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Cognitive Constructivism in the Classroom: The Case for Online Distance Learning

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Abstract

Online learning has been introduced for more than a decade. Many educational institutions embrace online learning to facilitate teaching and learning activities. The COVID-19 pandemic that hit countries around the globe has impacted the education landscape and created an urgency to transform conventional teaching and learning activities into online learning. Hence, this study aims to examine how online learning influences engagement between learners, instructors and content. To answer the objectives of the study, an online survey was administered to students in Malaysia who experience online learning during the pandemic. A total of 384 respondents participated in the survey. The respondents consist of university students from various universities in Malaysia. The findings indicate that social support plays a crucial role in online learning. Active interaction among learners, peers and instructors are also important. In addition, the flexibility of the instructors using different types of online learning platforms help learners to cope well in the transition process. These findings shed a light not only on instructors but also on the management as well as the policymaker in strategizing and enhancing mechanisms and action plans for the best online learning experience.

Keywords: Online, Online Distance Learning, Learners, Instructors, Engagement

Introduction

Online learning can be defined as a form of education that is conducted through an online medium (Bartley & Golek, 2004; Evans & Haase, 2001). Even though it has been conducted for decades, however, the spread of pandemic COVID-19 has impacted the education landscape where the forced closure of all academic institutions has created an urgent transformation for all face-to-face learning processes (Cohen, 2021). The global lockdown of educational institutions, compounded by the associated economic and public health crises, has not only caused interruptions in students' learning and development but also drastically

changed instructors' pedagogical approaches. In 2020, 1.6 billion learners in more than 190 countries were affected with the closure of schools and institutions around the world (United Nations, 2020). All institutions are forced to conduct their teaching and learning process through various online platforms. Therefore, this situation gives huge challenges to all instructors and learners as well as education systems to react immediately to these sudden changes.

Malaysia also faces dramatical changes in education systems where the enforcement of total lockdown since March 2020 causes all educational institutions to fully switch into online learning mode. Universiti Teknologi MARA (UiTM) is one of the public universities in Malaysia that has already implemented blended learning, which is face-to-face and online learning many years ago (Samat et al., 2020). Due to this pandemic, UiTM has moved to open and distance learning (ODL) for all campuses since April 2020 (Karim, 2020). Though the online medium is not new in higher educational institutions, the sudden switch to online mode causes many academicians to be unprepared and leads to high mental stress (Sia & Adamu, 2021). This is because they are forced to fully utilize online learning management systems immediately with minimum knowledge on handling all those online learning tools (Shanika, 2020). Due to this situation, the quality of teaching and learning process is highly affected and causes huge disparities especially for those who deal with laboratory testing and practical learning processes. Therefore, is an urgent call to find a quick solution on this matter.

Statement of Problem

Cognitive constructivism learning allows learners to develop their own understanding from learning resources (Hong, 2003). This teaching method is able to help learners integrate new information into existing knowledge and allow them to make proper amendments to their existing intellectual framework (McLeod, 2019). In the context of online learning, cognitive constructivism allows instructors to focus on delivering the knowledge and the outcome gathered at the end of the class. Past research has proved that constructivism course design is important to ensure the success of online learning delivery (Rossner-Merril et al., 1998; Salter, et al., 2004).

Additionally, online learning receives high acceptance in higher educational institutions due to it provides effective learning tools that encourage active learning and engagement from the learners, develop professional skills for instructors, cost-effective concepts and provide world-class education to everyone regardless of their location (Bartley & Golek, 2004). Furthermore, online learning is very beneficial to anyone who lives in remote locations, full time workers who need to study after their working hours and people who want to learn independently (Nguyen, 2015).

Despite its benefits, online learning also has its weaknesses. Past studies showed that this approach is ineffective due to several reasons. For example, poor internet connection makes the online learning tools unable to be accessed by the learners and creates an obstacle for those who live in rural areas (Kentnor, 2015). Besides, activities in group discussion become ineffective when the learners do not actively participate in the discussion (Nandi et al., 2009). Due to this matter, this study was carried out to investigate how online learning influences engagement between learners and instructors. Hence, this study is conducted to answer the following questions;

Objectives and Research Questions

Generally, this study is done to investigate how online learning influences engagement. Specifically, this study is conducted to answer the following questions.

1. How is authentic learning displayed in online engagement? (Learner-to-instructor)
2. How is active learning displayed in online engagement? (Learner-to-content & Learner-to-learner)

Literature Review

Cognitive Constructivism

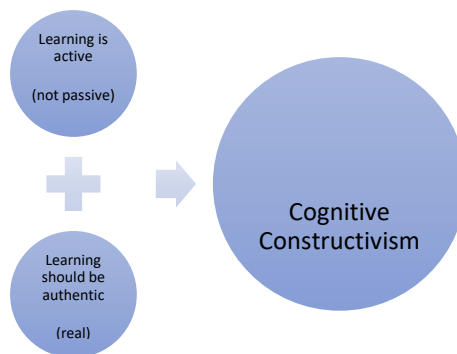


Figure 1 - Cognitive Constructivism (Source: Piaget, 1971)

Figure 1 presents the theory of cognitive constructivism by Piaget (1971). The theory states that knowledge is something that is actively constructed by learners based on their existing cognitive structures. Piaget (1971) reports that (a) the learners are actively involved. To do so, the (b) environment needs to be democratic. To support learning, the (c) activities are interactive and student-centred. Finally, (d) the teacher facilitates a process of learning in which students are encouraged to be responsible and autonomous.

