**Topic: Use of Technology in Higher Education**

# Literature review

## Role of Technology in Education

Today, learning with technology has become essential as developing students’ skills and knowledge related to Information and Communication Technology (ICT) from early years in education provides an important basis for using technology later in life (Fu, 2013). The advances in technology influence the way people, share, create, use and develop information in society and young people need to be highly skilled in their use of information and communication technologies to be able to adapt to the work environments in their future life (Flanigan & Babchuk, 2015). Technology in education has gained significant importance as it is essential to keep pace with the society and prepare students for their future roles and responsibilities (Hung & Yuen, 2010). Educators and researchers highlight the potential of technology to increase engagement of learners and motivation, improve learning outcomes and cater to different learning styles. As technology has become a part of everyday lives, integrating technology in to pedagogy would enhance the teaching and learning process.

Technology enables the educators and teachers an opportunity to design meaningful learning experiences that embed technology (Bauman, Marchal, Mclain, O’Conneil & Patterson, 2014). With the rapid development in technology and rapid changes in the society and business environment, students are required to be good communicators. Contemporary curriculum requires teachers to facilitate development of flexible and adaptable learners who can carry out new and challenging tasks and address problem situations easily and quickly (Cloete, 2017). As there is increased information available due to technological advancements, students are expected to competently discuss topics and latest developments in the topics with others, share their ideas effectively with others in different forms and for different reasons (Amory, 2012). The students need to learn good collaboration skills and be capable of working together with people from different cultural background and who have his/her own special disciplines and different ways of learning and working together (Karamat & Petrova, 2009). Technology enables teachers to support students in transforming skills and knowledge into solutions, products and new information, which they can apply in the real-life workplace situations (Amory, 2012). The rapid development in technology is increasing the scope of adopting technology in Higher Education, which would prepare the students to use technology efficiently in their future life. The technology is used in different forms in Higher education and the perspectives of teachers and students vary depending on their age, experience and frequency of use of technology in personal lives.

## Teacher’s Perspective about Use of Technology in Higher Education

Making technology available in the institutions is not enough to enhance the teaching and learning processes, it is also essential that teachers use the technology in an effective manner for teaching (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012). Teacher’s positive pedagogical thinking with respect to integrating technology in their teaching is essential. The teacher’s perspective or belief about teaching and learning are found to shape teachers’ practices (Fu, 2013). It is found through researches that teachers having a teacher-centered practice prefer traditional methods of teaching whereas teachers having learner-centered beliefs prefer use of technology, which supports learners in taking responsibility of their own learning and teachers support them further by teaching them how to use tools to construct knowledge and learn in a collaborative environment (Faruk & Cirak, 2017). Teachers are found to use same technological tools in different ways based on their beliefs about effective teaching approaches. A study carried out in University of Jyvaskyla, Finland aimed at analyzing teachers beliefs and perspectives about using technology in higher education and how it could be used to integrate technology in teaching and learning (Jaaskela, Hakkinen & Rasku-Puttonen, 2017). The research identified four valued pedagogical use of technology wherein some teachers considered technology as an additional tool for active and interactive learning, a tool for self-paced studying, tool for changing learning culture and a tool for integration and assessment of learning. The overall findings highlighted that teachers perceived technology as meaningful in their respective pedagogical approaches (Jaaskela et al., 2017). But they argued that poor identification of educational needs in technology intervention cannot allow effective use of technology in teaching and learning process.

Alleman et al. (2013) through their study revealed that use of technology among faculties for general and educational purpose is widespread but the use is not extensive. Use of technology by faculties in teaching process is influenced by factors such as their professional and demographic characteristics (Lai, 2011). A study conducted in a University in the Southwestern United States wherein a 5 year technology initiative was introduced from 2012 with an objective to increase student engagement and success using technology (Faruk & Cirak 2017). As part of the study iPads were given to faulty members and students and were briefed about different apps in the iPads and explained possible ways they can be used by both faculty and student for teaching and learning process. The findings showed that all the faculty participants irrespective of age and ranks adapted new technologies in their professional and daily life (Faruk & Cirak 2017). The faculty members used their laptops to provide information on course materials through power point slides, to make students view internet search results regarding a topic and used iPad for their class preparation that included reflection paper for students, overview of their documents, and used applications for educational purpose in their lectures (Faruk & Cirak 2017).

