PUPIL: International Journal of Teaching, Education and Learning
ISSN 2457-0648

Jeanne Lam, 2018

Volume 2 Issue 2, pp.66-80

Date of Publication: 19th July 2018

DOI-https://dx.doi.org/10.20319/pijtel.2018.22.6680

This paper can be cited as: Lam, J. (2018). The Pedagogy-Driven, Learner-Centred, Objective-Oriented and Technology-Enable (Plot) Online Learning Model. PUPIL: International Journal of Teaching, Education and Learning, 2(2), 66-80.

THE PEDAGOGY-DRIVEN, LEARNER-CENTRED, OBJECTIVE-ORIENTED AND TECHNOLOGY-ENABLE (PLOT) ONLINE LEARNING MODEL

Jeanne Lam
School of Professional and Continuing Education, The University of Hong Kong, Hong Kong
jeanne.lam@hkuspace.hku.hk

Abstract

Online learning changes the ways of learning. Learning has been shifted from traditional face-to-face teacher-student knowledge transfer to online learning with diversified learning pattern. To understand the learning experiences of online learning, a qualitative study with in-depth interview was conducted. The data was analysed by developing the thematic maps for thematic analysis. The final four themes categorized were pedagogy, learning, objective and technology. With the identified themes, the learning experiences of online learning were explored. An important finding was that the role of technology became more important and the role of teacher became less prominent. With the advanced technology which enabled diversified learning in the online environment, it was inevitable that some roles of teaching have been shifted from the teacher to the system. However, the role of technology cannot be truly reflected in the current online learning models. In this paper, the importance of pedagogical-driven element is again proven. Furthermore, the element of technical-enabled is found as essential in contemporary online learning. As a result, a new online learning model, Pedagogy-driven, Learner-Centred,

Objective-Oriented, Technology-Enabled (PLOT) model, was proposed, as a model for contemporary online learning.

Keywords

Online Learning, PLOT Model, Educational Technology, Pedagogy

1. Online Learning

Online learning has become more and more popular since the online technology started prevailing in late 20th Century. Online technology provides the environment for online communication. At the beginning, studies on online learning mainly focused on online interaction. Early in 1989, the learner-content, learner-instructor and learner-learner interactions in online education had been described (Moore, 1989). Researchers in the 1990s developed models to study the interactions in the online environment (Levin et al., 1990). In late 1990s, the studies on learning communities and learning network, as an extension of learning interaction, had become notable (Gunawardena et al., 1997). The most popular model for online learning is the Community of Inquiry (Garrison et al., 2001). This model defines the elements which are necessary in the collaborative learning environment. Interaction was believed as the core of online learning activities (Wang & Qiao, 2009).

The study on online learning has been shifted from interaction-focus to pedagogy-focused in early 21st Century. Besides 'social presence', the Community of Inquiry model brings in the element of 'teaching presence' (Garrison et al., 2001). Many pedagogy-focused models have been proposed. For example, Picciano (2009) proposes a multimodal model with pedagogical objectives. Course development model has also been proposed with pedagogy and instructional design as the core component (Lam et al., 2011). In practice, teachers' instructions help to maximize students' learning experience (Salleh, 2016).

However, in more recent studies, there are questions on whether the importance of teacher in the context of online learning should be lowered with more self-directed learning (Richter, 2013), which self-directed learning is 'a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material learning resources, choosing and implementing appropriate learning strategies, and evaluating learning outcomes' (Knowles, 1975, p.18). Self-directed learning can be defined as the amount of responsibilities of the learners' own learning (Fisher et al., 2001).

Technology is accelerating at an exponential rate and interactive technologies have been applied to learning (Chuang, 2015). Although technology has become essential in online learning, studies are still questioning the importance of technology in online learning (Loveless, 2011). Besides, it was found that technology is only mentioned in very few online learning models. For example, Khan's Octagonal Framework includes technological dimension as one of the eight dimensions in online learning (Khan, 2005). Recently, the TIPS Blended Learning Model included the technology element in understanding the context of blended learning and online learning (Lam, 2014) and it explained the role of learning platform, virtual classroom and multimedia learning objects in the online learning environment. It explained technology should be included in a holistic online learning model. In practice, the role of technology has become more important. For example, the schools have successfully made use of online learning games and online 3D application to teach the students (Kim et al., 2017; Alkhalidi & Izani, 2017)

2. Purposes, Methodology, Data Collection and Data Analysis

The purpose of this study was to understand the learning experiences of the students in the online learning environment. Qualitative approach was used for in-depth study. In a group of 80 learners, data was collected from 8 students. These students were selected for in-depth interviews. The identities of the students in this paper are presented as Student 1 to Student 8. The interviews were conducted with semi-structured design. The students were firstly asked with pre-designed questions and then follow-up questions based on the answers.