What Learners Gain from Online Learning

Online learning brings a variety of pedagogical benefits to learners. According to Robinson and Cook (2018), learners gain some advantages when they act actively in a learning environment, do their own revision before attending class and pay attention to the lessons. In addition, studies by Glynn, Brickman, Armstrong & Taasobshirazi (2011); Tseng & Tsai (2010) found that learner motivation is very important for effective learning to take place. Learners get even more motivated when education technologies are largely applied in learning activities (Mallillin et al., 2020; Prabu et al., 2020).

Online learning builds learners' confidence and self-efficacy as they are introduced to new skills and techniques (Zhang & Liu, 2019). According to Chen et al (2009); Ching & Hursh, (2014), instructors can access online learning activities without a time limit. This benefits instructors and learners by adding flexibility with better time management. Moreover, learners can enhance virtual communication and collaboration in online learning, which will enhance their personal development skills to advance in a career. In addition, the benefits of having online learning will build critical thinking skills that allow learners to solve problems they have (Webb et al., 2021).

On the other hand, there are some limitations of online learning that create a sense of isolation when learners feel bored while studying alone at home (Alfarimba, Ardianti, & Khamdun, 2021) and make it easier to procrastinate due to a lack of social interaction with peers, and excessive use of technology (Hui, & Ayub, 2021).

How is Teaching Done Online

Instructors use numerous education technologies and social networking for their online engagement with learners. As mentioned in a study by Bond et al. (2021), instructors utilize synchronous collaborative tools via video conference such as Google Meet, Zoom and MS Teams as their most frequent and commonly adopted educational technologies. To ensure the connectivity and active engagement, instructors combine the collaborative media with email and other text-based communication technology tools such as WhatsApp, Telegram, Facebook Messenger, WeChat etc (Major et al., 2020; Kim, 2020; Emm et al., 2020). Instructors who use synchronous communication tools enable them to get immediate feedback from learners, foster social skills and enhance motivation, thus leading to active engagement (Lim, 2017).

Friedman and Friedman (2021) analysed how social media technologies like Podcasts, Instagram and Facebook, were adopted as asynchronous media which enhance active learning. In addition, instructors who incorporated social media into their courses (Revere & Kovach, 2011) found learners had fun, could collaborate, and work well with others. Lim (2017) in his study highlighted that instructor use discussion forums and social media messaging to make it easier for learners to access the tools anytime and anywhere. However, instructors may fail to offer immediate feedback. In conducting asynchronous learning, instructors utilize the Learning Management System (LMS) of their main institutional system or digital classroom platforms for file repository and giving assessment in addition to teaching and learning purposes (Bond et al., 2021). LMS was also reported to be a preferred platform in which instructors used it for posting Email, texting/instant messaging, and lecture notes and assignments (Kobayashi, 2017).

Past Studies on Related to Online Learning

Past Studies on Student Gain from Online Learning

There are several studies conducted to investigate what learners gained from online learning. The research carried out by Almendingen, Morseth, Brevik and Tørris (2021) was done to find out learners' experiences with online teaching due to COVID-19. This study applied a mixed cross-sectional design where the method of quantitative and qualitative was utilised. For data collection, this study used an online survey and interviews. Items in the survey investigated learners' challenges, activities, and evaluations in online learning. The quantitative online survey was measured on Likert Scale. Meanwhile, the qualitative online survey used a semi-structured interview guide. There were 79 students and 4 students from Norway university responded to the quantitative and qualitative surveys respectively. Findings from the research indicated that learners benefited from the live, pre-recorded lectures and frequent online meetings. Next, Tareen and Haand (2020) investigated learners' perceptions of the benefits of online learning. The method used was a quantitative approach and a questionnaire was administered among 353 Malaysia public university master's program students. It was divided into 3 sections which consisted of demographics, benefits, and challenges of online learning. The researcher also made use of Likert Scale in their study. Apart from the

questionnaire, structured interviews were carried out with 6 respondents on the benefits and challenges of online learning. Results from this study disclosed that online learning is useful, promotes learners' participation, and caters to their needs.

On the contrary, there are also a few downsides to online learning. Based on the research done by Ismail, Abu Bakar, Syed Saadun Tarek Wafa (2020) conducted research on online learning challenges in a public university in Malaysia and 524 samples were collected. The survey also consisted of learners' opinions on online learning during COVID-19 and their challenges. The findings illustrated that learners faced difficulties in focusing during lessons especially when conducted via WhatsApp. The findings also revealed that it is challenging for the learning process to take place due to the learners receiving incoming messages from the instructors and other third parties through the application simultaneously. In addition, the learners have difficulties in understanding and asking questions. According to Tareen and Haand (2020) the learners felt the subject assessment strategy was uncertain. Furthermore, they also reported a lack of instructors' support and feedback in their study.

Past Studies on Online Teaching Tools and Techniques

Online teaching requires teachers or instructors to not only have better internet connections but also require them to master the educational technologies. Furthermore, online teaching could become very challenging because instructors needed to consider their condition as well as learners' condition (Dong et al., 2021). Besides, instructors were expected to be resourceful and able to help the learners in most circumstances related to online learning issues (Barbera & Linder-VanBerschoot, 2011). Maboe (2017) conducted a quantitative study on distance learning using a sample of 410 students from health services management backgrounds. The study suggested that the instructor should increase the interaction and provide support to learners both during and outside the class sessions. Another later study was conducted by Mathew and Chung (2021) on university students' perspectives on open and distance learning (ODL) during the COVID-19. The sample data were collected from diploma and bachelor's degree students in Malaysia. The study used close and open-ended questionnaires to explore students' perceptions toward the ODL. The result showed that students really enjoyed the instructor's flexibility on using different online platforms. In addition, the interaction between learners and instructors was found to be the most important factor that scored the highest percentage. In fact, the learners were happy when the instructors engaged with them and guided them during the ODL. These findings are in line with Cohen's (2004) social support theory that explains social support such as material and psychological help enhance engagement among learners and instructors. In ODL, social support is believed to be more crucial as there is no face-to-face session and learners are at their own place which limits their communication with peers.