Teachers are found to use technology for various tasks such as collaboration with their colleagues through chat applications such as hangout, skype and use file sharing applications such as Dropbox to provide information on assessments of lectures to the students (Ertmer et al., 2012). The faculty also use technology to prepare their lecture, research, grading and providing feedback. Herrington et al. (2010) suggests that technology provides increased benefits to the teachers not in terms of teaching activities but also helps them increase their personal productivity, enhance their pedagogical practice and use facilities such as recording voice and videos that can help provide guidance to the students in their absence (Faruk & Cirak 2017).The use of technology among teachers is gaining importance and using technology has enabled them to engage with students effectively and organize the teaching process.

## Social Networking Technology in Higher Education

Social space or many is where they can connect with friends and family members and strangers. Web 2.0, the new generation of web supports social interaction and enables people to exchange information and share their interests and other relevant information with others through various tools (Flanigan & Babchuk, 2015). A survey carried out by Bangert (2009) among 1173 higher education students enrolled in fully online and blended courses in university in USA showed that social, cognitive and teaching components are interrelated and essential for nurturing classroom community experienced by students indicating that social interaction is crucial in teaching a learning process (Alkhathlan & Al-Daraiseh, 2017). Many researchers emphasize that social networking is very essential to develop a sense of collaboration in the classroom that helps in effective learning.

A research by Hung & Yuen (2010) that included analyzing the effectiveness of Ning one o the social networking tools. It is a web-based social platform that allow text searching, media sharing, interaction through forum, chat, comments and blog and provide content delivery. The researchers conducted the research at two public universities in Taiwan in 2009 wherein participant students were surveyed to understand how learning in classroom was supported using social networking technology (Hung & Yuen, 2010). Most of the students found the social networking tool of Ning to be useful for information sharing and helped in effective engagement and facilitate effective learning (Hung & Yuen, 2010). Few challenges faced by the students included language barriers, time management and lack of effective internet connectivity highlighting that the effective use of technology in education depends on the other factors aiding to the technology such as good connectivity, ease of use of the respective tool and support from faculty in understanding the use of the tool. (Hung & Yeun, 2010). Social networking sites are being used as parallel learning channel and also as an extension of traditional classrooms (Lai, 2011).

A study by Junco (2011) that involved investigating the relationship between usage of social media mainly Facebook and students’ academic performance highlighted that Facebook activities that included browsing and sharing information with each other , exchanging links and checking updates from others had a positive impact on academic performance as it enabled the students to share academic related information anytime and from any location (Alkhathlan & Al-Daraiseh, 2017). Another study by Veletsianos & Navarrete (2012) that involves analyzing experience of higher education students and their outcomes of using social network site Elgg that taught an online course at public university in United States showed positive association with effective learning. Elgg offered various social networking features such as microblogging, message boards, collaborative document authoring and others (Veletsianos & Navarrete, 2012). The findings showed it was found to be engaging as it allowed communicating and interacting with each other, was easy to use and enabled them to access course content, discuss problems and ask questions freely. Social networking technology is playing an important role in higher education as it enable effective social interaction through which learning is more effective as it allows sharing of information and ideas and supports problem solving by collaborating with others.

## Use of Technology to Communicate and Collaborate in Education

Educational theories provide an understanding of the manner which students learn to make meaning through different types of communication (Lai, 2011). One of the theories is sociocultural theory developed by Vygotsky, which states that social interactions help in development of higher-order functions when they happen in cultural contexts (Kim, Song & Luo, 2016). Students learn more effectively when they communicate and interact with other learners in positive environment. Instructions are more effective when relevant and connected to the learner (Cloete, 2017). The sociocultural theory and social learning theory emphasize on interaction and communication with others, which is useful in teaching and learning (Kim et al., 2016). Learning is effective within a social environment wherein students learn by modelling and interacting with others. Technology can be used to enhance communication and social interaction among learners in schools and higher education (Faruk & Cirak, 2017). Technology is used to integrate the learning activities for students meaningfully and engagingly using technological tools such as word-processing, webpage authoring tools, online discussion forums, email and also use of media elements such as images, text, video and sound for learning and expressing their ideas (Fu, 2013).

Technology enhances collaborative learning wherein many different modes or means such as interactive platforms, online discussion groups and online classroom environments are used (Gallardo, Marqués, & Bullen, 2015). These collaborative environments enable students to work together in groups and carry out group projects or solve problems as a team through debates, discussion boards and study teams. Students work as a team and use various computer resources and tools to look for information, determine results and arrive at solutions or gain new knowledge and skills.