Data analysis was performed in three steps. Firstly, the transcripts were input into Nvivo, qualitative analysis software, for data categorizing. The results were used for performing thematic analysis (Braun & Clarke, 2006). Thematic maps (Braun & Wilkinson, 2003) were developed for final analysis. The developed thematic map shown in Fig. 1 was created with 13 themes and 32 sub-themes.

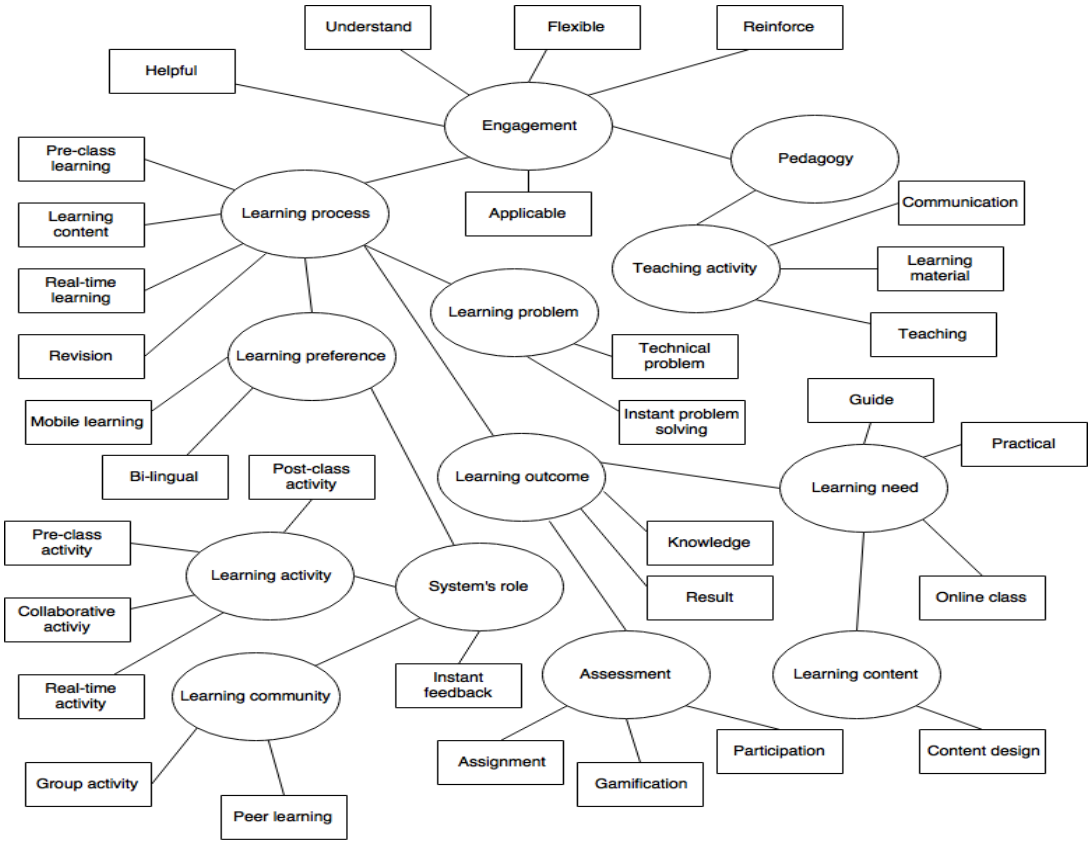

Figure 1: *Developed Thematic Map with 13 Themes*

The 13 developed themes are 1) Learning process; 2) Engagement; 3) Pedagogy; 4) Learning preference; 5) Learning problem; 6) Learning outcome; 7) Learning need; 8) Learning content; 9) Assessment; 10) System's role; 11) Learning activity; 12) Teaching activity; and 13) Learning community.

The developed thematic map was further consolidated into the final thematic map. The Final thematic map shown in Fig. 2 was created with 4 themes and 12 sub-themes.