Past Studies on Learning Content and Online Material

Online learning also provides intellectual interaction with the content that can divert the understanding and perspectives of learners (Moore, 1993). Many studies have been conducted to measure the effectiveness of online learning from the perspective of learner-content engagement. For example, prior study conducted by Martin & Bolliger (2018) has focused on learner-to-learner, learner-to-instructor and learner-to-content engagement. Based on 155 responses from eight universities in the United States, it was found that the interaction between learners and online materials occur when they are watching instructional

videos, searching for information and also have interaction with multimedia (Abrami et al., 2011). Furthermore, the findings of the study indicated that online course materials such as instructional materials, web resources, book chapters and other multimedia and instructional videos are very helpful to enhance learners' understanding.

Additionally, a recent study was conducted to investigate the learner-content interaction during the pandemic COVID-19 (Kumar et al., 2021). This study was done to assess the satisfaction of learners by examining the impact of online learning quality during the pandemic in Indian Universities. 435 responses from graduate and undergraduate students were gathered through structured questionnaires. The findings of this study indicated that in order to gain learners' satisfaction, the university should enhance the quality of their e-learning content. This study recommended that instructors, web designers and content designers should work together to provide quality materials to the learners that contain infographics, video clips and effective websites that can attract the students' attention.

Conceptual Framework

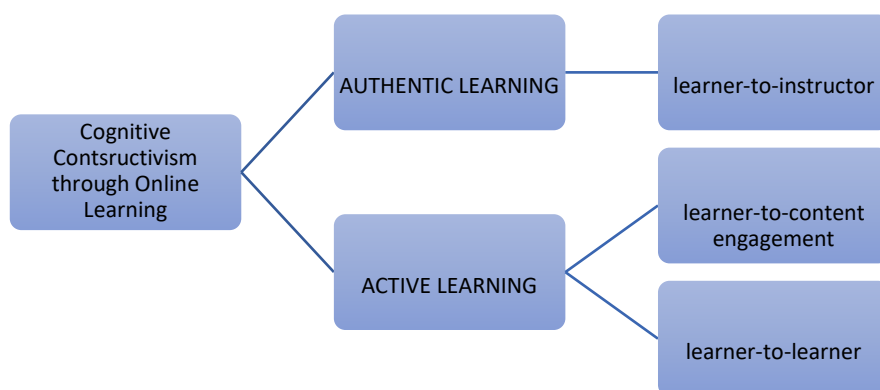


Figure 2 - Conceptual Framework of the Study

This study is rooted from Piaget's (1971) cognitive constructivism. Piaget's (1971) authentic and active learning is scaffolded onto Martin & Bollinger's (2018) engagement factors (Figure 2). Firstly, authentic learning can be achieved through learner-to-instructor engagement. Active learning can be achieved through (i) learner-to-content engagement and (ii) learner-to-learner engagement.

Methodology

This quantitative study is done to investigate engagement in online learning through scaffolds on Piaget's (1971) cognitive constructivism. 384 participants responded to the instrument. The instrument is a survey (Table 1). Section A has 2 items on the demographic profile. Section B has 6 items on learner-to-learner engagement, section C has 7 items on learner-to-learner engagement and section D has 7 items on learner-to-content engagement.

Table 1 - Distribution of Items in Instrument

CONSTRUCTS	SECTION		No of Items
	A	Demographic Profile	2
ONLINE ENGAGEMENT Martin & Bollinger (2018)	B	Learner-to-Learner Engagement	6
	C	Learner-to-Instructor Engagement	7
	D	Learner-to-Content Engagement	7

Table 2 - Reliability Statistics

Cronbach's Alpha	No of Items
0.912	22

SPSS (Version 26) analysis is carried out on the instrument to reveal a Cronbach Alpha (Table 2) of 0.912 thus showing a high internal reliability of the instrument. Data is analysed using SPSS and presented in the form of percentages in pie charts as well as mean scores in the form of bar charts.

Findings

This section discusses the findings for the study. The first section presents findings for the demographic profile and the remaining sections present findings to answer the two research questions. A total of 384 respondents were utilized in the analysis. More descriptions of the respondents are presented in Figures 3 to 9.

Findings for Demographic Profile

Gender

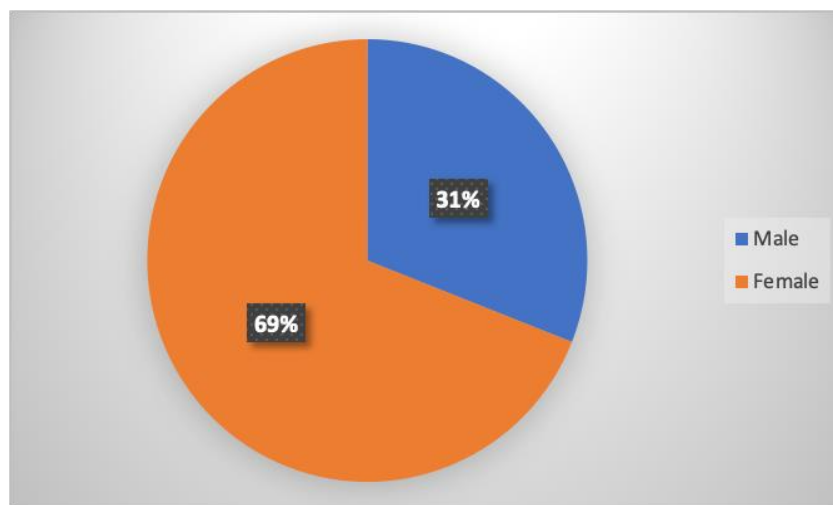


Figure 3 - Percentage for Gender

With reference to Figure 3, The vast majority of respondents (69 percent) were female, while 31 percent were male.