## Higher Education Students use Digital Technology for Social and Academic Purpose

Today, university students are different as compared to previous generation with respect to use of digital technology for learning and interaction with each other. The new generation is known as millennials or net generation are well versed with Web 2.0 technologies that include technologies such as Twitter, Facebook, wikis, blogs and virtual space on net (Flanogan & Babchuk, 2015). A study that was part of international project known as Digital Learners in Higher Education involved analyzing the use of technology by students in higher education (Gallardo et al., 2015). The research involved semi-structured interviews with university students and in the findings, students stated that they use their computers to access online learning materials sing mobile technology and have flexible access to social networks that include Facebook and Twitter which students used for social and academic purposes (Gallardo et al., 2015). Text messaging and chat using mobiles according to students in higher education is found to be very useful.

WhatsApp a cross platform messaging application has also been found to be widely as sending and receiving message is free (Thibodeaux, 2017). Boase (2013) states that mobile phones as per students provide range of services for communication and entertainment with respect to social and academic purpose. The findings of the research stated that use of Facebook and WhatsApp facilitated interactive work and collaboration through simultaneous communication with pers and creation of work groups (Boase, 2013). Students use mobile and smart phones as support tools for learning process as they have access to it everywhere and at any time (Brady, Holcomb & Smith, 2010). Meckel & Beurer-Zuellig (2008) state that advantage of smartphones in terms of collaboration include accelerating learning process, ability to review and achieve effective communication with peers and lecturers (Gallardo et al., 2015). Simplification of teams and coordinated tasks is found to be achieved through technology.

EPortfolio is the result of using technology to create a learning environment virtually. A research carried out among the undergraduate students of nursing involved assessing the effectiveness of using conventional approach and eportfolio for effective learning (Sanchez, Soto & Gonzalez, 2015). EPortfolio was introduced to students of pedagogy and nursing as assessment strategy and learning strategy. Students were using the eportfolio platform implemented by the University on open source platform of Mahara that provides integration with the institutional management system call Moodle (Sanchez et al., 2015). Moodle includes integration of formative and summative assessment. Students using technology showed that they employ deeper learning approaches (Boase, 2012). Deep study approach had a positive relationship with use of technology and amount and distribution of effort, quantity of feedback and use of feedback (Sanchez et al. 2015). Students using eportfolios used to cope with academic requirements effectively and valued use of feedback to improve their portfolio. EPortfolio is found to promote learning environment where feedback is important and provides student to take responsibility of their own learning and continuously enhance their skills and knowledge through discussions and raising concerns and getting the concerns addressed (Thibodeaux, 2017). Students thus find use of technology useful in order to achieve deep learning and engage with others in strengthening their skills and knowledge through interactions, improvement and easy and more access to the teacher or faculty.

## Increased Engagement with Technology

Student engagement refers to willingness to involve in learning activities with positive emotions. In large classrooms students tend to lose their attention towards a lecture of teaching process and are mostly disengaged (Lai, 2011). Many educators use technology to support and improve learning opportunities for students. Australia uses interactive student-response system such as clickers or KeyPads as part of adoption of technology in teaching and learning process (Coates, 2011). In one of the studies among the first year students in Australian university, the use of KePad and level of student engagement was analyzed based on factors that included social influence, attitude towards KeyPads, intention to use and engagement level (Sawang, O’Connor & Ali, 2017). The findings showed that student engagement is enhanced with the use of the tool and was found that introvert students felt more engaged as compared to extrovert students. It was found that use of KeyPads facilitated an indirect interaction between students and staff.

In another study it was found that KeyPads offered an alternative to participate in class discussion and interact the respective lecturers (Coates, 2010). The tool is also found to help students get immediate feedback on the level of understanding of the content taught in the class. (Sawang et al., 2017). Technology enables students to interact with peers and faculty from any location and out of the university hours making it a convenient way of communicating and engaging with others in the team without any time and place restrictions.

## Challenges in using Technology in Higher Education

Technology use though are a part of teaching and learning process in many higher education institutions across the world, there are some challenges to using technology in higher education (Bauman et al., 2014). There are many contextual factors that influence the effectiveness of use of technology by the university. The factors include educational model, characteristics of student population, learning context, responsiveness of faculties and availabilities of resources (Amory, 2012). One of the challenges include unwillingness to change at the institutional level (Cloete, 2017). There are different challenges such as reluctance on part of institutions to undertake the major modification to adopt to new technology for teaching and learning process (Fu, 2013). Institutions might not find it feasible to invest in technology due to lack of correlation between the educational model and student’s persistence or success (Bauman et al., 2014). The passive participation of students is another challenge. Students might not be well-versed with use of technology and might find it difficult to use technology for learning process (Cloete, 2017). Students who lack the basic skills for using technology might find it difficult to cope with the teaching process and hence universities might not be willing to use technology for teaching and learning process (Cloete, 2017).

