



TEACHERS' CHALLENGES TO INTEGRATE ICT IN EFL TEACHING AND LEARNING ACTIVITIES

Rea Aisha Champa, Dewi Rochsantiningih, Diah Kristiana
Master's Degree Program of English Education, Universitas Sebelas Maret
Surakarta – Indonesia
raishachampa11@gmail.com

Abstract

By means of the innovations in Information and Communication Technology, people are able to rapidly learn and transfer information. Keeping up with those innovations, the integration of ICT in education is the demand of time at present as ICT is being used in many other sectors all over the world. It urges the teachers to be skillful in operating ICT during their teaching. However, there are some barriers for the teachers that prevent them to use ICT in the classroom. This paper is intended to explore the challenges of English teachers in integrating ICT into their teaching. To gain an in-depth result, this case study focuses on the interview of some English teachers in a certain school in Surakarta. The analysis of the data revealed that the barriers of English teachers in integrating ICT are lack of: ICT integration training, competence, equipment, and appropriate software and materials.

Keywords: challenges, ICT, teachers, English class

Introduction

Technology devices are developing rapidly which produces many useful advanced devices. It causes the explosion of ever-changing technologies which makes world borderless. The ICT refers to the hardware, software, networks and media for the collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services (Evoh, 2007). Information are obtained more rapidly than the conventional methods, such as going to the library and printed materials. Because of its benefits, almost all people use it nowadays to support various aspects of their life. In addition, technology innovations influence the scientific and technological progress in all areas of society (Bilyalova, 2017: 176 Zhang & Aikman, 2007).

This phenomenon occurs in this revolution industry 4.0 era. This is recognized by the occurrence of sophisticated technologies such as E-banking, E-learning, online shopping, and online transportation. The development of super-computers, robots, artificial

intelligence, and genetic modification lead to a shift in labor trends that are no longer rely on human labor, but on technology. This shift will also change the social and cultural conditions of society. Eventually, it will occur widely on politic, economy, culture, law, health services and education. There is a global trend in both educational policy and research to recognize the need to reform education from traditional paradigms of teaching and learning into more innovative forms of pedagogical practice which integrating Information and Communications Technologies (ICT) (Hossain at al., 2016).

Several studies argue that the use of new technologies in the classroom is essential for providing opportunities for students to learn to operate in an information age. It is evident, as Yelland (2001) argued, that traditional educational environments do not seem to be suitable for preparing learners to function or be productive in the workplaces of today's society. She claimed that organisations that do not incorporate the use of new technologies in schools cannot seriously

claim to prepare their students for life in the twenty-first century.

This argument is supported by Grimus (2000), who pointed out that “by teaching ICT skills in primary schools the pupils are prepared to face future developments based on proper understanding.” Similarly, Bransford et al. (2000) reported that “what is now known about learning provides important guidelines for uses of technology that can help students and teachers develop the competencies needed for the twenty-first century.”

Therefore, the 21st-century learning demands the integration of ICT in the educational system (Lloyd, 2005: 2) and the education system has fully realized the potential of ICT as a valuable assisting tool in teaching and learning (Drier, 2001; Giannakos, 2014; Vajargah & Saadattlab, 2014). It has been suggested that ICT can and do play a number of roles in education. These include providing a catalyst for rethinking teaching practice; developing the kind of graduates and citizens required in an information society; improving educational outcomes and enhancing and improving the quality of teaching and learning (Alemu, 2015).

In the context of teaching and learning, technology can facilitate tasks and improve teachers’ performance in creating effective teaching and learning activities. Researchers explored the use of ICT in the classroom recently. They show that integrating ICT in teaching assists teachers to develop students’ proficiency (Barreh 2013; Romrell 2014; Drajadi & Rochsantiningasih 2018). It can be a medium to facilitate the learning process.

Integration of ICT into education is defined as using ICT effectively and efficiently in all dimensions of the educational process including the necessary infrastructure, curriculum and teaching-learning environments (Earle, 2002). The use of ICT is viewed as a potentially powerful enabling tool, specifically for educational change and reform (Tinio, 2003). Although the use of

technology in schools varies, it can be grouped primarily into three broad categories; technology for instructional preparation, technology for instructional delivery, and technology as a learning tool.