Age

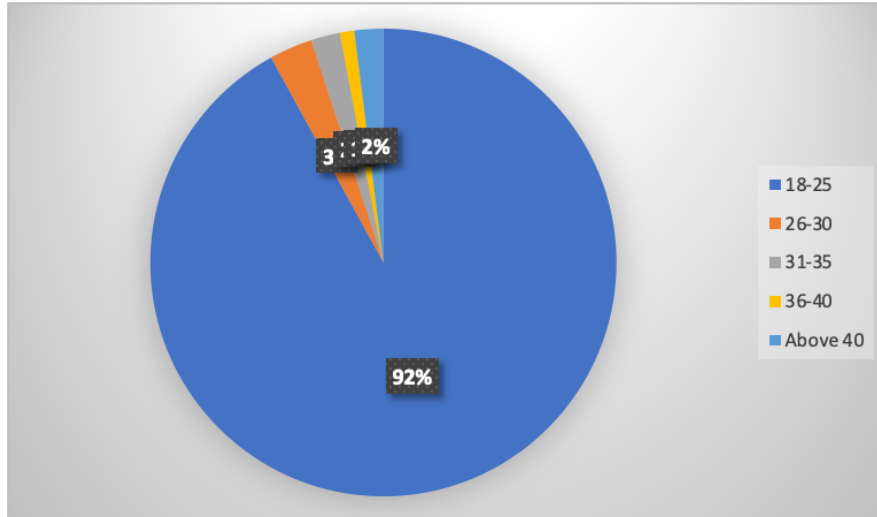


Figure 4 - Mean for Age

The respondents (Figure 4) were between the ages of 18 to 40 years and above; 18-25 (92 percent), 26-30 (3 percent), 31-35 (2 percent), 36-40 (1 percent), and 40 and above (2 percent).

University

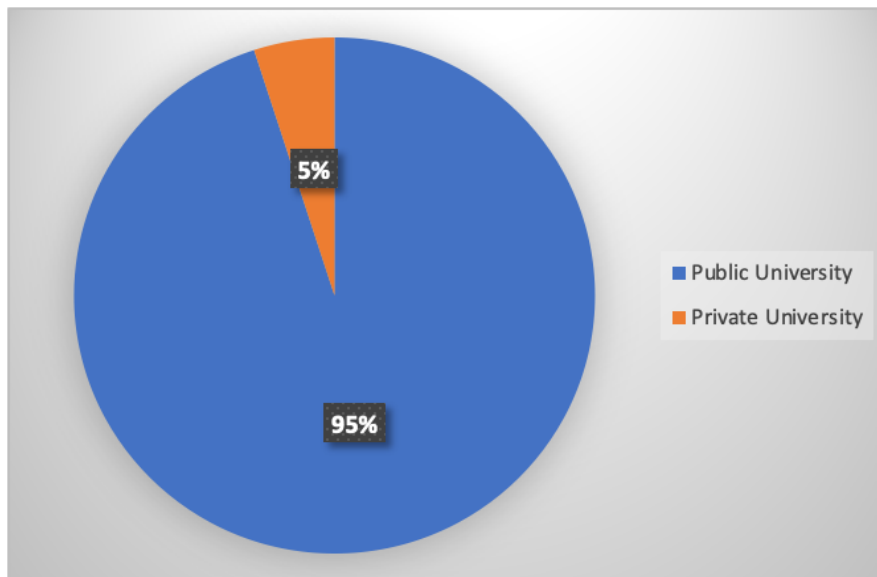


Figure 5 - Percentage for University

From Figure 5, most of the respondent (95 percent) study at Public University, while only 5 percent at Private University.

Name of University

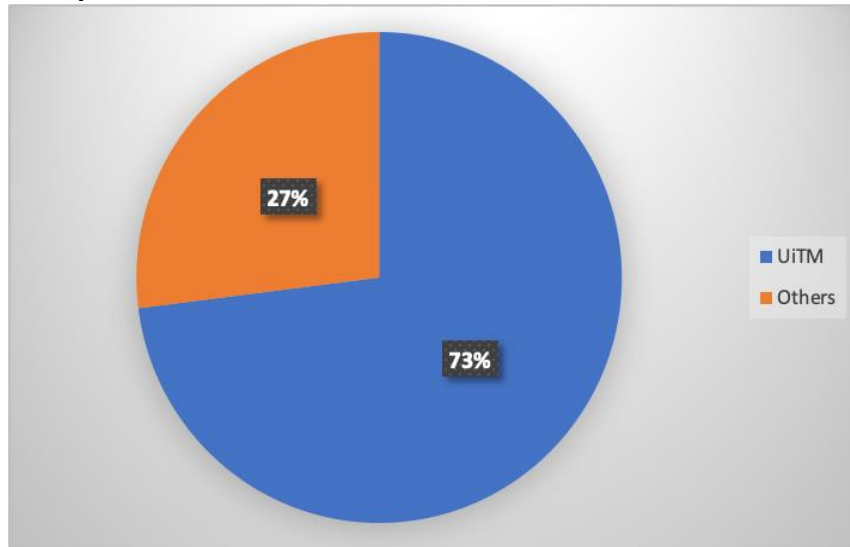


Figure 6 - Percentage for Name of University

From Figure 6, it shows that 73 percent registered at UiTM and the remaining 27 percent are students from other institutions namely UMK, UTEM, TATIAC and Nottingham University Malaysia Campus