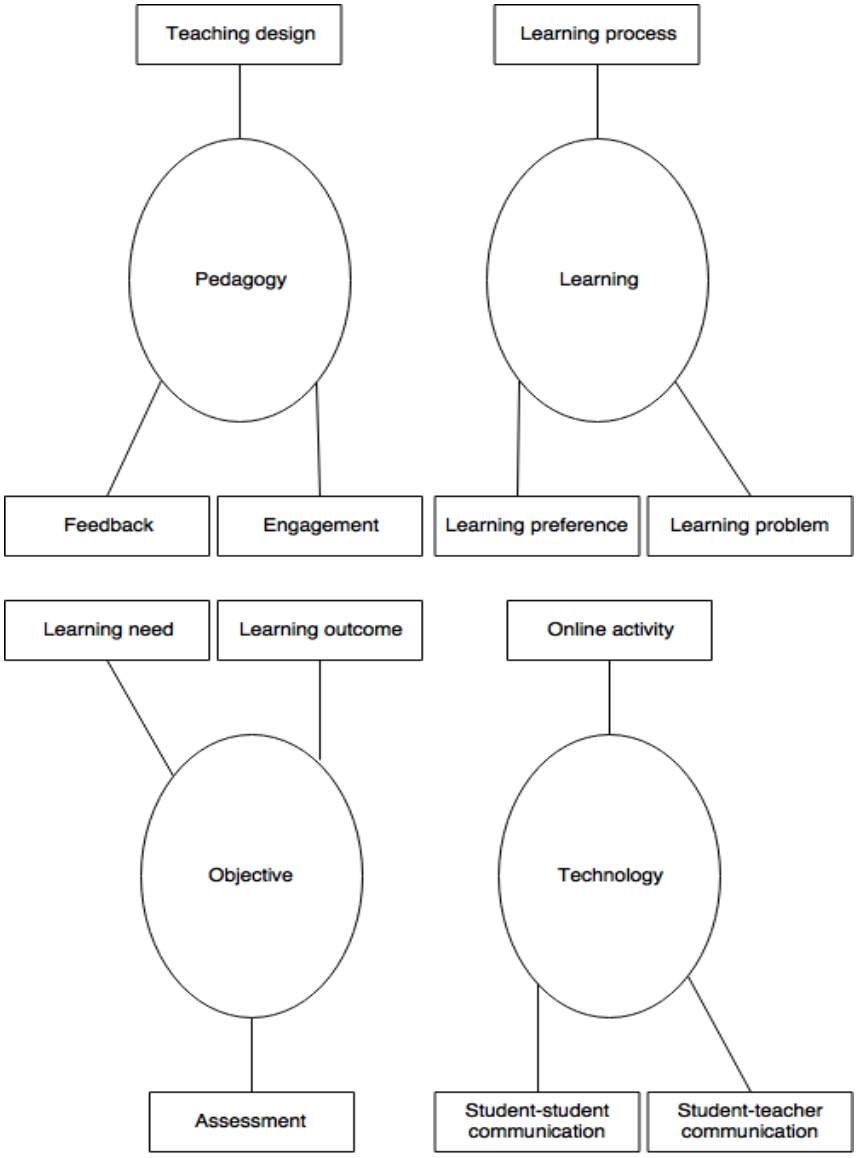

Figure 2: *Final Thematic Map with 4 Themes*

The 4 final themes are 1) Pedagogy; 2) Learning; 3) Objective; and 4) Technology.

3. Findings and Discussion

3.1 The First Theme: Pedagogy

The first theme categorized is pedagogy. It includes pedagogical design, engagement and feedback as the sub-themes. Pedagogical design consists of design on teaching, instruction and teaching activities. In the interviews, the students mentioned that the online system contains useful teaching materials designed by the school and teachers. Besides, they described the online activities designed for their learning. They include ‘chapter preview’, ‘warm-up quiz’, ‘matching

game', 'weekly assignment', 'chapter review', 'level quiz', 'chapter exercise' and 'thinking form'. The first four activities are pre-class activities and the last five activities are post-class activities. Table 1 shows the online activities and descriptions of them.

