Reimagining the Role of Technology towards Innovative Pedagogies in Teaching and Learning

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ABSTRACT

Emerging technologies such as Mixed Reality (MR), Augmented Reality (AR), Immersed Augmented Reality (IVR) and Artificial Intelligent (AI) are paving the way for the future of education. These new technologies are changing the education landscape. Since these technological trends in education are growing, there is a need to look at how these technologies could be integrated successfully into the learning ecosystem. To apprehend the benefits of technology in education and provide authentic learning experiences, educators need to use technology effectively in their teaching practices. Hence, it is vital to revisit the role of technology in providing meaningful teaching and learning experiences. This paper showcases emerging practices of technology integration in teaching and learning and how each technology plays an important role in the implementation of innovative pedagogies. Additionally, the key lessons learnt from the emerging practices and the way forward are also shared. As a suggestion, more research should be conducted in investigating the impacts of these emerging technologies in teaching and learning.

Keywords: Technology in education; innovative pedagogies, teaching and learning; the role of technology

I. Introduction

With the help of technology, the process of teaching and learning is no longer restricted to the classroom environment (Licorish et al., 2018). Significantly, the emerging and developing of technology and its application to teaching comes into full play in education (Bonfield et al., 2020; Hashim, 2018; Pedro et al., 2019). Technological innovations have gone hand-in-hand with the growth of innovative pedagogies. There has been a very significant proliferation of literature regarding the use of technology in learning. However, to apprehend the benefits of technology

in education and in an attempt to provide authentic and meaningful learning experiences, educators need to use technology effectively in their teaching practices (Carpenter et al., 2020). Hence, in adopting the emerging technologies, it is imperative to reimagining the role of each technology and how each technology could be applied in transforming teaching and learning.

II. Reimagining The Role of Technology in Education and the Emerging Practice

Since technology has become an ever-present part of student life in today's networked society, the new generation of learners may be developing different ways of learning through the ubiquitous digital technologies that are central to their everyday life (Han & Shin, 2016). The following are ways that technology could be better leveraged to improve learning:

a. improve learning experience (Belbase, 2020; Hernandez-de-Menendez et al., 2020; Rahman et al., 2020)

b. enhance student engagement (Kim et al., 2020)

c. provide authentic (Mettis & Väljataga, 2021; Stefaniak & Xu, 2020) and contextualized learning (Alsomi & Saaty, 2020)

d. promote autonomous learning (Du, 2020; Lenkaitis, 2020)

e. allow anywhere and anytime learning (Bulus, 2020; Manzoor et al., 2020)

f. accommodate diversity in learning styles (Syahrin & Salih, 2020; Tambunan et al., 2021)

g. encourage collaborative learning (Yehya, 2020)

h. allow easy access to learning material (Yatigammana, 2020)

Due to the above-mentioned roles of technology, the followings are among the emerging practices that have been implemented towards innovative pedagogies in teaching and learning;

a. massive open online courses (MOOC)

MOOC is an online platform where everyone can enroll because the courses offered are free. Massive Open Online Courses (MOOCs), has become widespread among academicians around the world. There are now multiple MOOC platforms, offering hundreds of courses such as Open Learning, Coursera, Khan Academy, EdX, Udemy, and many more.

b. Games and Gamification

Referred to as "Game-Based Learning", this emerging technology has expanded far beyond integrating digital and online games into the learning. Games are effective tools for scaffolding concepts and simulating real world experience.

c. Virtual Reality

Virtual reality reflects the current trend in current education toward more authentic online education. The term Virtual Reality is not new but rather has broadened recently. VR uses additional tools such as VR goggles which help to present an artificial environment using sounds, 3D images, or other stimuli to give the impression of immersing in a non-physical world. In virtual reality, the role of memory in learning have proven to improve learning.

d. Augmented Reality

Augmented reality (AR) technology has a great potential for all areas. AR allows the users to add digital content to printed material or objects. Then using a smart device or tablet, viewers can scan an object and the digital content will appear. The digital information can range from a link to a website, an invitation to make a phone call, a video, a 3D model or any other supported digital information.

e. Podcasting

Podcasting offers the opportunity for educators to easily broadcast engaging audio content, which students can then listen to at any time and wherever they are. Podcasts can easily be used in schools, universities or colleges to engage students, and improve teaching and learning practice. On the other hand, students can also use podcasting as part of learning activities.

f. Movie Production

Movie production can promote learning by encouraging meta-cognition and the synthesis of multiple concepts in an engaging, project-based exercise, with the additional benefit of producing educational media useful for peer-learning (Anderson, 2013; Reyna & Meier, 2020).

g. Music Composition

Incorporating music into almost any class can be a great way to teach content—and it doesn't take special training or expensive resources. Enhancing knowledge acquisition through music composition. Learners can be assigned with a task to compose music based on what they have learnt.