Discipline

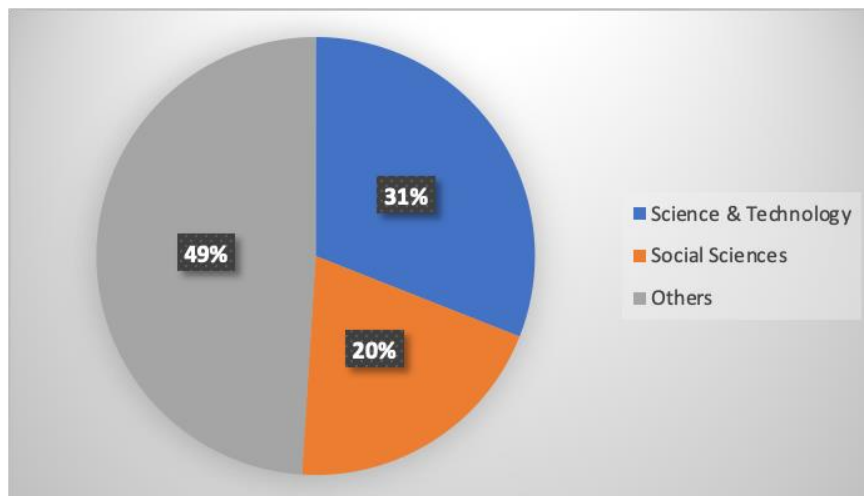


Figure 7 - Percentage for Discipline

Moreover, the participants (Figure 7) were distributed equally with 31 percent studying in science & technology discipline, followed by social sciences (20 percent), while the other 49 percent studying in either education, Islamic studies, architecture, art, music etc.

Mode of Study

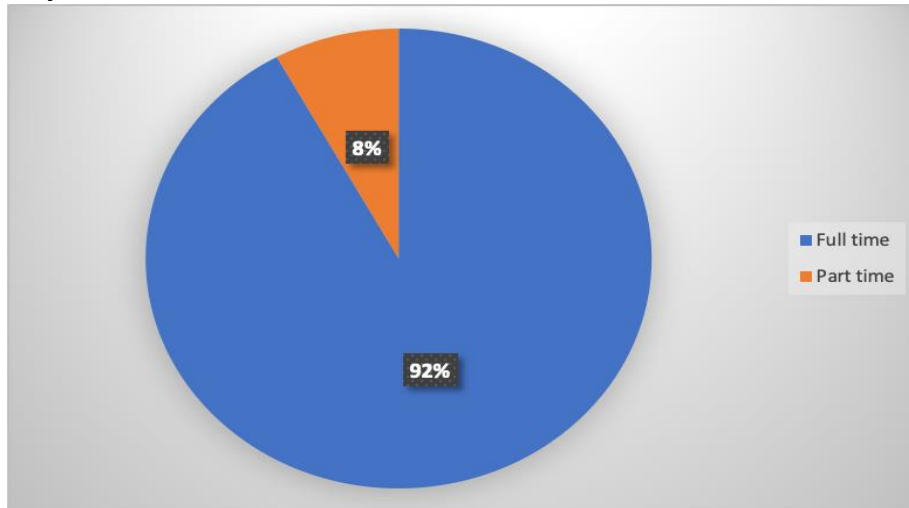


Figure 8 - Percentage for Mode of Study

The highest group (Figure 8) of respondents were full time students (92 percent) while the rest were part-time students.

Level of Study

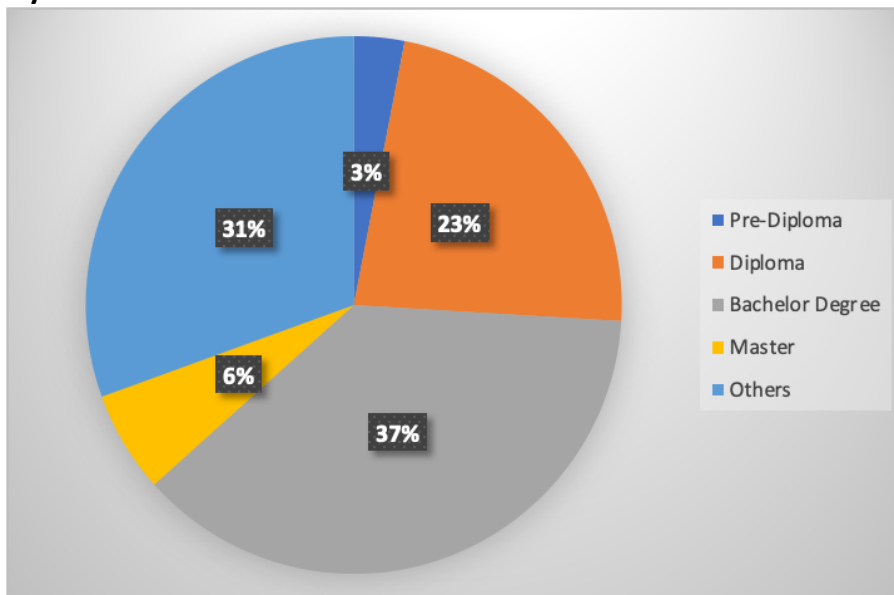


Figure 9 - Percentage for Level of Study

In terms of the level of education in Figure 9, nearly half of the respondents (49 percent) enrolled in bachelor's degree programs, 30 percent in diploma, 8 and 4 percent in master's and pre-diploma programs, while the remaining 40 percent for other Ph.D., postdoctoral, foundation level and graduate certificates.