Table 1: *Online Activity Design*

Online Activities	Descriptions of Activities	Pre-class or Post-class
Chapter Preview	PPT with narrations for previewing the contents to be taught in a class.	Pre-class
Warm-up Quiz	Simple multiple-choice questions for students to learn before a class.	Pre-class
Matching Game	Drag and drop matching game for students to learn the Accounting terms.	Pre-class
Weekly Assignment	Weekly instruction to the students to guide their online learning.	Pre-class
Chapter Review	PPT with narrations for reviewing the contents taught in a class.	Post-class
Level Quiz	Mainly multiple-choice questions in 'Gold', 'Silver' and 'Bronze' levels. This activity contributed 5 marks to the overall assessment of the course.	Post-class
Chapter Quiz	Multiple-choice questions for students to practise after a class.	Post-class
Chapter Exercise	Long questions for students to practise after a class.	Post-class
Thinking Forum	Scenario-based online discussion for students to learn after a class.	Post-class

Engagement was achieved through the thoughtful pedagogical design. The students found they were engaged as the learning contents and activities were helpful, useful, flexible, convenient and appropriate in helping them to understand, have deep learning and reinforce their learning. These were seen in the conversations by the students in the interviews:

- Student 3: The exercises were helpful for my examination.
- Student 5: It was convenient to go online, and with more explanations.
- Student 1: It further helped me to learn how to apply the knowledge.

The system acted as the source of providing students' learning information and feedback for the teaching design. Student 1 mentioned that the teacher could know their weakness from the system and adjusted the teaching by repeating or clarifying some contents.

- Student 1: Our revision became efficient and time was saved when we revised them together via the online system. Besides, the teacher could identify (from the system) the area which needed to be clarified or repeated.

3.2 The Second Theme: Learning

Learning is the second theme and its sub-themes are learning process, learning preference and learning problem.

In the learning process, students had pre-class learning, real-time learning and post-class learning. While the real-time learning was with real-time instruction by the teachers, the pre-class and post-class learning were performed by the students with self-directed learning and pre-designed guided learning. During self-directed learning, a student showed the will that the teacher could be online to answer the enquires at non-teaching hours.

- Student 1: If the teacher allocates time for answering our enquiries, e.g. every night from 8-10pm, we will prepare to hear the feedback (by teacher) at that specific time.

Students showed their learning preference on having mobile learning as the course they studied was only supported by web learning.

- Student 2: I think using an app would be more interesting. I can make use of it to revise in travels and do not need to hold notes in my hands.
- Student 5: I think mobile phones are very suitable for doing 'Matching Game' because I can directly use my fingers to move those options and this will be more convenient. These can be done mainly by mobile phones.

Besides, as English is their second language, they preferred to have bi-lingual learning contents instead of just English contents.

- Student 5: My English was not good enough and made me unable to understand the questions.
- Student 4: It would be better if the video provided both English and Chinese subtitles as reading is easier than listening.

During online learning, students found problems in two categories, course problem and technical problem.

- Student 7: If I got it wrong, I would also do the next one even if I did not understand. The explanations in wrongly answered questions were too brief for me to understand…. For those questions related to theories, when I got one wrong, the system might just simply show the correct answer without any explanation.
- Student 1: Errors occurred in the online system.

3.3 The Third Theme: Objective

The third theme is objective. The sub-themes are learning outcome, learning need, and assessment.

They have intended learning outcomes. They needed to achieve intended learning outcome in terms of knowledge and results. Most of the students said they wanted to learn more. Besides, all of them mentioned they did online learning for obtaining good results. For example, Student 3 said he wanted to obtain good results in examination and therefore he did online learning.

- Student 3: Before the mid-term test or examination, I did all the reviews covered in the online system.

The students learnt because of their learning needs. They needed online class, good course design, online feedback, online questions, learning support and technical support. For example, Student 7 showed the need of having learning support.

- Student 7: Current answer explanation just only indicated 3-4 rows answer with 1-2 rows formula as a brief explanation. It would be quite difficult for me to understand especially in the long questions in the 'Gold Level' quiz. Maybe the flow of calculation can be recorded as video and shown to the students.

Through assessment, whether the intended learning outcomes were achieved was measured. The assessment in this course included assignment, online participation and examination. Assignments were in the form of multiple-choice, long questions, discussion and games. Student 1 further explained that online system 'facilitated communication' (social learning) during the students doing assignments together online.

3.4 The Fourth Theme: Technology

The last theme is technology. It has online activity, student-student communication and student-teacher communication as sub-themes.