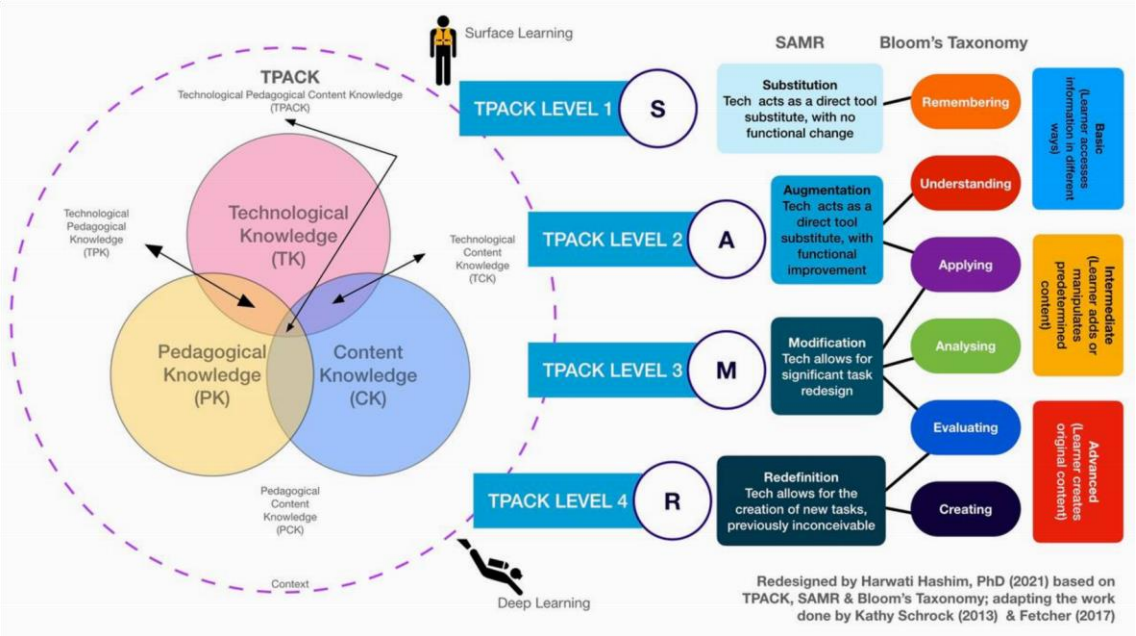
III. The Key Lessons Learnt

Technology has come to stay, and its advents in education is still posing challenge to many educators. Among the challenges are:

a. finding or adjusting the right 'recipe' in blending teachers' Technological,

Pedagogical, Content Knowledge (TPACK), SAMR & Bloom's Taxonomy

Figure 1. TPACK, SAMR & Bloom's Taxonomy adapted from Kathy (2013) & Fetcher



(2017)

Based on Figure 1, TPACK shows the essential relationships of three primary forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK). At the heart of the TPACK framework is the complex interplay Technological pedagogical content knowledge (TPACK) which is an understanding that emerges from interactions between content, pedagogy, and technology knowledge. TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies and pedagogical techniques that use technologies in constructive ways to teach content (Koehler et al., 2009).

The Substitution Augmentation Modification Redefinition (SAMR) Model shows how to progress through teaching and learning with technology. The first two stages (Substitution and Augmentation) are referring to the role of

technology in enhancing learning; while the other two stages (modification and Redefinition) are considered as transforming learning. Ideally, the last stage (Redefinition) is the ultimate aim of effective teaching and learning with technology.

SAMR helps educators in designing learning tasks that have significant impact on student outcomes. This is further extended by Kathy Schrock by making connections to the updated Bloom's Taxonomy.

b. deciding suitable innovative pedagogies for digital learning environment Innovative pedagogies are focused on meaningful and conducive learning environments. Educators are challenged in designing lessons for their learners which suit digital environment. Approaches such as collaborative learning, contextualized learning, blended learning, flipped learning, problem-based learning, and project-based learning are among the approaches that can be used in digital learning environment.

c. the digital learning dilemma: high tech vs low tech, or a blend of both? Educators' technological knowledge is also needed in deciding whether

high-tech or low-tech tools should be used in learning,

IV. Conclusion

Overall, technology is central to education and its integration into teaching and learning has great promise for student learning experiences. With technology, one can expect increased efficiency and effectiveness on both the part of teachers

and students. Technology can also prompt pedagogical change and address issues that affect learning and teaching. Technology can therefore be seen as both a tool and a catalyst for change.

