INNOVATIVE PRACTICES of TECHNOLOGY-ENHANCED LEARNING

Editors
DONNIE ADAMS
DOROTHY DEWITT
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DOROTHY DEWITT

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About the Editors and Contributors
Technology has the potential to transform teaching and learning practices. Information communication technologies (ICT) for transforming education has been noted in research through the last three decades. Although the conceptions of use of ICT and the effect of the transformation seem to vary, the focus was always on learning and improvements in the cognitive processes for learning. The emergence of web 2.0 technologies led to the need for transformative practices in higher education. Bates and Sangra (2011) in their book “Managing Technology in Higher Education: Strategies for Transforming Teaching and Learning” addressed this need as they suggested ways to use technology to transform educational practice in higher education.

The process of transforming teaching and learning is a complex process which may involve changes in teachers’ beliefs and conception of teaching and learning. In Malaysia, the Malaysian Education Blueprint 2015 – 2025 (Higher Education) lists transformation of the delivery of higher education as one of the shifts in the aspiration to deliver a world-class higher education system. For this purpose, change is required in the processes of learning so as to develop students with enhanced capabilities to be future-ready Malaysians, as well academics who could perform this task (Ministry of Education, 2015). Hence, academics and students alike may need to unlearn and relearn concepts of teaching and learning.

This book is an effort to achieve the aim of transforming education through technology-enhanced learning (TEL) and to showcase practices from Malaysia and surrounding regions. The task of transforming education is not limited to Malaysia, as the concept of education is evolving. This is especially made evident during the COVID-19 pandemic when the delivery of education had to change.
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Hence, in order to be competitive, all higher education institutions need to consider transformative practices. Traditional practices of teaching may not be suitable for preparing our youth for the technology-rich and competitive future. Hence, TEL practices may help enhance this transformation.

TEL is concerned about the “enhancement” of learning using technology. In the Malaysian context, technology has been used as an “enabler” when the Smart School concept was introduced in 1996, putting emphasis on the pedagogy rather than on the technology. Hence, technology is an enabler when access (including at anytime and anywhere) to resources on online platforms or courses such as on Learning Management systems and Massive Online Open Courses (MOOCs) is provided. Technology is also an enabler when contextualised situations and simulations are provided for the learner to visualise and practice in sometimes risky situations (Gauttier, & Arnedillo-Sanchez, 2016).

The concept of TEL needs to be carefully determined. UNESCO’s International Bureau of Education (http://www.ibe.unesco.org/) defines TEL as the use of “information and communication technologies as mediating devices supporting student learning”, which encompasses different applications and processes from the delivery of digital content to creation of resources to inform learners and enable learners’ reflection so as to integrate new knowledge into existing knowledge structures. Although the collaborative processes for learning is highlighted in the UNESCO’s definition, they do state that TEL is also referred to as ‘e-learning’ (or electronic learning) and ‘digital learning’. Hence, a common misconception is that TEL is e-learning.

The role of technology in TEL is to enable new learning experiences and enrich learning through interactive and collaborative digital media (Laurillard, Oliver, Wasson, & Hoppe, 2009). In Kirkwood and Price’s (2014) review of literature on TEL, there were three types of interventions for TEL practice: interventions that replicated existing (traditional) teaching practices new technologies; interventions that supplemented existing teaching with resources or tools so as to increased flexibility for learners, and interventions which transform and enrich teaching and/or learning processes and outcomes, example active learning and collaborative learning. Hence, the current practice of TEL may still be related to traditional teaching and not all has been transformative. Hence, with this book, we hope that the TEL practices
outlined will enable other researchers to use as exemplars to transform and enrich their students’ learning.

In TEL, technology is the “enhancer” of learning. Gauttier, & Arnedillo-Sanchez (2016) claims that this is a person-centered event, and in this case, a student-centered event, to extend the abilities of the individual, either his competency, mood or performance. This could mean enhancing memory, flexibility or time spent on a task, improving engagement or attitude, test scores, deeper understanding and reflection, or even improved interactions and sharing online (Gauttier, & Arnedillo-Sanchez, 2016). Hence, in this book, Laurillard, Oliver, Wasson, & Hoppe’s (2009) definition of TEL is taken, where the role of technology is to enable new learning experiences and enrich learning through interactive and collaborative digital media.

In Chapter 1, Technology-Enhanced Learning: Benefits and Considerations, the evolution of technology from computer-based training to e-learning models is discussed before going into the tools for TEL and the benefits. Lastly, suggestions on implementing TEL are shared.

In Chapter 2, Blended Learning in Action: Innovative Practices, Methodologies, and Implications, an overview of blended learning and the characteristic features is elaborated. Blended learning is one form of TEL due to the flexibility of the learning as well as the interactive processes involved. Several models of blended learning are discussed, and findings regarding students’ readiness for blended learning is described. This data indicates the form of blended learning preferred (50% blended) as well as the forms of online media preferred. This would be useful for lecturers and teachers when designing their TEL environments.