Technology helped the students to achieve the intended learning outcome by providing an environment for them to learn by themselves. The students did online activities before and after the lesson. In the system, there are 9 online activities. Student 3 and 7 expressed the reasons they went to the system to learn before and after the lesson were that the online learning activities were helpful to their studies.

- Student 3: The 'Warm-up Quiz' (an online learning activity) was for preparing for the next class… (It) helped me to understand the topic which was going to be taught, I took a look at it which helped answer the questions in class.
- Student 7: The main reason I went there was because it was a good way for me to have self-training or practice after attending the class to test my understanding about the relevant topics.

The system also served as a channel for social learning. The students learnt from the peers and the teachers through live communication and offline communication.

- Student 7: We also did the exercise together in SOUL (the learning platform) and we discussed difficult areas.

3.5 Need of Contemporary Online Learning Model

It was found that with the sophisticated features designed in the system, some of the works of the teachers were replaced by technology. The role of technology became more important. The online environment provided learning resources with pedagogical design for the students to have self-directed learning and without guidance from the teacher.

- Student 1: The online system allowed us to learn and solve problems by ourselves. It assisted my other learning without guidance from the teacher.

Besides, in traditional face-to-face teaching, learning feedback was given the students by the teachers. However, in the online learning environment, feedback was given by the system. Even though Student 3 was doing self-learning, she got instant feedback from the system which was helpful for learning.

- Student 3: When I did the 'Level Quiz', I had the opportunity to do the calculation. With the instant feedback provided in the system, I could understand why I did some questions wrongly without asking the teacher. It helped me to be able to learn by myself. Through doing the online exercise, I found I could learn quicker.

Without the online system, online learning cannot be taken place. Furthermore, technology has taken up some teaching supports like providing instant feedback, instant marking, learning advice by system and artificial intelligence and personalize learning path setting for achieving individuals' learning objectives. The existing online model did not fully reflect the important role of technology. Therefore, a contemporary online learning model has to be constructed.

4. The Plot Model

A contemporary online learning model is developed based on the analysis results. Different from other online learning models with stronger focus on teaching and learning, objectives and technology are positioned in more important roles. Figure 3 shows the Pedagogy-Driven, Learner-Centred, Objective-Oriented and Technology-Enabled (PLOT) Online Learning Model.