Teacher’s professional use of technology involves preparation for various classroom activities; such as, preparing instructional material, communicating or collaborating with peers, students and their parents, locating digital resources, and creating lesson plans (Bebell et al. 2004). When technology is used for instructional delivery, the teacher or students can use it. Teachers can present instruction by means of a projector or students may use computer-assisted learning applications such as drill and practice, tutorials, and simulations (Barron et al. 2006; Bitter and Legacy 2008). The third category, technology as a tool, involves student use of basic software applications to extend their abilities to solve problems, create products, or communicate and share their perspectives with each other (Jonassen et al. 2008). Example applications include word processing, presentations, databases, spreadsheets, Web 2.0 tools, and concept mapping (Brown and Adler 2008).

ICT will provide benefits for teachers and students in learning in the school as it is developed and used well. According to Bransford et al. (2000), several studies have reviewed the literature on ICT and learning and have concluded that it has great potential to enhance student achievement and teacher learning. Wong et al. (2006) point out that technology can play a part in supporting face-to-face teaching and learning in the classroom.

Many researchers and theorists assert that the use of computers can help students to become knowledgeable, reduce the amount of direct instruction given to them, and give teachers an opportunity to help those students with particular needs (Iding, Crosby, & Speitel, 2002; Romeo, 2006). While new technologies can help teachers enhance their pedagogical practice, they

can also assist students in their learning. According to Grabe and Grabe (2007), technologies can play a role in student skills, motivation, and knowledge. They claim that ICT can be used to present information to students and help them complete learning tasks.

Many believe that the success of technology integration and the effective use of technology in education mostly depend on teachers' willingness to adopt and attitudes toward technology (Cavas, et. al, 2009). Teachers have to be aware that today's students are different from those they might have encountered in the past. It has been contended that digital native students often have short attention spans when exposed to traditional teaching styles, but not for the things that interest them (Prensky, 2001b). Although this has arguably always been the case, it is the pace of change and scale of difference that today is greater than ever before.

Students nowadays think and learn differently and perform many functions in quite distinct ways such that their teachers have a need to understand and communicate in the language of their students and use an adapted teaching approach that best fits into students' learning strategies. Teachers of course, must know how to grasp students' attention and interests in the classroom. Therefore, teachers need to integrate ICT to add value to the teaching and learning activities. Information technology should be used in combination with other teaching methods. In an earlier study by Sheingold and Hadley (1990), it was also agreed that integrating technology is more than just helping people to use computers, but it is also for helping teachers to utilize it for learning.

Balanskat, Blamire, and Kefala (2006) agree that although educators appears to acknowledge the value of ICT in schools, difficulties continue to be encountered during the process of adopting the technologies. Multiple previous studies have concluded that achieving technology

integration into classroom instruction is a slow and complex process that is influenced by many factors (Levin and Wadmany 2008).

In the Indonesian context ICT is generally still an exclusive matter for the Indonesian people. The rapid change of technology development makes the teachers hard to keep up. Potter & Rockinson-Szapkiw (2012) stated that teachers require a shift thinking, to learn and adapt how to manage learning behavior differently as they use ICT in the classroom. In fact, most of the teachers are having obstacles in integrating technology to their learning process because they lack of proficiency. A high percentage of teachers do not know how to integrate educational technology into their curriculum (Townsend, 2017: 12). Mishra & Koehler (2008: 10) stated that teaching with technology is a "wicked problem" for teachers that it has "incomplete, contradictory and changing requirements".

Education pratitioners slowly but sure has to willy-nilly become digitalized in any section. It is urged by the changes or era and demanded by the digital students nowadays. With the reality of the integration of ICT in teaching and learning process, this study aims to explored the challenges that faced by the teachers in integrating ICT which later can be used to find the solution to solves obstacles faced by the students.

Methodology

This study intended to discover EFL teachers' challenges to integrate ICT in their teaching by employing qualitative approach. Data are collected through observation and in-depth interviews focusing on the integration of ICT in teaching and learning process. The informants are three English teachers in a certain Senior High School namely Re, Wi, and Ds. The researcher was also given a chance to observe a few class activities. The process of collecting and analyzing data continuously bundled together to complete information comprehensively, as

Miles and Huberman (1994) noted that in Qualitative Design, Data Collection, Data Display, Data Reduction, and Data Verification or Conclusion connect each other.

