Chapter 14
Empowering Blended Learning via MOOCs for Teacher Education in Malaysian Higher Education

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Abstract Previous years have seen emerging learning environments such as massive open online courses (MOOCs) that alter the higher education landscape. MOOCs provide a platform to conduct globalized online learning with various approaches, learners and contexts – further expanding the possibilities of its applications in the context of teacher education in blended learning at higher education level. Malaysia too has begun to adopt MOOCs via its nationwide initiative, called Malaysia MOOCs, in which all public universities produce and implement MOOCs in blended learning settings. To date, the initiative has produced around 570 MOOCs with enrolments of over 380,000 learners. Nevertheless, with regard to MOOCs in teacher education, limited research has been carried out in this field; hence, we have yet to fully understand its potentials, benefits and drawbacks in higher education. As such, this chapter will discuss these aspects in the context of Asian higher education where a case study in Malaysia is presented. The discussion revolves around whether MOOCs in blended learning enhance or disrupt learning. This chapter ends with a discussion on issues, challenges and future directions of MOOCs in blended learning for higher education in Malaysian, Asian and global contexts.

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14.1   Introduction

Massive open online courses (MOOCs) have emerged in previous years, shifting the higher education landscape (Ally, Embi, & Norman, 2019; Spring & Graham, 2017). MOOCs provide the avenue for implementation of globalized online learning across diverse learning approaches and contexts as well as accommodate a wide variety of learners (Kizilcec, Pérez-Sanagustín, & Maldonado, 2017; Lim, Tinio, Smith, & Bhowmik, 2018). In the context of teacher education, MOOCs show much promise in blended learning contexts at higher education level (Yousef, Chatti & Schroeder, 2015; Andersen, Na-songkhla, Hasse, Nordin, & Norman, 2018). In line with the global phenomenon, Malaysia too has begun to adopt MOOCs on a nationwide scale, called Malaysia MOOCs. The birth of the initiative was based on the Malaysia Education Blueprint, 2015–2025 (Higher Education) in which one of the aspects in the blueprint aspires globalized online learning via MOOCs (Embi, 2011; Nordin, Embi, & Norman, 2015). This is also in line with the Malaysia e-Learning policy, where 70% of the courses conducted in public universities are required to be in blended learning settings by year 2025 (Nordin, Norman, Embi, Mansor, & Idris, 2016). The aim of MOOCs is to provide an efficient course delivery system, enhancing universities' performance and expertise and making Malaysia a global education hub. MOOCs in Malaysia emphasize flexible learning with a comprehensive integration on competency-based learning, where the focus is on student achievement and learning outcomes (Nordin, Embi, Norman, & Panah, 2017).

To date, the initiative has produced around 570 MOOCs with enrolments of over 380,000 learners. Nevertheless, with regard to MOOCs in teacher education, limited research has been carried out in this field; hence, we have yet to fully understand its potentials, benefits and drawbacks. As such, this chapter will discuss these aspects in the context of Asian Higher Education where a case study in Malaysia is presented. The discussion revolves around whether MOOCs in blended learning enhance or disrupt learning. This chapter ends with a discussion on issues, challenges and future directions of MOOCs in blended learning for higher education in Malaysian, Asian and global contexts.

14.2   E-Learning Policy in Malaysian Higher Education

The National e-Learning Policy was launched by the Ministry of Higher Education in 2011 to support the National Higher Education Strategic Plan (PSPTN). It serves as the guidance for the implementation of e-Learning among tertiary institutions (Higher Education Institutions (HEIs)) in Malaysia. The ultimate goal of e-learning policy is to optimize the use information technology and communication as a tool to improve the quality of teaching and learning with the aim of developing world-class human capital. Generally, the e-learning policy is underpinned with five main aspects, namely (a) infrastructure, (b) organizational structure, (c) curriculum and

e-content, (d) professional development and (e) culture. This new policy has shifted its focus to highlighting innovation in education, rebranding the Malaysian education and reducing cost of delivery and bringing Malaysian expertise and skills to global context while promoting lifelong learning in education (Malaysia Education Blueprint, 2015).

