption will be rapid. Secondly, the innovation has to be compatible with existing values, experiences and needs for potential users. Thirdly, the innovation must not be too complex. This is because new ideas that are easy to comprehend are adopted more rapidly than those that require new skills. Fourthly, the innovation must have trial ability for it to be tested for a limited time without adoption. Trial ability provides individuals with less uncertainty and gives them an opportunity to learn and practice by doing. Finally, the innovation must offer observable results. If an innovation shows positive results, the possibility of its adoption is enhanced.

Rogers (1975) indicates that the decision to accept an innovation is neither authoritative nor collective. Each member of a social system faces 5-stage innovation-decisions process. The first stage is called the knowledge stage. In this stage, potential adopters of an innovation must first learn the innovation and know how it functions. In the second stage, the potential users must be persuaded as to the merits of the innovation before they adopt it. Thirdly, they must make a decision to either adopt the innovation or not. The fourth stage is the implementation stage where users put the innovation into actual use. Finally the users must confirm that their decision to adopt the innovation was appropriate. Once these stages are achieved, the diffusion of the innovation that has been introduced takes place. The theory is relevant to the study since it explains the various stages of adoption of technology. The theory also helps the researcher understand the stages of adoption of technology in education in higher learning institutions in Malaysia.

### **Technology Acceptance Theory**

Technology Acceptance Model was first put forward by Davis (1989). The Theory states that when users are presented with a new technology, a number of factors influence Organization Formal and informal linking structures Communication processes Environment Technology support infrastructure Government regulations Technology decision making and adoption Technology Cost Availability their decision about how and when they will use it and Perceived usefulness. All technology acceptance theories are designed to measure the degree of acceptance and satisfaction to the individuals against any technology or information system but from different points of view depending on the constructs or determinants which represent their structure Technology Acceptance Model is an information systems theory that models how users come to accept and use a technology. Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance. Perceived ease of use (PEOU); this is the degree to which a person believes that using a particular system would be free from effort (Davis, 1989).

The attitude toward adoption will decide about the adopter's positive or negative behavior in the future concerning new technology. The model is one of the most frequently employed models for research into new information technology acceptance. Many other researchers have also utilized and suggested additions for TAM theoretical framework (Venkatesh & Davis, 2000, Chuttur, 2009). The TAM model has been used by a number of researchers in ICT integration in management of schools, for instance principals' characteristics influencing ICT in management of

secondary schools (Edward, 2015) and principals' role in promoting use and integration of information and communication technology in public secondary schools (Tanui, 2013). Dishaw and Strong (1999) argued that TAM framework lack the task focus which has led to mixed findings since information and communication technology is task oriented. These researchers therefore proposed the task-technology fit model to address this problem.

## **2.2 Empirical Review**

According to Baylor and Ritchie (2020), training has an important influence on how well integration of ICT is embraced in the classroom. Kalra (2018) stress the need for ongoing support by an ICT coordinator, who is in a good position to guide and successfully integrate ICT at institutional level. The study concluded that a large number of teacher trainers were found not to have access to computers to aid the teaching/learning process and this consequently imply that teacher trainers did not have access to the internet which means that integration is influenced to a large extent by inaccessibility of requisite ICT infrastructure. The study concluded also that, there were a myriad of factors which were found to influence integration of these technologies in learning such as; inadequate computers in the college, lack of expertise necessary for the integration of ICT in the teaching and learning process, high work load for the teacher trainers and lack of interest among teacher trainers which prevented them from integrating ICT in teaching and learning process. Thus, posing a challenge in the integration process.

Melo, Llopis, Gascó and González (2020) observed that without guiding policy means that integration of ICT In teacher training colleges is better said than done. Finally, it was concluded that the adequacy of funds was a factor that influenced integration of ICT in the process of teaching and learning. This impacted on the provision of hardware and software, maintenance of the ICT infrastructure which ensures that computers work properly and provision of training for the personnel on how to use ICT, thus addressing technophobia which causes teacher trainers to fail to take up tasks that require integration of ICT. Based on the study findings, it was recommended that Primary teacher training colleges should develop strategies to identify strengths and weakness of various technological resources with a view to adopting ICT in the process of teaching and learning. It was also recommended that Primary teacher training colleges should provide teachers with regular trainings and seminars on how to adopt ICT in the teaching and learning process. The primary teacher training colleges should ensure that they provide refresher training on regular basis.