Findings and Discussion

1. Integration of ICT in Teaching and Learning Process

a. Teacher Re

Teacher Re is a young teacher, she has been teaching for around one and a half years in that school. From the observation done to Re, she always bring and use some common hardware into her every class such as a laptop, cell phone or portable speakers for preparing and delivering English teaching material for the students such as text, video, audio, picture, power-point. She utilized students' phones for them to find the difficult words of a certain text that they learn during the lesson. She added:

"I like to use the software material because it's more practical and more efficient. I can make the lesson more attractive by showing them some short videos or pictures which related with the material. Students also can use their devices to support their learning English, they can browse or use translation application to find the meaning of the difficult words that they have met during the lesson"

Teacher Re also handy enough in operating the software that she uses in her every lesson,

"I quite master the programs that I use to teach my students, they are usually Microsoft Words and also Power Point, sometimes I use video and audio player too."

However, she admitted that the use of her technology isn't maximum enough and hasn't yet reached the standard of using ICT in digitalized era.

"I haven't felt satisfied with the use of technology I used in class, it's only used to delivering the lesson. I ever asked to ask my students to make and post a short video on Instagram which they describe a certain place

that they visit during their holiday, but it didn't run well. Their main problem was feeling embarrassed. I really want to make the students produce something using technology except Power Point Presentation but I can't think of any activities or website or application which are applicable and practical for the students; and also suitable with the materials.

b. Teacher Wi

Teacher Wi is also a young English teacher, she has been teaching in this school for around two years. She sometimes uses her laptop to present the materials but not on every materials. She likes to ask the students to have a discussion related to the materials in a group with the help of their own gadgets.

"I prefer using gadget and make them discuss something related to the material – usually I guide what they need to do. It makes the lesson more effective sometimes."

In line with teacher Re, teacher Wi also feel that her use of technology during lesson hasn't fully met the standard of the ideal integration of ICT in digitalized era. "I haven't fully integrated technology well in teaching." She has ever wanted to try to use education application, Edmodo, to be used to support the lesson. However, some technical issues occurred.

"I once tried to use the Edmodo application to support the learning of students at home using their respective gadgets. However, some obstacles have occurred, starting from I have not yet understood how to use it, the limited number of participants in one class at Edmodo and moreover I forget the password."

c. Teacher Ds

Teacher Ds is one of the senior English teacher in a certain senior high school. Because she teaches the twelfth graders so she rarely use any ICT during the lesson. Based on the observation done, she mostly ask the students to do the numbers of test items to be discussed. She uses her laptop and selected audios for only giving the students exercise of listening.

“Because I teach 12th grade students, I rarely use technology in learning. ICT usage in class when I give training about listening.”

She added that sometimes technology's used during the lesson when the students are asked to discuss a certain topic in class, they will use their phones to browse the topic. Furthermore, the use of gadget for students also in terms of dictionary, they use their phone to browse the meaning of a certain difficult words for them.

“Sometimes I ask students to search for material on the internet from the topic we will discuss in class. I also use their cellphone to become a dictionary for them”

Those three teachers tend to use the ICT only to present the teaching material. They rarely show to use a various number of complex computer applications. They hardly utilize the ICTs to create collaborative project among the students about the subject that they are being taught (Dwiono, 2019). Moreover, the teachers never utilize any a broad range of devices and tools which are used to design innovative teaching material such as production equipment, publication software, web design tools. Assessed based on the SAMR model, two of the teachers are just substitute the traditional method of delivering the material from handout to a soft file in terms of PPT. Augmentation happens rarely when the students using their cellphone as a tool to enhance their task or learning. Budiman & Ngadiso's (2018) found that the teachers in Indonesia tend to be in under the area of enhancement which is substitution and augmentation dominated rather than modification and redefinition regarding the extent to which ICT is integrated in teaching.

2. Challenges in Integrating ICT

a. Lack of Training

Official training regarding ICT integration in teaching and learning never been conducted to the teachers. It makes

them feel clueless about how to integrate ICT in proper way. Teacher Re said:

“there's no official training from government giving us proper view of using ICT in teaching and learning process. It makes me confuse whether I already integrate ICT well or I still need improvement.”

In line with teacher Re, teacher Wi and Ds also claimed that no official training from government to assist them integrating ICT in teaching and learning process. Teacher Ds added,

“Frankly the use of technology in the classroom has no training from the government, in fact we need to know how to use technology properly during the lesson in class.”