Chapter 3 is on Technology applications used among undergraduates from 2013 to 2018 and the implications for instruction. The technology applications used by undergraduates is elaborated. Most of the applications are collaborative and interactive tools which may not be used specifically for learning. However, there is potential for some of these tools to be used for learning as majority of students have access to them. However, the trends related to the use of tools shows that some technology apps that were popular 5 years ago have declined in popularity. Hence, technology changes according to the needs of the community. Instead of focusing on learning specific technology tools, it is more important to encourage life-long learning skills, and allow students to develop on their existing skills, using apps
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that students were familiar with for learning. This may also engage learners for TEL.

Lecturers may not have the capabilities and skills to implement TEL. Hence, it was important to investigate the perceptions of TEL among university educators. For this purpose, in Chapter 4, Perceptions and Challenges in Blended Learning Approaches among University Educators, was investigated. In the higher education institution sampled, majority of educators do not have sufficient knowledge in using blended learning. The implication of this study is that administrators and managers need to be aware of this situation and provide opportunities for educators to be trained in TEL practices. This would enable the transformation of educational practices in line with the needs of the students so that their institutions could be competitive.

The next section of the book looks into implementing TEL in the classrooms. As the aim of the book is also to share best practices in TEL so that it can be implemented by other practitioners, the chapters have been organised such that the definition of the technology and some additional links to implementing the technology are given. In addition, the instructional strategies in using the technology is suggested.

A mobile e-book for learning abstract algebra was used for TEL in Chapter 5, Implementing E-Book in a Mathematics Course: Investigating Postgraduate Students Patterns of Usage. The patterns indicated that there were some difficulties in some of the tools which the students used. In addition, the search feature in the e-book was useful for the students. Hence, e-books and other resources should be considered for interaction and collaboration in TEL.

Videos were used in flipped classrooms in Chapter 6, “Eye-Tech”: Flipping Fundamental Funduscopy For Medical Students. Flipped classroom, a form of blended learning, can be used for TEL as it enables interactions and collaborations, especially during the face-to-face sessions. In this chapter, the limited class time was spent in more effective processes.

Features of gamification can engage learners. In Chapter 7, Gamification in a Blended Learning Environment: The Mojo of ClassDojo, presented a strategy for using this application in engaging students, based on the Octalysis model. The challenges that arose from using this app was also discussed.
Assessment related to TEL may pose some difficulties. In Chapter 8, an innovative form of assessment is presented in Screencasting For Assessment of Content Knowledge: Learners’ Experiences and Beliefs. Learners develop screencasts based on their readings and present it among the other participants in their community of learners. The ability of the learners in developing their screencasts and the effectiveness of conveying their knowledge was investigated. As a form of assessment, this can develop cognitive processes and higher order thinking for TEL.

TEL should enhance understanding, especially when the cognitive processes are activated. In Chapter 9, Augmented Reality (AR) Experiences: A Tool to Enhance Conceptual Understanding for Education Counselling Students, additional information in the form of videos was augmented on posters students viewed to enhance understanding. The usability of the tool and the effectiveness for learning was investigated. This proved to be an engaging way to learn and to collaborate.

In Chapter 10, Blended-learning applied in a joint master program in Vietnam – voices from professionals, discussed the voice of instructors using a learning tool, Brightspace. The study was discussed from the dimensions of blended learning. The thoughts and pedagogical implications in using TEL was recorded.

Learning Management Systems such as MOODLE offer a suite of applications on a platform, which is at most times customised to the institution. Most times, the instructor need not even look for other applications as the most pedagogically-sound tools would have been included for TEL. In Chapter 11, Instructor Characteristics and Satisfaction in a Blended Learning Implementation Environment, instructor characteristics as well as level of use and satisfaction was investigated. It is hoped that the predictors of the characteristics of successful instructors for TEL implementation could be determined.

In the next chapter, a creative school environment is designed. Chapter 12 is on Building A Creative School Environment to Push Technology- Enhanced Learning – Case Study at Schools in Vietnam. Creative TEL environments could be designed and the researchers suggest several solutions.

Lastly, In Chapter 13, a motivational instructional design model is used to engage students in using virtual reality for learning. Virtual
Reality for Evoking Emotions: A Motivational Design for Instruction used the ARCS motivational model to design an environment to engage with trainee counsellors and show them the potential of this tool to engage their clients and evoke emotions during sessions as future counsellors.