According to Lazar (2015) with the help of new technology comes an explosion of learning and receiving new information, especially on mobile devices. The study found out that, today more than ever the role of educational technology in teaching is of great importance because of the use of information and communication technologies. With the help of various applications for distance education, the Internet, teachers, and students themselves, they see the advantage of educational technology. The study indicated that for a better understanding of educational technology requires a set of computer science, pedagogy, psychology, cybernetics and informatics. It was revealed that the knowledge teachers possess is sufficient for a basic use of education technology. However, educational technology is one big system. The study argued that, first of all, teachers have a basic knowledge of the use of educational technology; it takes far more professional training through a variety of conferences, courses, professional literature and seminars in order to get a better knowledge in the use of educational technology. Based on the findings it was concluded that, with

the application of educational technology, students can independently progress in mastering teaching materials, to choose the pace of work, to repeat the material that is not sufficiently clear, that after tests performed immediately get results and track their progress. Interactive, multimedia content provides a great advantage of modern learning over traditional learning. With the application of educational technology we get feedback between the teacher and the student. The study recommended that more studies should be done to find the right strategies to apply educational technology in teaching.

Adedokun-Shittu and Shittu (2014) in their study discovered that, Education technology has been confirmed to have great potentials that impact on teaching and learning, it motivates and engages students to learn and helps broaden their skills, helps to simulate the workplace experiences thereby preparing students for the challenges of the labor market. This revolutionaries the school environment, facilitates teaching by providing resourceful teaching aids for teachers and connects the school to the outside world. Trucano (2005) ascertained that technology empowers teachers and learners and promotes the growth of skills necessary for the 21st century workplace.

Wright, Stanford, and Beedle (2007) describe ICTs as giving opportunities for students to explore, discover, create, communicate effectively and freely with instructors, complete and receive assignments and feedback online, initiate and participate in online discussions. Both lecturers and students in the study of discourse in this article agree on the significant impact ICT has on students and their learning and on teaching and teaching styles. Among the impacts of ICT in teaching and learning reported were; learning aid and resourcefulness, comfort with ICT, psychoanalytical and psychosocial aid, task enabler, interdependence with ICT and learning collaboration. They concluded that access to technology alone does not guarantee integration and technology alone will not guarantee students' learning. Thus, bearing this in mind Robinson (2007) suggests that technology integration be understood as an integral component of a more comprehensive package of education reform which will include curriculum, assessment, instruction and other practices within the context of the entire school. It was recommended that studies evaluating technology impact should employ a combination of quantitative and qualitative approaches such that each can compensate for the weakness of the other, thereby given a detailed and credible result

Leena (2018) discovered that some of the challenges facing integration of technology in learning are; instructors do not know how to use the technology, some educators reject to incorporate technology in the process of teaching and learning. They have not willing to modify their traditional teaching methods (Lepi, 2013); the request for individual learning is not sufficiently supported by new technologies or practices. Technology is not constantly appropriate for all learning styles. Nevertheless, it can assist each learner to obtain his requirements; a variety of the technologies are only initiating to improve. (Poala, 2015), teachers fail to assess both the positive and negative sides of using educational technology and its impacts on the process of teaching and learning the English language. (Lepi, 2013), most teachers do not prefer to not use modern technologies for teaching and learning. They have a negative attitude to current technologies. Therefore, they need an alteration in their attitude and willingness to familiarize with the current progressions to integrate modern technologies into their classrooms and better approaches to teaching are required (Paohhuyla, 2015).

Espay et al (2019) found that some of the common challenges hindering proper integration of technology in education includes; fear of technology, fear of the unknowns with new technologies,

scared to experiment with new technologies, instructors or teachers think they have to learn it all at once, the learners think that a technology coach must have all answers, some schools have technology, but it remains unused, lack of training opportunities, lack of technology support, lack of time to attend training to learn new technologies, lack of time to practice with new technologies, lack of time to create lesson plans that incorporate technology, some teachers practice a "learned helplessness" - it's easier to ask questions than to try to figure things out for themselves, inability to allow students to know more than the teacher, some teachers think they must have the newest technologies in order to effectively do their jobs and both learners and instructors don't understand that older technologies are just as effective for many tasks. The study concluded that teachers face many challenges as they attempt to integrate technology into their classrooms. The study therefore recommended that it is important that technology coaches are aware of those challenges, understand the implications of those challenges, and are able to generate answers to the challenges.

Zinger et al (2018) identified two broad types of barriers that hinder and challenge teachers' efforts in successfully integrating technological pedagogy in the classroom. The barriers were classified as first-order, or extrinsic, and second-order, or intrinsic, barriers. The study found out that first-order barriers are associated with availability of resources, for example, lack of high-speed internet access and lack of teacher PD are first-order barriers. These barriers are more likely to exist in schools serving poorer children (Warschauer et al., 2014). Globally, first-order barriers relating to hardware are most likely to be encountered in developing countries. The study also indicated that second-order barriers are complex and require significant attention at the teacher instructional level. Second-order barriers associated with teachers include teachers' beliefs about the role of technology in their classroom, beliefs about their own teaching, and the willingness or ability to change their practice. The study concluded that the challenges that teachers and students experience in their classroom and context should guide program design and support of technology-based programs. It was recommended that, better understanding teacher technological pedagogical developmental trajectories could inform development efforts across schools and countries.