It reveals that the teachers have insufficient training about ICT in teaching as one problem faced by the teachers. It means that the teachers have the insufficient source to get information and knowledge about how ICT used in teaching. Whereas training could be a way that the teachers can improve their knowledge in using ICT in teaching. Meanwhile, they do not receive any training or workshop on how to integrate ICT in English language teaching. They are not even provided by the government. Studies also have well explored that lack of training is a significant problem for the teacher to use pedagogical ICT in teaching (Anderson et al., 1984: 13). It may a signal that teachers' incompetence to use various modern ICTs in teaching is caused by the insufficient training that the teachers receive.

This finding is also found in Pelgrum's (2001) study that there were not enough training opportunities for teachers in the use of ICTs in a classroom environment. Similarly, Beggs (2000) found that one of the top three barriers to teachers' use of ICT in teaching students was the lack of training. Recent research in Turkey found that the main problem with the implementation of new ICT in science was

the insufficient amount of in-service training programs for science teachers (Özden, 2007), and Toprakci (2006) concluded that limited teacher training in the use of ICT in Turkish schools is an obstacle. As it is assumed that as the teacher have lack of competence to integrate ICT, it means that the country did not yet succeed in realizing sufficient facilities to train teachers with technologies (Pelgrum, 2001). Meanwhile, governments and the stakes holders are supposed to monitor and guide the implementation of ICT in teaching. It is since having policies without a proper implementation and monitoring makes no sense (Jude, 2014: 110).

b. Lack of appropriate software

Appropriate software in educational use which is practical and flexible are limit and rarely to be found. Teacher Ds uttered:

“I feel that software or applications that support usability in the classroom are still very few. Even if there is, it will still be less flexible so it will experience a few obstacles because of the complexity of the application operation.”

In line with teacher Ds, teacher Wi and Re also experiencing the lack of appropriate software for their students,

“there are many applications with learning theme, but those are appropriate and suitable for the material are very few. Even if there is, it is certainly not flexible to operate and surely will take time for students and teachers to adapt and understand how to use the application”

Lack of appropriate software discourage the integration of ICT in learning. In Goktas and Yildirim’s research (2009), they claimed lack of software is one of the barriers’ list in integrating ICT in teaching and learning process. Insufficient proper and practical software in terms of application can’t enrich the teachers’ learning using technology. They will tend to use the basic software of

application. One of the main barriers of integrating ICT into teaching and learning process is lack of appropriate software (Bullock, 2004; Muantaz 2000).

c. Lack of Competence

These three teachers have mastered to operate the basic software to support the learning process, such as Microsoft word and power point. However when it comes into a complex use of technology to support the learning, the lack of competence to operate an education application occurred to become one of the challenges faced by the teachers. Teacher Re said,

“the complexity of the application operation makes me feel technologically blind. This makes me discourage to use certain applications to support learning.”

Teacher Ds is experiencing the same as teacher Re,

“the lack of training on how to use applications that support classroom learning made me feel that I was still lacking in using technology during students’ learning. I only integrate ICT monotonically.”

A high percentage of teachers do not know how to integrate educational technology into their curriculum (Hu & Garimella, 2014). Newhouse (2002) found that many teachers lack the knowledge and skills to use computers and were not enthusiastic about the changes and integration of supplementary learning associated with bringing computers into their teaching practices. Teachers’ lack of knowledge and skills is a serious obstacle to using ICT in primary and secondary schools. (Pelgrum 2001). Balanskat et al. (2006) have shown that in Denmark many teachers still chose not to use ICT and media in teaching situations because of their lack of ICT skills rather than for pedagogical or didactics reasons”

d. Lack of appropriate material

From many sources on the internet, there is no material which is made to support classroom learning. Teachers often have to filter material that suits their needs from the internet. Teacher Re claimed that she always make her own material before she teach the students,