Analysis of e-Learning policies has been conducted to obtain responses from e-Learning administrators and lecturers in Malaysia. Findings related to the status, trends, effectiveness and challenges of e-learning policy in Malaysian HEIs revealed that 38.5% of HEIs have e-learning policy while 61.5% of HEIs do not have e-Learning policies yet. The study also revealed that development for e-Learning policies only includes the top management and representatives of faculties/centres/departments and disregards the involvement of the students and external stakeholders. In addition, the dissemination of information on e-Learning policies includes formal training programmes (80%), university web sites (70%), circulars (60%), pamphlets (60%) and induction programmes (40%). The majority of HEIs also possess low awareness of e-learning policy whereby eight HEIs are at a low level of awareness regarding e-Learning policies and six HEIs were reported to have high awareness on e-Learning policies (Malaysia Education Blueprint, 2015).

Despite high awareness of e-Learning policies among lecturers in HEIs, support from the lecturers is still very low (25–50%), while 76–100% of the contribution was from management, faculty/school/department and students at HEIs. The lecturers in HEIs have also confirmed that information about the policy was obtained mainly from institutional websites (58%), circulars (57.4%) and formal training programmes conducted by their respective HEIs. Despite of the training and dissemination of information about e-Learning policies, majority of the lecturers (64.4%) in HEIs stated that they did not fully comply with the e-Learning policies in their respective HEIs, while only 30.6% of the lecturers have fully complied with the e-learning policy in their respective HEIs (Malaysia Education Blueprint, 2015).

14.3 Globalized Online Learning and the Malaysia Education Blueprint, 2015–2025 (Higher Education)

In the Malaysia Education Blueprint, 2015–2025, Globalized Online Learning refers to the shift in learning environment towards a wider context, particularly the global context. This initiative is in line with the national agenda of the Ministry of Education to ensure holistic and relevant graduates from all HEIs. According to the Malaysia Education Blueprint, 2015–2025, Malaysia's Internet penetration has increased to 67%, making it seventh place among Asian countries. The remarkable position of Malaysia to be among the top users of Internet uncovers a new potential for the current learning environment. There are significant opportunities to achieve the desired outcomes first set forth in the National e-Learning Policy (Dasar e-Pembelajaran Negara or DePAN). Malaysia needs to move from a

mass production delivery model to one where technology-enabled innovations are harnessed to democratize access to education and offer more personalized learning experiences to all students (Malaysia Education Blueprint, 2015).

Blended learning models have become a staple pedagogical approach in all HEIs. Students will benefit from robust cyber infrastructure that can support the use of technologies like videoconferencing, live streaming and massive open online courses (MOOCs). Malaysian HEIs will also develop MOOCs in their niche areas of expertise while participating in international MOOC consortiums and building the Malaysian education brand globally (Malaysia Education Blueprint, 2015).

To achieve these outcomes, the Ministry of Education is working with Higher Education Institution (HEI) to build the capabilities of the academic community and explore the establishment of a national e-learning platform to coordinate and spearhead content development. Key initiatives include:

- Launching MOOCs in subjects of distinction for Malaysia such as Islamic banking and finance, in partnership with high profile international MOOC consortiums like EdX and Coursera, so as to build Malaysia's global brand
- Making online learning an integral component of higher education and lifelong learning, starting with the conversion of common undergraduate courses into MOOCs, and requiring up to 70% of programmes to use blended learning models by year 2025
- Establishing the required cyber infrastructure (physical network infrastructure, info structure, platform, devices and equipment) and strengthening the capabilities of the academic community to deliver online learning at scale

In Malaysia, MOOCs were developed by respective HEIs according to the course offered by the institutions. The development of the course may vary according to the existing academic programmes, and other customized courses below consideration of each HEI MOOC Malaysia can be divided into three types of courses, namely (i) general course, (ii) niche courses and (iii) lifelong learning courses. HEIs can develop and offer in-depth courses from any of the above categories and simultaneously coordinate with the Malaysia MOOC committees in terms of topics and types of courses to be developed by HEIs before it is developed and then offered on MOOC Malaysia platform (Malaysia Education Blueprint, 2015).