Findings for Authentic Learning

This section presents the answer to Research 1: How is authentic learning displayed in online engagement? (Learner-to-instructor). Authentic learning is done through learner-to-instructor engagement.

Learner-to-Instructor Engagement

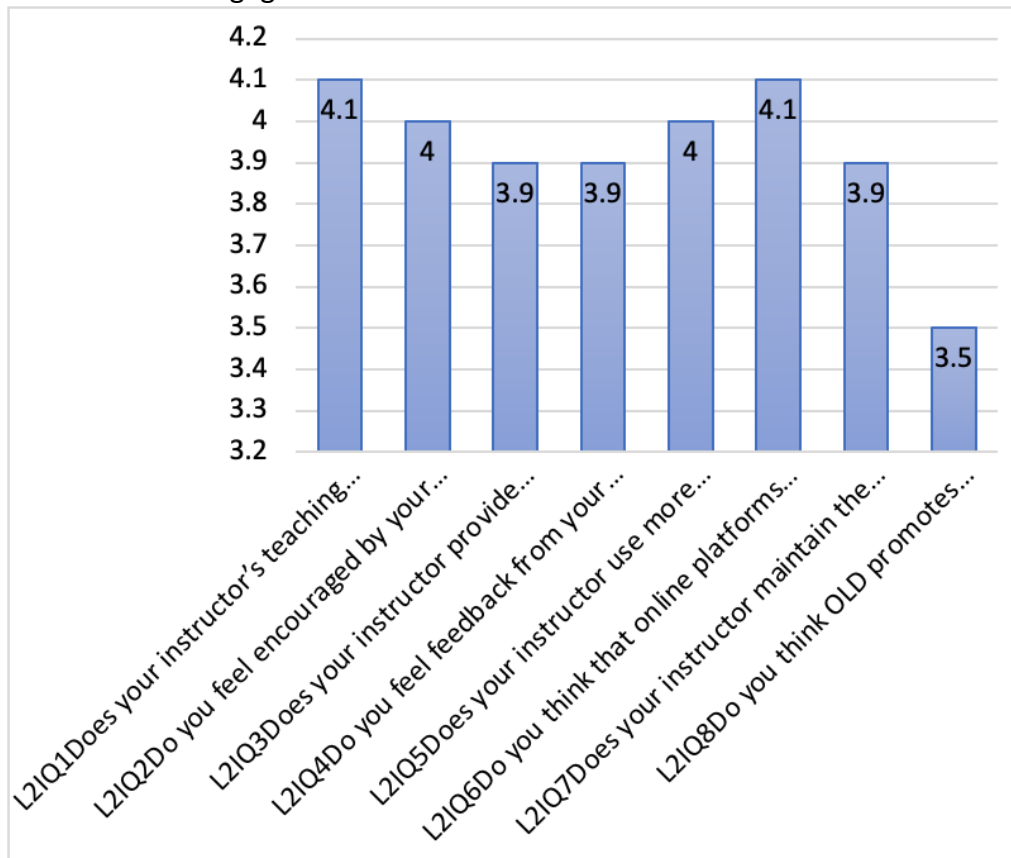


Figure 10 - Mean for Learner-to-Instructor

On the learner-to-Instructor subscale in Figure 10, participants score the highest mean of 4.1 for instructor's teaching style that led them to actively participate in online learning (L2IQ1). With the same mean score of 4.1, participants also highly consider that the online platform used by instructors for online class is effective and convenient (L2IQ6). The mean score of 4.0 is related to how instructors' encouragement keeps participants engaging in online classrooms (L2IQ2). Such motivation in learners' engagement is probably due to instructors using more than two communication tools to stay connected with participants (L2IQ5) with the same mean score of 4.0.

Both L2IQ3 and L2IQ4 have a mean score of 3.9 on which focus on instructors providing feedback on learners' assessments as well as the feedback given to learners' performance were clear and positive. The same mean score of 3.9 for item L2IQ7 also shows that instructors do engage with the learners even after the online sessions. Overall, participants score a mean of 3.5 on thinking that ODL brings greater participation and interaction among learners and instructors (L2IQ8).

Findings for Active Learning

This section presents data to answer Research Question 2 which is look into how is active learning displayed in online engagement? During online learning, active learning can be achieved through (i) Learner-to-Content Engagement and (ii) learner-to-learner engagement.