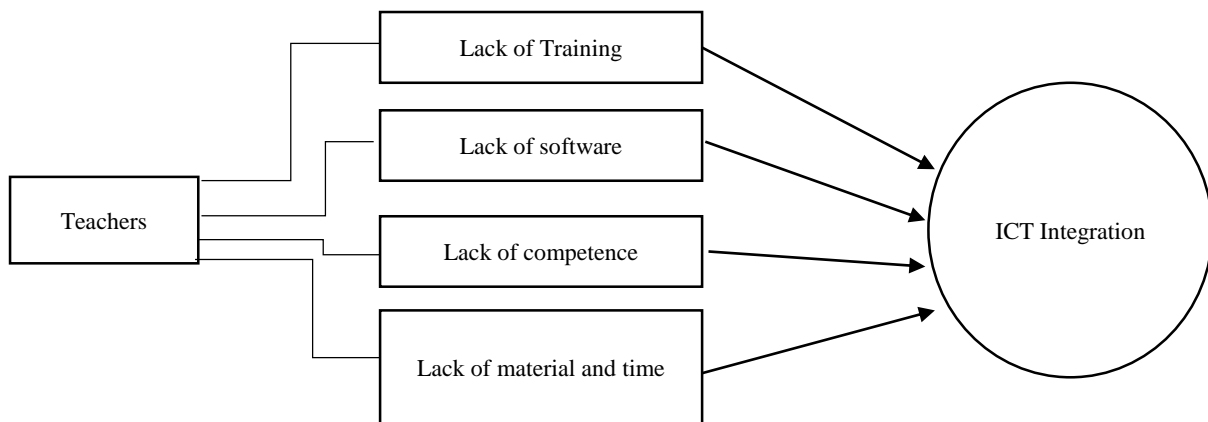
“I always make my own material which I’m going to deliver to students. The material on the internet sometimes does not meet the standard of my teaching needs, so I have to spend more time adjusting the needs of students.”

The lack of material discourages teacher Wi to use technology in learning,

“when time is limited and I don't have time to make my own material, I prefer to use books as a medium of teaching in delivering the material.”

Recent studies show that lack of time is an important factor affecting the application of new technologies in science education (Al-Alwani, 2005). Several recent studies indicate that many teachers have competence and confidence in using computers in the classroom, but they still make little use of technologies because they do not have enough time. According to Sicilia (2005), the most common challenge reported by all the teachers was the lack of time they had to plan technology lessons, explore the different Internet sites, or look at various aspects of educational software. Teachers take much more time to design projects that include the use of new ICT than to prepare traditional lessons.

Figure 1.
 Challenges Faced by Teachers in Integrating ICT



Conclusion

The teachers are beginner users regarding their competence level to use ICT in teaching. They use more basic function in a limited number of computer applications in the English teaching than ICTs categorized in average and advanced. Based on SAMR, the ICT integrated by teachers in English language teaching is dominated by the substitution level and little in augmentation level. When the teachers are dominant to integrate ICT in

the substitution, they integrate the ICT is intended just to change from using into not using non-traditional teaching strategies such as from hard copy textbook into a soft file display using ICT without any improvement or change. Augmentation level, meaning that the teachers are already able to make little improvement or change to the ICT use in teaching.

Teachers are facing some challenges in integrating ICT into their teaching and learning process. They make the

integration of ICT in class isn't reached the maximum result. The teachers rarely use several of complex computer applications to create and design collaborative learning among the students or to use pervasive devices and tools to create innovation and knowledge in teaching and learning because of these challenges. The challenges are: 1) Lack of training from government which makes the teachers clueless on how to integrate ICT properly; 2) lack of appropriate software, makes the teachers use ICT monotonically; 3) lack of competence – lack of operating complex application; and 4) lack of appropriate material which makes the teachers take their time to make her own material.

This study hopefully can be perceived as a picture of the current practices in instructional ICT which can be used to plan teacher training efforts based on documented needs. As it is found that the teachers face some barriers in integrating ICT in teaching. Furthermore, in regard with the government regulation that imposing the rule of the integration of ICT as a means in the teaching and learning process, it is fundamental to equip the teachers with adequate knowledge of the current practice of the integration of ICT.