14.4   Teacher Education and MOOCs in Malaysia

Teacher education involves the general aspects of education involving schooling, teaching, teachers and their education that introduces pre-service and in-service teachers to specific forms of practice in teaching. Initially, the term "teacher training" was used to refer to trainings for pre-service and in-service teachers for professional development. In 1981, the term was replaced with "teacher education" aiming to make these teachers more proficient and pedagogically skilled. The training was aimed to fulfil the aspiration of developing proficient and skilful teachers (Zeichner,

1983). The implementation of MOOCs for teacher education has revealed various consensuses around online learning. Implementation of MOOC provides high-quality education that functions as a means to enhance online learning experience at a larger scale. In other words, an MOOC enables learners to improve their skills and professionalism efficiently with greater cost savings. In teacher education, particularly in the Universiti Kebangsaan Malaysia (UKM) context, this platform has evolved to be an accessible and flexible means for learning in higher education institutions. As an assessable and practical tool for learning, UKM MOOC also provides completion assessment and award certification for students who successfully completed the course. Introducing MOOCs for teacher education has also improved the development of pre-service and in-service teachers' skills related to pedagogy in the twenty-first century. Aspects related to teaching, digital literacy and academic writing are increasingly demanding. Therefore, the introduction of MOOCs as a part of teacher education and skills development becomes a stepping stone in producing relevant, skilled and well-trained teachers. Elements of "massiveness" in MOOCs provide larger opportunities for all learners to participate in learning the subject matter regardless of their background knowledge and expertise. Knowledge sharing on a large scale enables an increasing number of enrolments for professional development which has resulted in high production of skilled and knowledgeable students who are also trainee teachers (Malaysia Education Blueprint, 2015).

14.5   A Case Study of Blended Learning and MOOCs for Teacher Training at Universiti Kebangsaan Malaysia

In line with global and local aspiration of MOOCs for globalizing online learning, Universiti Kebangsaan Malaysia (UKM) has also developed its own MOOC initiative called UKM MOOC. As of November 2018, UKM MOOC has produced a total of 189 MOOCs with enrolments of over 19,5000 students across the MOOCs that is conducted in blended learning format. The UKM MOOC can be accessed via https://www.openlearning.com/ukmmooc. In illustrating teacher training and blended learning using MOOCs, we describe a case study of educational technology course at postgraduate level in Faculty of Education. The course is an educational technology course that focuses on instructional design and development of educational technology products.

For the blended learning environment, a course MOOC was provided to the students as the online learning environment. The MOOC was positioned as a centralized platform for access of learning materials and tasks, as well as a platform for discussions among students enrolled in the MOOC. The MOOC has been developed since 2015 and has been conducted for six cohorts – each cohort has a period of 4 months. Although the MOOC is used for the educational technology course, the

enrolment in the MOOC is not restricted to students from UKM or those currently taking the course. Anyone from anywhere could enrol the course anytime they wanted to. Currently, the course has a total enrolment of over 700 students from 26 countries:

- Asia: Malaysia, Thailand, Indonesia, Oman, Kuwait, Saudi Arabia, Pakistan, Bangladesh, Hong Kong, Iran
- Europe: France, Belgium, Germany, the Netherlands, Greece, Finland, Portugal, United Kingdom, Switzerland, Norway, Georgia
- North America: Canada, USA
- South America: Peru
- Africa: South Africa and Australia

This was conducted to ensure learners not only blended with their coursemates but also with coursemates from the global learning community.

The instructional design of the course MOOC has roots in the H-MOOC framework of Pérez-Sanagustín, Hilliger, Alario-Hoyos, Kloos, and Rayyan (2017), problem-based learning and the ADDIE framework (analysis, design, development, implementation and evaluation). The H-MOOC framework posits that hybrid MOOC initiatives be framed on two factors, which are (i) institutional support to reuse an existing MOOC and (ii) curricular alignment between a MOOC and the programme, or the blended/hybrid course. As the UKM MOOC is part of the nationwide initiative of Malaysia MOOCs, the typical development of MOOCs at the university has full institutional support at university and faculty levels. The curriculum of the developed MOOC would be aligned based on the programme or course offered by the faculty. However, in the education technology course, we reversed or "flipped" the typical development mode of MOOCs to involve our postgraduates in MOOC development. The postgraduates consisted of in-service teachers, education minister officers as well as full-time postgraduates enrolled in the field of education. Here the postgraduates took the roles of subject matter experts, instructional designers and learning content developers. With regard to subject matter experts and instructional designers, they designed the learning that was reviewed by lecturers. As learning content developers, their role was to develop content based on the developed learning designs. As for learning tools and materials, a course MOOC was provided as a learning platform to access learning materials and tasks and to engage with their coursemates.