Learner-to-Content Engagement

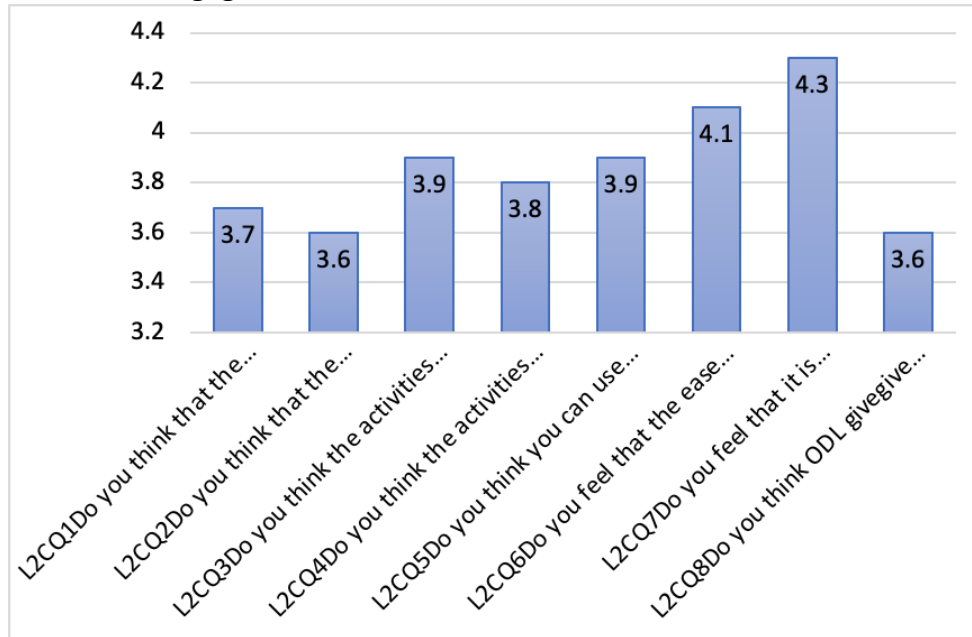


Figure 11 - Mean for Learner -to- Content

Based on Figure 11, L2CQ7 (Do you feel that it is important to get an overview of the content before the class begins?) recorded the highest mean, which was 4.3, followed by L2CQ6 (Do you feel that the ease of online content is important?) with a 4.1 mean score. L2CQ3 and L2CQ5 (Do you think the activities could improve the understanding of subject-matters? and Do you think you can use relevant knowledge wisely in the learning process?) recorded the same mean which was 3.9. Following this L2CQ4 (Do you think the activities in online learning could improve your critical thinking skills?) recorded 3.8 mean scores. Next 3.7 mean scores for L2CQ3 (Do you think the activities could improve the understanding of subject-matter?). The lowest mean was 3.6 shared by L2CQ2 and L2CQ8 (Do you think that the synchronous activities (i.e. online discussion) could offer immediate assistance? and Do you think ODL gives more benefits than drawbacks?)

Learner-to Learner Engagement

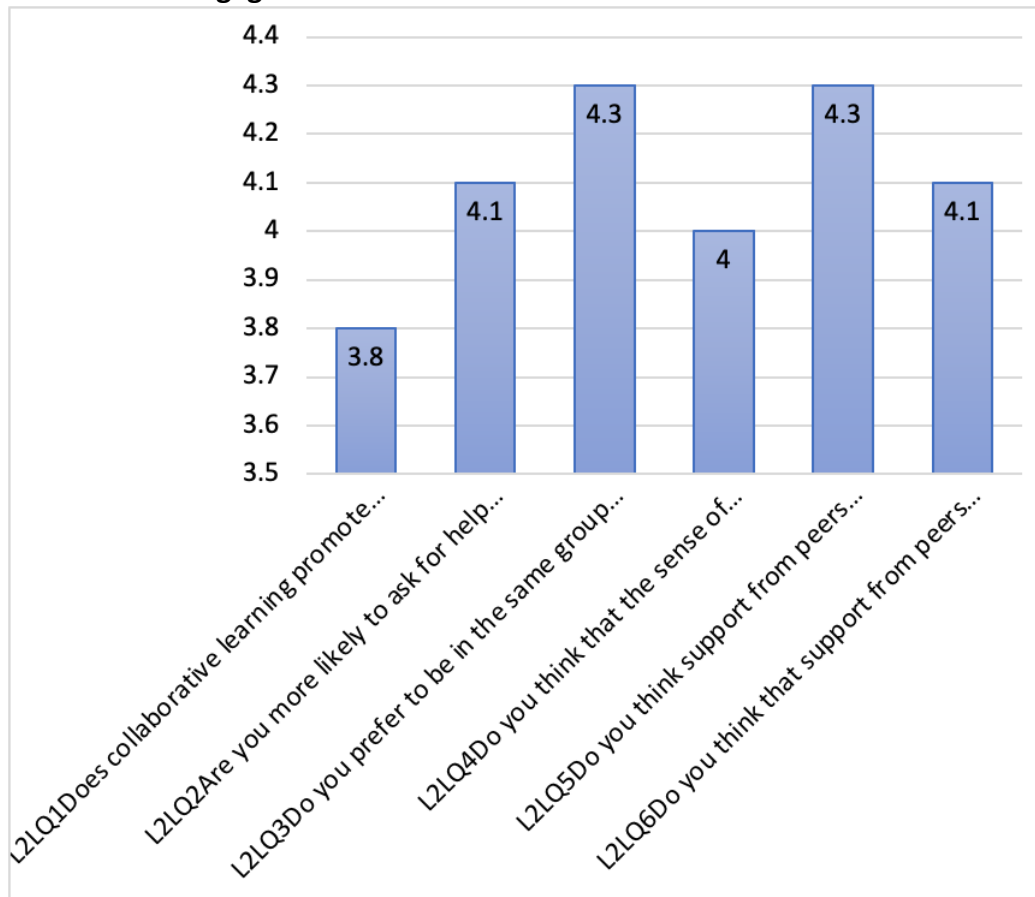


Figure 12 - Mean for Learner-to-Learner

Figure 12 shows the mean score for the learner-to-learner engagement statements listed on the instruments. The mean score ranges from 3.8 to 4.3 for all six statements. This shows most participants agree that all six statements are important. Both Item L2LQ3 and Item L2LQ5 have the highest mean score of 4.3. Similarly, both Item L2LQ2 and L2LQ6 have a mean score of 4.1. These four items related to peers' influence towards their online engagement. All participants agree on the importance of peers during ODL in terms of learning, support, and motivation. Item L2LQ4 asks for the influence of the community toward their ODL engagement. Mean score of 4 for this item implies that participants agree that the community is important in their ODL engagement. Item L2LQ1 has the lowest mean score of 3.8 which indicates that participants view collaborative learning in promoting peer-to-peer understanding as the least important.