References

- Al-Alwani, A. (2005). Barriers to Integrating Information Technology in Saudi Arabia Science Education. Doctoral dissertation, the University of Kansas, Kansas.
- Alemu, B. M. (2015). Integrating ICT into Teaching-Learning Practices: Promise, Challenges and Future Directions of Higher Educational Institutes. *Universal journal of educational research*, 3(3), 170-189.
- Balanskat, A., Blamire, R., & Kefala, S. (2006). A review of studies of ICT impact on schools in Europe: European Schoolnet.
- Barreh, Kadar A., & Abas Z. W. (2013). A Framework for Mobile Learning for Enhancing Learning in Higher Education. *Malaysian Online Journal of Educational Technology*, 3(3). Retrieved from www.mojet.net
- Barron, A. E., Ivers, K. S., Lilavois, N., & Wells, J. A. (2006). *Technologies for education: A practical guide* (5th ed.). Westport, CT: Libraries Unlimited.
- Bebell, D., Russell, M., & O'Dwyer, L. (2004). Measuring teachers' technology uses: Why multiple measures are more revealing. *Journal of Research on Technology in Education*, 37(1), 45–63.
- Beggs, T. A. (2000, April 9-11, 2000). Influences and barriers to the adoption of instructional technology. Paper presented at the Proceedings of the Mid-South Instructional Technology Conference, Murfreesboro, TN.
- Bilyalova, A. (2017). ICT in Teaching a Foreign Language in High School. *Procedia - Social and Behavioral Sciences*, 237(June 2016), p.175–181.
- Bitter, G. G., & Legacy, J. M. (2008). *Using technology in the classroom* (7th ed.). Boston, MA: Allyn & Bacon.
- Bingimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia journal of mathematics, science & technology education*, 5(3).
- Bransford, J., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How people learn: brain, mind, experience, and school* (2nd ed.). Washington, D.C.: National Academy Press
- Brown, J. S., & Adler, R. P. (2008). Minds on fire: Open education, the long tail, and learning 2.0. *EDUCAUSE Review*, 43(1), 16–33.
- Budiman, A., & Ngadiso. (2018). EFL Teacher's Belief and Practice on Integrating Information and Communication Technology (ICT) in the Classroom. *Asian EFL Journal*, 20(4), 07-22.
- Bullock, D. (2004). Moving from theory to practice: An examination of the factors that preservice teachers encounter as

- they attempt to gain experience teaching with technology during field placement experiences, *Journal of Technology and Teacher Education*, 12(2), 211-237.
- Cavas, B., Cavas, P., Karaoglan, B., & Kalsa, T. (2009). A study on science teachers' attitudes toward information and communication technologies in education. *The Turkish Online Journal of Educational Technology*, 8(2), 34-67.
- Drajati, Nur Arifah & Tan, Lynde Haryati & Haryati, Sri, A., & Zainnuri, & Rochsantiningasih, Dewi & Zainnuri, H. (2018). Investigating English Language Teachers in Developing TPACK and Multimodal Literacy. *Indonesian Journal of Applied Linguistics*, 7(January), 575-582. <https://doi.org/10.17509/ijal.v7i3.9806>
- Drier, H.S. (2001). Teaching and learning mathematics with interactive spreadsheets. *School Science and mathematics*, 101 (4), 170-179
- Dwiono, R. (2019). Integration Level of Information and Communication Technology (ICT) in the English Teaching using SAMR Model (A Case Study at the Senior High School in Lampung in the Academic Year of 2017/2018) (Doctoral dissertation, Universitas Sebelas Maret).
- Earle, R. S. (2002). The integration of instructional technology into public education: Promises and challenges. *Educational Technology-Saddle Brook Then Englewood Cliffs Nj-*, 42(1), 5-13.
- Evoh, C.J. (2007) Policy networks and the transformation of secondary education Through ICTs in Africa: The prospects and challenges of the NEPAD E-schools Initiative. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)* 3 (1), 64-84.
- Goktas, Y., Yildirim, S., & Yildirim, Z. (2009). Main barriers and possible enablers of ICTs integration into pre-service teacher education programs. *Journal of Educational Technology & Society*, 12(1), 193-204.
- Grabe, M., & Grabe, C. (2007). *Integrating technology for meaningful learning* (5th ed.). Boston, NY: Houghton Mifflin.
- Grimus, M. (2000). ICT and multimedia in the primary school. Paper presented at the 16th conference on educational uses of information and communication technologies, Beijing, China.
- Hossain, M. A., Salam, M. A., Shilpi, F., & Officer, A. D. (2016). Readiness and challenges of using Information and Communications Technology (ICT) in higher education of Bangladesh. *The Online Journal of New Horizons in Education*, 6(1), 123-132.
- Hu, H., & Garimella, U. (2014). iPads for STEM Teachers: A case study on perceived usefulness, perceived proficiency, intention to adopt, and integration in K-12 instruction. *Journal of Educational Technology Development and Exchange*, 7(1), 49-66.
- Iding, M., Crosby, M. E., & Speitel, T. (2002). Teachers and technology: Beliefs and practices. *International Journal of Instructional Media*, 29(2), 153-171.
- Jude, L. T., Kajura, M. A., & Birevu, M. P. (2014). Adoption of the SAMR Model to Assess ICT Pedagogical Adoption: A Case of Makerere University, 4(2). <https://doi.org/10.7763/IJEEEE.2014.V4.312>
- Jonassen, D., Howland, J., Marra, R., & Crismond, D. (2008). *Meaningful learning with technology*. Upper Saddle River, NJ: Pearson, Merrill Prentice Hall.
- Levin, T., & Wadman, R. (2008). Teachers' views on factors affecting effective integration of information technology in the classroom: Developmental scenery. *Journal of Technology and Teacher Education*,