As stated before, the instructional design also integrated problem-based learning using the generic ADDIE framework. The instructional design of blended learning was conducted in five phases of ADDIE. In the first phase (analysis phase), the instructors met with students in face-to-face sessions to provide the learning task which was to produce a MOOC in collaboration with instructors on the subject area. The task was loosely provided to students in order to shift the autonomy level of problem creation to students. In other words, this was done to provide a sense of belonging or sense of control over problem formulation, as discussed by Ryberg et al. (2010). In the second phase (design phase), online collaborative mind mapping (Norman et al., 2017) was carried out to achieve mutual consensus of brainstorming
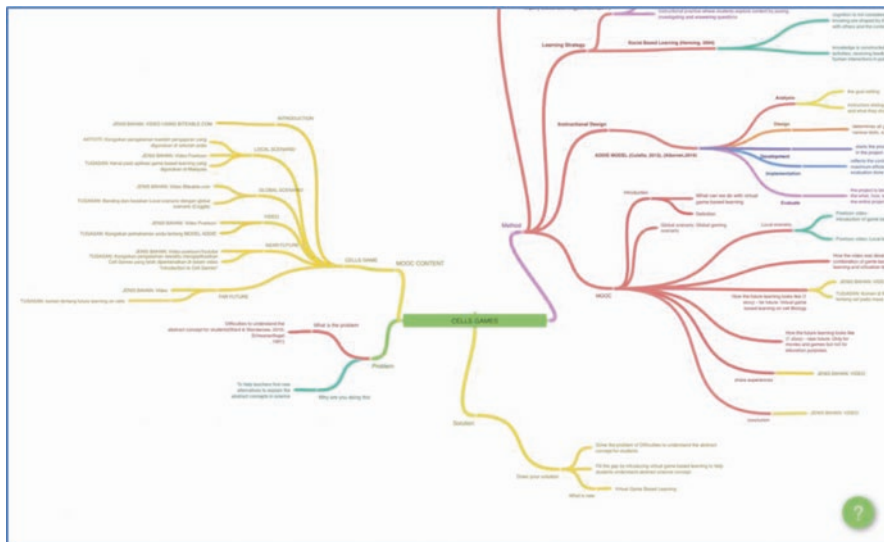
Fig. 14.1 Online collaborative mind map produced for problem formulation and planning of instructional design

over formulation of their learning problem as well as identification of gaps in literature, learning theories and strategies. Online mind mapping also assisted in planning of instructional design in MOOC that they were developing. An example of a mind map is illustrated in Fig. 14.1.

In the third phase (development phase), the students developed their MOOCs based on the mind maps developed in the previous phase. This was conducted in blended learning settings where both online and face-to-face settings were applied. Figure 14.2 shows the interface of the MOOC and learning materials developed. Table 14.1 summarizes the 19 MOOCs developed by the students. With regard to the field of study, four MOOCs were in mathematics, three in general science, three for language learning, two in biology and two in educational approaches, while the remaining were for ICT and risk management. As for the mode of learning material delivery, most of the materials were developed in English (13 MOOCs), while the remaining ones were developed in Malay language.

In the fourth phase (implementation phase), the developed MOOCs were presented in face-to-face sessions and shared online (via instant messaging) for review. In the final phase (evaluation), the MOOCs were reviewed by the instructors and peers in terms of instruction design, subject matter and language in blended learning settings. The MOOCs were then improved based on the feedback given.

Fig. 14.2 User interface and learning materials for one of the developed MOOCs

14.5.1   Average Active Learning Time and Daily Active Students on the Course MOOC

In assessing learning patterns in online learning settings, measures such as active learning time and daily active students were used for the assessment of the course MOOC. The average active time spent on each page is recorded as it varies according to the topics and module presented in the MOOC. Interestingly, "the share your video tutorials" page and "resources on blended learning" page recorded the highest average active learning time on the course MOOC with average times of 1 hour and 38 minutes, respectively. This can be related to a study conducted by Hone and Said (Hone & El Said, 2016), where they studied on retention rates of MOOCs with 379 participants. The study revealed that learning materials on MOOC have a significant effect on retention. Meanwhile, Kolås, Nordseth, and Hoem (2016) reported that the use of interactive videos increased retention levels in MOOCs. The study revealed that quizzes that were embedded in the videos increased engagement in MOOC and avoided passive video watching.