Discussion and Conclusion

Discussion

Authentic Learning

The aim of this study is to examine the authentic learning in online learning method. Authentic learning can be achieved through learner-to-instructor engagement. The findings of the study suggest that the instructors' teaching styles lead learners to actively participate in online learning, this contributes to the learner-instructor engagement. This finding is similar to Maboe (2017), Kim (2020) and Emm et al., (2020) that emphasize the importance of active learning which involves high interaction between learner and instructor will create a better

experience for learners. Other than the active teaching style, the choice and flexibility of online platforms used by the instructors also score the highest point. There are a variety of online platforms that can be used by the instructor in delivering online learning. The platforms that are convenient to use by the learners help them a lot to juggle between the hassle of learning to use new methods and at the same time trying to master the content of their courses. Almendingen, Morseth, Brevik and Torris (2021) and Mathew and Chung (2021) also reported that learners benefit from the flexibility and different mediums used by the instructors in online learning such as pre-recorded video, live conference and chats.

The encouragement from the instructors was rated second-highest score. Most of the respondents agree that they feel encouraged when the instructors keep engaged in online learning. This situation explains the roles of social support as explained by Cohen (2004). When learners receive psychological support from the instructor, they will keep motivated and enjoy online learning.

Active Learning

The second objective of this study is to examine how active learning is displayed in online learning which focuses on the learner-to-content and learner-to-learner perspectives. The result of this study suggests that it is very important for the learners to get an overview of the course content before the class begins. The instructor needs to prepare a good quality of digital learning content and share it with the learners before class time. Hence, facilitate learners in understanding the subject better. This result is supported by Dwivedi et al. (2019) that also reported on the importance of digital content quality. The low quality of digital content will create a gap between online learning and the face-to-face learning environment. Khlaif et al. (2021) in their study also find an agreement on the quality of the digital content. According to them, good quality digital content will reduce the gap between online and face-to-face learning.

In online learning, learners experience synchronous and asynchronous sessions. However, the combination of these two sessions is least important as a question whether synchronous or asynchronous activities offer immediate assistance while online learning scores the lowest mean as compared to the other strategies. This finding is consistent with Martin and Bolliger (2018). However, an early study done by Parker and Martin (2010) claims differently. They suggest that the combination of both synchronous and asynchronous will enhance engagement between students with course content and instructor.

Peer support is found as one of the key factors that assist the learners in online learning. The results of the survey show that support from peers motivates learners to finish tasks and the opportunity to choose the group members to score the highest mean. Dunn and Kennedy (2019) claimed that motivated learners tend to achieve high academic attainment. Another recent study on the impact of psychological capital and social support on engagement and burnout in online distance learning by Barratt and Duran (2021) reported the same finding as this study. According to Barratt and Duran, social support from friends, family and other related parties enhancing engagement in online learning thus resulted in a good grade. All these findings suggest peer support could reduce stress from online learning and increase the efficacy of the learning process. This study also reveals that support from peers also prevents learners from dropping out of the course.

Previous research claimed that working collaboratively is important in online learning (Lowyck & Pöysä, 2001; Martin & Bolliger, 2018). However, in this study, the participants view collaborative learning in promoting peer-to-peer understanding as to the least important as it scores the lowest mean out of six items. This finding implies that not all learners are happy when collaborating with their friends. Perhaps this occurs due to the possibility of some members do not complete their tasks for the group assignment.

Conclusion

In conclusion, this present study supports the cognitive constructivism theory as suggested by Piaget (1971). From the perspective of authentic learning, the findings of the study showed that learners are really concern on the instructors' teaching styles to enhance their participation in online learning. Furthermore, learners also take high consideration on the effectiveness of online platform used by the learners. Moreover, from the perspective of active learning, the findings showed that the content of online distance learning is very important to be shared among learners before they participate in online class. The support from peers in learner-to-learners engagement is also supported in the present study. Thus, it showed that learners prefer to be in the same group and get support from their friends to participate in online class. Overall, to ensure the success of online distance learning, both parties either learners or instructors, must actively engage to create a positive atmosphere that will increase the learning efficacy. The flexibility of using various platforms or tools in online learning is also crucial. As such will cater to the learner's limitations in aspects such as technology readiness, internet connectivity and learning styles. Apart from the technical aspect of online learning itself, social support plays a bigger role to learners. Other than instructors, social support from family, friends, and technical staff can make a big difference and enhance engagement levels in online distance learning.

Pedagogical Implications and Suggestions for Future Research

The present study contributes to the literature by investigating the impact of cognitive constructivism in online distance learning in Malaysia. Practically, the findings in this study provides important insights to future pedagogical approaches on online learning. Based on the findings, it is recommended that instructors should play a major role to ensure the environment of online class is interesting and effective to increase the students' interest and participation in online class. The instructors should enrich their skills to master various online learning tools that are freely provided over the Internet. Therefore, the process of online teaching and learning can be more interesting if the courses are designed according to the online approach and the learning tools and materials are utilized effectively. Furthermore, the quality of online learning should be improved by reviewing the course syllabus and teaching materials to suit online learning practices. The teaching materials should be shared to the students as preparation for them before participating in online class. Moreover, the instructors should enhance group discussion among learners and conduct activities that allow learners to communicate between them to increase their motivation and support in the online learning process. Besides, future study can be conducted to investigate this issue from different perspectives such as the heterogeneity of the effects of online learning from the learners' context. Understanding the context of learners such as the students' acceptance and readiness may provide better understanding on this matter.

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