REFERENCES


1. Introduction

Digital technology has influenced how people communicate, connect and learn (Adams, Sumintono, Mohamed, & Noor, 2018). From literature reviews, it is found that there have been numerous effects from the impact of technology on students (Bontly, Gomez, Khalil & Mansour, 2019). Firstly, technology changes the roles of teachers and students (Harper, 2018), and this also transformed the processes and methodologies in teaching and learning (Englund, Olofsson & Price, 2017). Secondly, scholars posit that there are increased levels of motivation and self-esteem among students because technologies have enhanced their learning from all three aspects of cognitive, affective and psychomotor (Khan, Hameed, Yu, Islam, Sheikh, & Khan, 2018). As such, students are now more technologically savvy, able to accomplish more tasks within their space and time, collaborate with their peers and be more resourceful in seeking information that could support their learning experience (Yuen, Koo, & Woods, 2018).

Thirdly, learning with technologies has allowed created more opportunities for them to improve their technical skills, and this could
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improve their marketability in the job market as globalization has changed tremendously in the era of Industry 4.0 that is confronted also with Machine Learning and Artificial Intelligence (Simic, & Nedelko, 2019). In recent years, the increased interest for applying digital technologies aiming to improve learning and teaching has led to the evolution of technology enhanced learning. Typically, the role of technology in technology enhanced learning is to enable new learning experiences and enrich learning through interactive and collaborative digital media (Laurillard, Oliver, Wasson, & Hoppe, 2009).

The chapter is structured into three parts. Part I discusses the evolvement of technology in education. Part II provides a glimpse of emerging tools supporting technology enhanced learning to facilitate effective learning. Part III introduces the benefits, considerations and limitations in technology enhanced learning; as a result, readers will gain insights of how to integrate technologies into learning.

2. The Evolution of Technology in Education

The 21st century comes with different challenges and demands. As society is rapidly changing, it is evident that much of it is brought by the infusion of technology in everyday life. The generation of students we have now is different from before. They are digital natives, and technology is very much a significant part of their life (Adams, Tan, Sumintono, & Oh, 2020). Technology has also evolved exponentially since the start of the internet in the 1990s, and this has allowed students to achieve more than before. Technological, Pedagogical and Content knowledge has also improved the lives of students so much that teachers’ role shifted from being the authority with the knowledge to the person as a facilitator. (Ersanli, 2016).

Historically and chronologically, the following are the prominent technologies used in the classroom setting;

a. 1800s: Chalkboards and Slide Rules
b. 1900s: Pencils, Paper and Film Projectors
c. 1940s: Mimeograph Machines and Ballpoint Pens
d. 1950s: Television. Interestingly, a review of the past (circa 1950s) revealed that schools relied on the television and coined them as Instructional Television (ITV) as people at that point in time
have also speculated that televisions could replace teachers in the classroom.

e. 1960s: Overhead Projectors
f. 1970s: Handheld Calculators and Scantron Sheets
g. 1980s: Use of computer networking/computer-based training (CBT) and Open online courses
h. 1990s: Start of the World Wide Web (1991), Google (1999), and also the expansion of Learning Management Systems. Also emerged in the late 1990s was the definition of e-learning in the late 1990s.
i. After 2000: Massive Open Online Course (MOOC) in 2008 and the Social Media that covers a wide range of different technologies, including blogs, wikis, YouTube videos, mobile devices such as phones and tablets, Twitter, Skype, and Facebook.

In the present day, the term e-learning is synonymous with online learning, online education. (Singh, & Thurman, 2019). They rely heavily on the use of the internet and electronic devices, which also allows learning to be carried out anytime and anywhere. Expanding from here, there are two types of e-learning. The first is recognized as the Synchronous e-Learning; It occurs when the teacher and the students interact with each other in real-time, from different locations. The second is recognized as Asynchronous e-Learning, whereby the learners undergo a self-learning according to their pace and circumstance without the teacher being there. In other words, the learner and the instructor are not online at the same time (Xie, Liu, & Bhairma, 2018).

Additionally, some other researchers observed that they are three different e-learning models: a) adjunct, b) blended and c) fully online (Algahtani, 2011). See Figure 1. Bielaczyc (2006) claims that when designing TEL, technology should be considered as one component in a holistic endeavor, which should include other, socially driven design elements in four critical dimensions: “(a) cultural beliefs of the people who are to use the designed product, (b) their practices in engaging in both online and offline activities, (c) the socio-techno-spatial relations (d) their interaction with the ‘outside world’.” (p. 301).
The process of transforming teaching and learning is a complex process which may involve changes in teachers’ beliefs and conception of teaching and learning. In Malaysia, the Malaysian Education Blueprint 2015 – 2025 (Higher Education) lists transformation of the delivery of higher education as one of the shifts in the aspiration to deliver a world-class higher education system. For this purpose, change is required in the processes of learning so as to develop students with enhanced capabilities to be future-ready Malaysians, as well academics who could perform this task (Ministry of Education, 2015). Hence, academics and students alike may need to unlearn and relearn concepts of teaching and learning.

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