### **3.0 Methods**

The paper was based on literature review methodology where relevant empirical literature was reviewed to identify main themes. A critical review of empirical literature was conducted to establish the established the outcomes of Technology Integration in Instruction by Higher Learning Institutions in Asia with a focus on Malaysia.

### **4.0 Results and Discussion of Findings**

Based on the results from the reviewed literature it was revealed that the factors that influenced integration of ICT in the primary teacher training colleges included: adequacy of internet connectivity, adequacy of computer hardware, adequacy of computer software, maintenance of ICT infrastructure, training of personnel in ICT, teacher workload, teacher gender, teacher age, presence of ICT policy and adequacy of fund. The reviewed literature also indicated that, other institution-related factors that can be connected to educational computer use are the degree of computer training and ICT-related support.

The results from the reviewed literature indicated that, training has an important influence on how well integration of ICT is embraced in the classroom. The results also indicate that there is need for ongoing support by an ICT coordinator, who is in a good position to guide and successfully

integrate ICT at institutional level. , today more than ever the role of educational technology in teaching is of great importance because of the use of information and communication technologies. With the help of various applications for distance education, the Internet, teachers, and students themselves, they see the advantage of educational technology. Based on the findings of the reviewed literatures, for a better understanding of educational technology requires a set of computer science, pedagogy, psychology, cybernetics and informatics. The knowledge teachers possess is sufficient for a basic use of education technology. However, educational technology is one big system.

As per the reviewed literatures' findings, education technology has been confirmed to have great potentials that impact on teaching and learning, it motivates and engages students to learn and helps broaden their skills, helps to simulate the workplace experiences thereby preparing students for the challenges of the labor market. This revolutionaries the school environment, facilitates teaching by providing resourceful teaching aids for teachers and connects the school to the outside world. The results from the reviewed literatures also show that that technology empowers teachers and learners and promotes the growth of skills necessary for the 21st century workplace.

## **5.0 Conclusion**

There are a number of factors which are found to influence integration of these technologies in learning such as; inadequate computers in the college, lack of expertise necessary for the integration of ICT in the teaching and learning process, high work load for the teacher trainers and lack of interest among teacher trainers which prevented them from integrating ICT in teaching and learning process. The study based on the reviewed literatures also concludes that, in many cases there are lack of proper ICT policy for guiding the process of integrating ICT in the teaching and learning process. Without guiding policy means that integration of ICT In teacher training colleges is better said than done. Finally, it was concluded that the adequacy of funds was a factor that influenced integration of ICT in the process of teaching and learning. These impacts on the provision of hardware and software, maintenance of the ICT infrastructure which ensures that computers work properly and provision of training for the personnel on how to use ICT, thus addressing technophobia which causes teacher trainers to fail to take up tasks that require integration of ICT.

With the application of educational technology, students can independently progress in mastering teaching materials, to choose the pace of work, to repeat the material that is not sufficiently clear, that after tests performed immediately get results and track their progress. Interactive, multimedia content provides a great advantage of modern learning over traditional learning. With the application of educational technology we get feedback between the teacher and the student. It is also concluded that access to technology alone does not guarantee integration and technology alone will not guarantee students' learning. Thus, bearing this in mind Robinson (2007) suggests that technology integration be understood as an integral component of a more comprehensive package of education reform which will include curriculum, assessment, instruction and other practices within the context of the entire school.

Educators in most cases fail to assess both the positive and negative sides of using educational technology and its impacts on the process of teaching and learning the English language. Most teachers do not prefer to not use modern technologies for teaching and learning, they have a negative attitude to current technologies. It is also concluded on the basis of the reviewed literature

that teachers face many challenges as they attempt to integrate technology into their classrooms. Finally, based on the results of the reviewed literature, the study concludes that the challenges that teachers and students experience in their classroom and context should guide program design and support of technology-based programs.

## **6.0 Recommendation**

Based on the findings of the reviewed literatures, the study recommends that, the managements of higher learning institutions in Malaysia should provide teachers with regular trainings and seminars on how to adopt ICT in the teaching and learning process. In addition to this, the management of such higher learning institutions should ensure that they provide refresher training on regular basis. The study also recommends that, more studies should be done to find the right strategies to apply educational technology in teaching in the learning institutions in Malaysia.

The study based on the findings of the reviewed literature recommends that, studies evaluating technology impact in learning in higher learning institutions in Malaysia should employ a combination of quantitative and qualitative approaches such that each can compensate for the weakness of the other, thereby given a detailed and credible result. The study further recommends that better understanding teacher technological pedagogical developmental trajectories could inform development efforts across higher learning institutions in Malaysia.

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