Coming back to this study, the highest active time was on "the share your video tutorials" page that consisted of learning products developed by students in the form of 3D animations. "The resources on blended learning" page had the second highest

Table 14.1 Summary of MOOCs developed

Topic	Details	Field	Material delivery language	URL
Fun with Math	Exposure for primary school students to the foundations of mathematics	Mathematics	English	https://www.openlearning.com/courses/funwithmath/
Pengenalan Web 2.0 (Introduction to Web 2.0)	Introduction to web 2.0 and software for digital educational materials	ICT	Malay language	https://www.openlearning.com/courses/web-2-0-exploration/pengenalan_web_2_0
Risk Management	Risk management introduction and process, as well as risk tolerance and roles of risk manager within organizational settings	Risk management	English	https://www.openlearning.com/courses/risk-management-my/
Theorem Pythagoras (Pythagoras theorem)	Introduction to the basics of Pythagoras theorem	Mathematics	Malay language	https://www.openlearning.com/courses/theorem-phytagoras/
Digestive system	Exposure to human's digestive system, function of the associated organs and relevant processes	Biology	Malay language	https://www.openlearning.com/courses/digestive-system/
Writing skills for beginners	Introduction to academic writing, its features, reviewing process, reference access and writing process of an academic paper	Language	English	https://www.openlearning.com/courses/writing-skills-for-beginners/
Teknologi Maklumat Komunikasi (information technology and communication)	Exposure to basic digital literacy for primary school students which includes usage of software for word processing, presentations and spreadsheets	ICT	Malay language	https://www.openlearning.com/courses/teknologi-maklumat-komunikasi
Bilik Darjah Pintar (smart classrooms)	Introduction to setting up smart classrooms for learning	Education	Malay language	https://www.openlearning.com/courses/bilik-darjah-pintar/HomePage
Augmented Reality Geometri Sekolah Rendah (augmented reality for primary school)	Introduction to geometry for primary school level using augmented reality	Mathematics	Malay language	https://www.openlearning.com/courses/augmented-reality-geometri-sekolah-rendah/

Table 14.1 (continued)

| Topic	Details	Field	Material delivery language	URL
Cell games	Learning in the field of biology focusing on cells using game-based learning approaches	Biology	English	https://www.openlearning.com/courses/cells-games/
First touch learning	Introduction to learning via touch-based learning tools	Education	English	https://www.openlearning.com/courses/first-touch-learning/
Future classroom for ESL learners	Introduction to the future of learning and technologies that can assist in learning of English	Language	English	https://www.openlearning.com/courses/future-class-for-esl-learners/
Virtual science lab	Exposure to physics via a virtual science lab	Physics	English	https://www.openlearning.com/courses/physics-virtual-lab/
Science smart learning	Introduction to teaching and learning approaches of science with the support of ICT	Science	English	https://www.openlearning.com/courses/science-smart-learning/
Fun in English learning	Introduction to English language learning via digital posters	Language	English	https://www.openlearning.com/courses/fun-in-learning-english-language/homepage
Mobile learning for science	Exposure to science via mobile learning	Science	English	https://www.openlearning.com/courses/mobile-learning-for-science
Revolution of science learning	Introduction to science via learning apps and game-based learning	Science	English	https://www.openlearning.com/courses/revolution-of-science-learning
School of tomorrow	Exposure to the concepts of future schools and its impacts on education	Education	English	https://www.openlearning.com/courses/school-of-tomorrow
Smart learning in geometry	Introduction to mathematics focusing on measurements using ICT	Mathematics	English	https://www.openlearning.com/courses/smart-learning-in-geometry/homepage
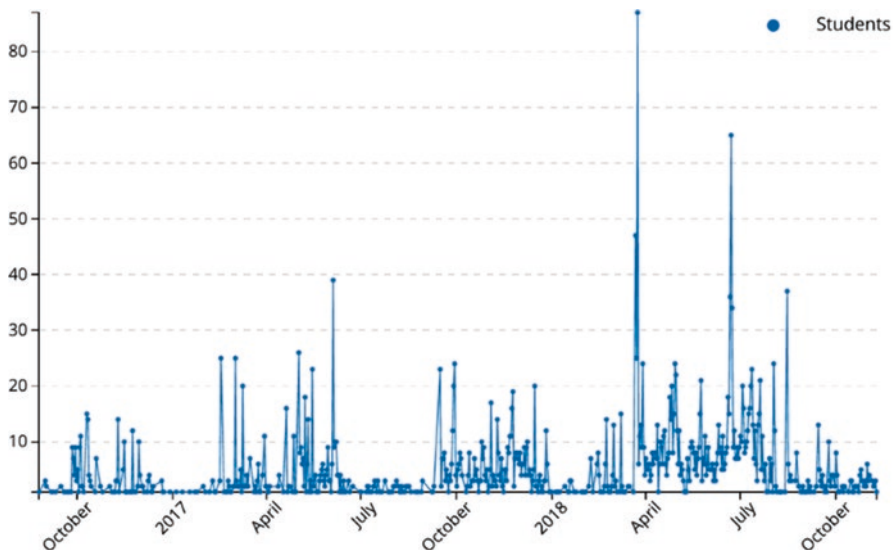
Fig. 14.3 Daily active students