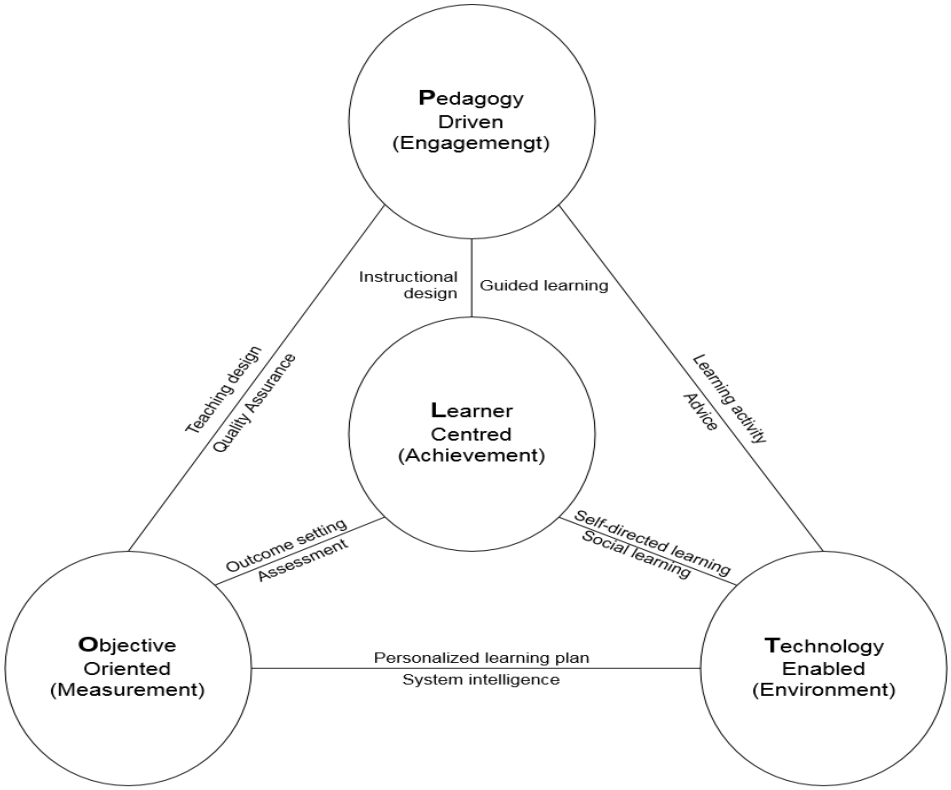

Figure 3: *The PLOT Model*

Pedagogy-driven is the first element in the PLOT model. The purpose of this element is for provide pedagogical design for students' learning engagement. It interacts with the objective-oriented element by providing teaching design for meeting the learning objectives. It also interacts with the learner-centred element by providing instructional design for learners to learn. The interaction with the technology-enabled element is by providing teaching activities to the system repository. The teaching activities include recorded lectures, pre-class activities, assignments, learning games, discussion questions, learning projects, and other activities for students learning.

Learner-centred element is the second element in the PLOT model. It is positioned in the centre of the model as learning is the core part of online learning. Learning occurs in this

element. The purpose of this element is to attain learning achievement. In order to attain the achievement, learners have to set the learning outcomes (interact with objective-oriented element), to have guided learning from the instruction (interact with pedagogy-driven element), to have self-directed learning with the learning activities and collaborate with teachers and other students to learn (interact with technology-enabled element).

The third element is objective-oriented which the purpose is for providing measurement to learning. It obtains the learning needs from the learner-centred element and provides personalized learning plan setting via the system intelligence of the technology-enabled element. Personalization of learning can be achieved with the analysis by the system. This element also interacts with the learner-centred element by measuring if the intended outcomes were achieved with learning assessment. Finally, it provides quality assurance by ensuring the pedagogical design met with the intended learning outcomes.

The last element is technology-enabled. The purpose of this element is for providing an environment for learning. It interacts with the learner-centred element by providing platform and channel for self-learning with pre-designed activities and for social learning. Different from the classroom that serves as a physical environment for face-to-face learning, the online learning environment not only provides a venue for learning, but it also provides learning and teaching advices. This element interacts with the objective-oriented element by using system intelligence to advise if the learning objectives are met. It also interacts with the pedagogy-driven element by providing feedback using artificial intelligence. For example, if the difficulty of a particular exercise is easy but many students do it wrong, the system will give such advice for improving pedagogical design.

Table 2 summarized the elements, purposes and interaction among the elements of the PLOT online learning model. With the PLOT model, the weight of learning objectives and technology can be better reflected. The understanding on contemporary online learning can be in a holistic way.

Table 2: *Elements, Purposes and Elements' Interaction of PLOT*

Elements	Purposes	Elements' Interaction
Pedagogy-driven	Engagement	• Teaching design for meeting objectives • Instructional design for learning • Learning activities provision to system repository
Learner-centred	Achievement	• Learning outcome setting • Guided learning from the instruction • Self-directed learning with the learning activities • Collaborating with others for learning
Objective-oriented	Measurement	• Personalized learning plan setting through the system • Assessment to ensure the intended outcome achieved • Ensuring design meets intended learning outcome
Technology-enabled	Environment	• Platform provision for learning with activities • Channel provision for social learning • Using artificial intelligence to provide advice on design • Advising if objectives met through system intelligence

5. Conclusion

In-depth interviews were conducted to understand the learning experiences on the students in online learning. During the study, it was found that the role of technology had become very important in contemporary online learning. However, it was not fully reflected in the current online learning model. Therefore, a PLOT online learning model was proposed to reflect a more holistic and realistic framework in contemporary online learning.

The PLOT model has four elements, namely Pedagogy-Driven, Learner-Centred, Objective-Oriented and Technology-Enabled. The purposes of these elements are to encourage engagement, attain achievement, provide measurement and provide environment for online learning respectively. In online learning, learning occurs through the interaction among these elements.

The paper has discussed the increasing importance of technology. However, it does not mean the importance of pedagogy should be lowered. In online learning, both pedagogy and technology should be present. The term 'online' is enabled by technology and 'learning' is designed by pedagogy. Although the role of technology has become more prominent, online learning is still needed to be pedagogy-driven. The role of teacher is only shifted from the stage (lecture) to the backstage (design and guide).