Amory (2012) argues that technology in education is used to attract students and technology is not a tool supporting knowledge construction instead it is object of the learning. The developing nations on the other hand other challenges of access, quality and equity. Some educators feel technology reduces face-to-face interactions and students might not develop certain skills effectively mainly those who are weak in studies and need continuous guidance from their teachers or faculty (Fu, 2013). Technology use has increased significantly in all walks of life and hence its integration into education in higher education institutions is essential in order to prepare the students for their future life and career.

# References

Alkhathlan, A. & Al-Daraiseh, A. (2017). An Analytical Study of the Use of Social Networks for Collaborative Learning in Higher Education*. I.J. Modern Education and Computer Science*, 2, 1-13.

Alleman, N., Holly, L., & Costello, C. (2013). Leveraging a new building to overcome first and second-order barriers to faculty technology integration. *Journal of Learning Spaces*, 2(1).

Amory, A. (2012). Instructivist ideology: Education technology embracing the past?’. *Interactive Learning Environments,* 20(1), 41–55.

Bauman, W., Marchal, J., Mclain, K., O’Conneil, M. & Patterson, S. (2014). Teaching the millennial generation in the religious and theological studies classroom. *Teaching Theology and Religion,* 17(4), 301–322.

Boase, J. (2013). Implications of software-based mobile media for social research. *Mobile Media & Communication*, 1(1), 57–62.

Brady, K., Holcomb, L., & Smith, B. (2010). The use of alternative social networking sites in higher educational settings: A case study of the e-learning benefits of Ning in education. *Journal of Interactive Online Learning,* 9(2), 151–170.

Cloete, A. (2017). Technology and education: Challenges and opportunities. *HTS Teologiese Studies/Theological Studies,* 73(4).

Coates, H. (2010). Development of the Australasian survey of student engagement (AUSSE). *Higher Education*, 60, 1-17.

Ertmer, P., Ottenbreit-Leftwich, A., Sadik, O., Sendurur, E., & Sendurur, P. (2012).Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education*, 59, 423-435.

Faruk, O. & Cirak, N. (2017). Technology and College Students: What Faculty Members Think About the Use of Technology in Higher Education. *Malaysian Online Journal of Educational Technology*, 5(2), 51-67.

Flanigan, A. & Babchuk, W. (2015). Social media as academic quicksand: A phenomenological study of student experiences in and out of the classroom. *Learning and Individual Differences,* 44, 40–45.

Fu, J. (2013). ICT in Education: A Critical Literature Review and Its Implications. *International Journal of Education and Development using Information and Communication Technology,* 9(1), 112-125.

Gallardo, E., Marqués, L., & Bullen, M. (2015). Students in higher education: Social and academic uses of digital technology. *Universities and Knowledge Society Journal,* 12(1), 25-37.

Hrastinski, S. & Aghaee. N. (2012). How are Campus Students Using Social Media to Support Their Studies? An Explorative Interview Study. *Educ. Inf. Technol*, (2012), 17, 451–464.

Hung, H. & Yuen, S. (2010). Educational use of social networking technology in higher education. *Teaching in Higher Education*, 15(6), 703-714.

Jaaskela, P., Hakkinen, P. & Rasku-Puttonen, H. (2017). Teacher Beliefs Regarding Learning, Pedagogy, and the Use of Technology in Higher Education, *Journal of Research on Technology in Education,* 49(3-4), 198-211.

Karamat, P. & Petrova, K. (2009). Collaborative Trends in Higher Education. Systemics, *Cybernetics & Informatics,* 7(2), 57-62.

Kim, J., Song, H. & Luo, W. (2016). Broadening the understanding of social presence: Implications and contributions to the mediated communication and online education, *Computers in Human Behavior*, 65, 672–679.

Lai, K. (2011). Digital technology and the culture of teaching and learning in higher education. *Australasian Journal of Educational Technology*, 27(8), 1263-1275.

Sanchez, A., Soto, A. & Gonzalez, J. (2015). Factors Influencing E-Portfolio Use and Students’ Approaches to Learning in Higher Education*. International Journal of Information and Communication Technology Education*, 11(3), 39-52.

Sawang, S., O’Connor, P.& Ali, M. (2017). Using Technology to Enhance Students’ engagement in a Large Classroom. *Journal of Learning Design*, 10(1), 11-19.

Thibodeaux, T. (2017). Factors that Contribute to ePortfolio Persistence. *International Journal of ePortfolio*, 7(1), 1-12.

Veletsianos, G. & Navarrete, C. (2012). Online Social Networks as Formal Learning Environments: Learner Experiences and Activities. *The international review of research in open and distance learning*, 31(1).