active time, which had videos and presentation slides from the International Association for Blended Learning 2017: 2nd World Conference on Blended Learning. The high average time was probably due to the learning resources available on the page from an international conference. In relation, reviewing active learning time in an online context is crucial as it provides an insight to visualizations of learning analytics and patterns. These visualizations assist instructors to identify active learners and contributors in MOOC learning and help instructors gain in-depth information for the design of effective blended teaching and learning (Martin & Ndoye, 2016). In other words, data analytics on active learning time on MOOCs is useful to provide more information in designing effective online programmes and courses. Daily active students were also assessed, as shown in Fig. 14.3. From the figure, we can observe that there are several peaks of active time. It can be seen that the highest peaks were between the months of April and June, where the semester ends. The high number of daily active students was probably due to the fact that learning task deadline was assigned near the end of the course period (Nordin, Embi & Norman, 2016). In a related study, Nawrot and Doucet (2014) found out that integration of submission time of learning assignments increased task submission and active learning time.

14.6   Concluding Remarks: Issues, Challenges and Future Directions of Blended Learning for Teacher Training in Malaysian and Asian Higher Education

This chapter has illustrated the Malaysian scenario of blended learning via its e-learning policy and blueprint as well as the Malaysia MOOC initiative that has influenced blended learning for teacher training in Malaysia. This chapter also presents a case study in a local university, UKM, in which the Education Faculty reversed the typical MOOC development model (institutional and faculty level) to students creating MOOCs for their peers. The instructional process was described via five phases, where the initiative produced 19 MOOCs by students in collaboration with instructors. There are several issues, challenges and implications for the overall Asian higher education with regard to blended learning for teacher education.

First, although blended learning is typically conducted throughout the Asian continent in teacher education, without proper frameworks for implementation such as the H-framework by Pérez-Sanagustín et al. (2017), implementation of blended learning would be ineffective, and learning would be enhanced by blended learning. Second, the emergence of MOOCs from Asian countries and also global MOOCs could be used to mould blended learning for teacher education to suit the localities of a nation or a learning context. Whether MOOCs are driven by local or global learning content, each brings certain values that could be useful for cultivating globalized online learning in the region or locality (Margaryan, Bianco, & Littlejohn, 2015). Third, although the ideal learner-centric mode is typically preferred over teacher-centric mode, careful measures should be taken to ensure learning is enhanced rather than disrupted. The level of learner autonomy is quite diverse among learners as different types of learners have different needs of intervention levels. There is always the possibility that learning would diverge from the intended aim if certain measures and interventions are not properly put in place.

Fourth, there is still lack of research in blended learning for teacher education in terms of instructional design framework, especially for the Asian region. These studies would be beneficial in becoming foundations of resolving issues and challenges faced in implementing blended learning (Spring, Graham, & Hadlock, 2016). Fifth, there is also limited research that addresses the issue of blended learning assessment for teacher education (Ally et al., 2019; Spring & Graham, 2016). While measures such as MOOC learning analytics and social network analysis (refer to Norman, Nordin, Din, Ally, & Dogan, 2015) could be beneficial in understanding learning patterns of online learning, there are yet proper measures and tools to assess blended learning settings which could quantify both online and face-to-face learning. Such assessment solutions would truly be beneficial in assisting an educator understand more about effective design of blended learning.

Finally, as this research area is quite promising, there is an urgent need for more longitudinal and rigorous studies that could further enhance and cultivate the field of blended learning in Malaysia. It is hoped that this chapter could be beneficial for future educators and researchers interested in the field of blended learning in teacher education and its impact on Asian higher education.

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