Bibliography

Alsolami, T., & Saaty, N. (2020). The links between technology and principles of language teaching and learning: theoretical and practical insights. Technium Soc. Sci. J., 14, 718.

Anderson, J. (2013). Evaluating student-generated film as a learning tool for qualitative methods: geographical “drifts” and the city. Journal of Geography in Higher Education, 37(1), 136-146.

Belbase, S. (2020). Early Undergraduate Emirati Female Students' Beliefs about Learning Mathematics Using Technology. European Journal of Educational Research, 9(3), 1235-1255.

Bonfield, C. A., Salter, M., Longmuir, A., Benson, M., & Adachi, C. (2020). Transformation or evolution?: Education 4.0, teaching and learning in the digital age. Higher Education Pedagogies, 5(1), 223-246.

Bulus, P. (2020). Significant of Smartphone: An Educational Technology Tool for Teaching and Learning. International Journal of Innovative Science and Research Technology, 1-634.

Carpenter, J. P., Rosenberg, J. M., Dousay, T. A., Romero-Hall, E., Trust, T., Kessler, A., ... & Krutka, D. G. (2020). What should teacher educators know about technology? Perspectives and self-assessments. Teaching and Teacher Education, 95, 103124.

Davy, T. K., Ellen, H. L., & Samuel, K. W. (2021). Engaging students in creative music making with musical instrument application in an online flipped classroom. Education and Information Technologies, 1-20.

Du, Y. (2020). Study on Cultivating College Students' English Autonomous Learning Ability under the Flipped Classroom Model. English Language Teaching, 13(6) , 13-19.

Hashim, H. (2018). Application of technology in the digital era education. International Journal of Research in Counseling and Education, 2(1), 1-5.

Hernandez-de-Menendez, M., Díaz, C. A. E., & Morales-Menendez, R. (2020). Educational experiences with Generation Z. International Journal on Interactive Design and Manufacturing (IJIDeM), 14(3), 847-859.

Han, I., Shin, W.S. (2016). The use of a mobile learning management system and academic achievement of online students. Comput. Educ. 102, 79–89.

Kim, H. J., Yi, P., & Hong, J. I. (2020). Students' academic use of mobile technology and higher-order thinking skills: The role of active engagement. Education Sciences, 10(3), 47.

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? Contemporary Issues in Technology and Teacher Education, 9(1) , 60-70.

Lenkaitis, C. A. (2020). Technology as a mediating tool: videoconferencing, L2 learning, and learner autonomy. Computer Assisted Language Learning, 33(5-6), 483-509.

Licorish, S. A., Owen, H. E., Daniel, B., & George, J. L. (2018). Students' perception of Kahoot!'s influence on teaching and learning. Research and Practice in Technology Enhanced Learning, 13(1), 1-23.

Manzoor, S., Sarwar, S., & Asim, M. (2020). M-Learning in Higher Education:

Exploring the Gender Based Faculty Performance of Business Schools in Pakistan. Pakistan Journal of Gender Studies, 20(1), 195-210.

Mettis, K., & Väljataga, T. (2021). Designing learning experiences for outdoor hybrid learning spaces. British Journal of Educational Technology, 52(1), 498-513.

Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). Artificial intelligence in education: Challenges and opportunities for sustainable development.

Rahman, N. A., Arifin, N., Manaf, M., Ahmad, M., Zin, N. M., & Jamaludin, M. (2020 , March). Students' Perception in Blended Learning among Science and Technology Cluster Students. In Journal of Physics: Conference Series (Vol. 1496 , No. 1, p. 012012). IOP Publishing.

Reyna, J., & Meier, P. (2020). Co-Creation of Knowledge Using Mobile Technologies and Digital Media as Pedagogical Devices in Undergraduate STEM Education. Research in Learning Technology, 28.

Syahrin, S., & Salih, A. A. (2020). An ESL Online Classroom Experience in Oman during Covid-19. Arab World English Journal, 11(3), 42-55.

Stefaniak, J., & Xu, M. (2020). Leveraging dynamic decision-making and environmental analysis to support authentic learning experiences in digital environments. Revista de Educación a Distancia (RED), 20(64).

Tambunan, H., Silitonga, M., & Sidabutar, U. B. (2021). Online and face-to-face composition in forming the professional competencies of technical teacher candidates with various learning style types. Education and Information Technologies, 26(2), 2017-2031.

Yatigammana, K. (2020). Digital Disruption in Learning: Overcoming the challenges in Digital Technology in Science Education.

Yehya, F. M. (2020). Promoting Technology-Implementation Learning paradigm for online learning in secondary Education. Global Journal of Information Technology: Emerging Technologies, 10(1), 12-21.