Limitation of this study was that the technology part of this course was not fully analysed. By interviewing the students, their learning experiences were obtained. It was known from the students that the system's teaching support was good. However, it was unknown that how the system operated for providing support, feedback and advice to the students. Further studies and analysis on the learning environment should be performed for deeper understanding on the role of technology. For instance, how the game results are recorded and reflected in the assessment for objective measurement can be an area for study. Another finding which worth further extended from this study is on online learning in second language or even online learning for a second language, as some students in this study suggested that the system could provide bilingual support during their learning online. This could be explored in terms of the availability of multilingual support of the system.

References

Alkhalidi, A., & Izani, M. (2017). Assisting Interior Design Class Using Online 3D Application. International Journal of Social Science, 3(3), 124-132. https://doi.org/10.20319/pijss.2017.33.124132

Braun V. & Clarke V. (2006). Using Thematic Analysis in Psychology. Qualitative Research in Psychology, 3(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Braun V. & Wilkinson S. (2003). Liability or Asset? Women Talk about The Vagina. Psychology of Women Section Review, 5, 28-42.

Chuang, Y. T. (2015). SSCLS: A Smartphone-Supported Collaborative System. Telematics and Informatics, 32(3), 463-474. https://doi.org/10.1016/j.tele.2014.10.004 https://doi.org/10.1016/j.tele.2014.10.004

Fisher, M., King, J., & Tague, G. (2001). Development of a Self-Directed Learning Readiness Scale for Nursing Education. Nurse Education Today, 21, 516-525. https://doi.org/10.1054/nedt.2001.0589

Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a Global Online Debate and the Development of an Interaction Analysis Model for Examining Social Construction of Knowledge in Computer Conferencing. Journal of Educational Computing Research, 11(4), 395-429. https://doi.org/10.2190/7MQV-X9UJ-C7Q3-NRAG

Khan, B. H. (2005). Managing e-learning: Design, delivery, implementation, and evaluation. US: Information Science Publishing. https://doi.org/10.4018/978-1-59140-634-1

Kim, S., Park, I., Yang, M., Lee, A., & Kang, S. (2017). Development of an Educational Online Game for the Intervention of Korean Dyslexia – A Game Utilising Syllable Counting for Phonological Awareness Intervention. International Journal of Social Science, 2(2), 2544-2550.

Knowles, M. (1975). Self-directed learning: A guide for learners and teachers. New York: Cambridge Adult Education.

Lam, J. (2014). The context of blended learning: The TIPS blended learning model. In S. Cheung, J. Fong, J. Zhang, R. Kwan & L. F. Kwok (Eds.), Hybrid learning: Theory and practice (pp. 80-92). Berlin: Springer. https://doi.org/10.1007/978-3-319-08961-4_9

Lam, J., Hung, A., Chan, F. T., Zhang, W. Y., Yan, K. & Woo, G. (2011). Blended Learning Course Development Model. In V. Lee, F. L. Wang, S. Cheung & A. Hung (Eds.), Blended learning: Maximization of teaching and learning effectiveness (pp. 52-64). HK: City University of Hong Kong.

Levin, J. A., Kim, H., & Riel, M. M. (1990). Analyzing Instructional Interactions on Electronic Message Networks. In Harasim, L. (Ed.) Online Education (185-213), New York: Praeger.

Loveless, A. (2011). Technology, Pedagogy and Education: Reflections on the Accomplishment of What Teachers Know, Do and Believe in a Digital Age. Technology, Pedagogy and Education, 20(3), 301-316. https://doi.org/10.1080/1475939X.2011.610931

Moore, M. G. (1989). Three Types of Interaction. American Journal of Distance Education 3(2), 1-7. Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence and computer conferencing in distance education, America Journal of Distance Education, 15(1), 7-23.

Picciano, A. G. (2009). Blending with purpose: The multimodal model. Journal of Asynchronous Learning Networks, 13(1), 7-18.

Richter, S. (2013). Article review: The challenges to connectivist learning on open online networks.https://eddinit.wordpress.com/2013/04/29/article-review-the-challenges-to-connectivist-learning-on-open-online-networks/

Salleh, N. B. M. (2016). Maximizing Students' Learning Experience through Differentiated Instructions in an ICT Integrated Environment. International Journal of Social Sciences, 2(1), 1401-1409.

Wang, N. & Qiao, A. (2009). On the Nature and Underlying Theories of Online Learning Activities. Distance Education in China, 1, 36-40.