- 16(2), 233-263.
- Lloyd, M. (2005). Towards a definition of the integration of ICT in the classroom. *Proceedings AARE '05 Education Research - Creative Dissent: Constructive Solutions*, 1–18. <https://doi.org/10.1063/1.2130520>
- Miles, M. B., Huberman, A. M., Huberman, M. A., & Huberman, M. (1994). *Qualitative data analysis: An expanded sourcebook*. sage.
- Mishra, P., & Koehler, M. J. (2008). Introducing technological pedagogical content knowledge. In annual meeting of the American Educational Research Association (pp. 1-16).
- Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: A review of the literature. *Journal of Information Technology of Teacher Education*, 9(3), 319-341.
- Newhouse, P. (2002). *Literature review: The impact of ICT on learning and teaching*, Perth, Western Australia: Department of Education.
- Özden, M. (2007). Problems with science and technology education in Turkey. *Eurasia Journal of Mathematics, Science & Technology Education*, 3(2), 157-161.
- Pelgrum, W. J. (2001). Obstacles to the integration of ICT in education: results from a worldwide educational assessment. *Computers & Education*, 37, 163-178
- Potter, S., & Rockinson-Szapkiw, A. J. (2012). Technology integration for instructional improvement: The impact of professional development. *Performance Improvement*, 51(2). doi:10.1002/pfi.21246
- Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the horizon*, 9(5), 1-6.
- Romeo, G. I. (2006). Engage, empower, enable: Developing a shared vision for technology in education In M. S. Khine (Ed.), *Engaged Learning and Emerging Technologies*. The Netherlands: Springer Science.
- Romrell, D., Kidder, L. C., & Wood, E. (2014). The SAMR model as a framework for evaluating mLearning. *Journal of Asynchronous Learning Network*, 18(2), 1–15.
- Sheingold, K., & Hadley, M. (1990). *Accomplished teachers: Integrating computers into classroom practice*.
- Sicilia, C. (2005). *The Challenges and Benefits to Teachers' Practices in Constructivist Learning Environments Supported by Technology*. Unpublished master's thesis, McGill University, Montreal
- Tinio, Victoria L. (2003). *ICT in Education*. Manila: e-ASE Force. Accessed on January 2019, Retrieved from https://en.wikibooks.org/wiki/ICT_in_Education/Notes#84
- Toprakci, E. (2006). Obstacles at integration of schools into information and communication technologies by taking into consideration the opinions of the teachers and principals of primary and secondary schools in Turkey. *Journal of Instructional Science and Technology (e-JIST)*, 9(1), 1-16
- Townsend, M. B. (2017). *Ipads In K-12 Schools : A Grounded Theory Study Of Value*. University of Phoenix. Retrieved from <https://search.proquest.com/openview/4c968226219520d7032600df13d36619/1?pq-origsite=gscholar&cbl=18750&diss=y>
- Vajargah, K. F., & Saadattlab, A. (2014). A feasibility study of using ict in Iranian secondary schools: The case of Tehran province. *Tojet*, 13(3)
- Wong, A. F. L., Quek, C.-L., Divaharan, S., Liu, W.-C., Peer, J., & Williams, M. D. (2006). Singapore students' and teachers' perceptions of computer-supported Project Work classroom learning environments. *Journal of Research on Technology in Education*, 38(4), 449-479.

- Yelland, N. (2001). Teaching and learning with information and communication technologies (ICT) for numeracy in the early childhood and primary years of schooling. Australia: Department of Education, Training and Youth Affairs.
- Zhang, P., & Aikman, S. (2007). Attitudes in ICT Acceptance and use. In J. Jacko (Ed.), *Human-Computer Interaction, Part I* (pp. 1021-1030). Syracuse, NY: Springer-Verlag Berlin Heidelberg.