

Learning Flexibility and Environmental Changes with the Advent of Online Learning during COVID-19 Pandemic

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ABSTRACT

The vital purpose of this study is to identify whether learning flexibility and environment will influence undergraduate students' online learning during the COVID-19 pandemic in Malaysia. It is important to point out the determinants that will influence online learning that needs to be faced despite experiencing this world health crisis. The high level of online learning among students will also improve the performance of educational institutions which need to be competitive with other competitors in the sector. In addition, this study also aims to measure whether gender has a significant difference in undergraduates' online learning. Thus, survey questions from previous studies were adopted and customised to collect data. A sample of 129 undergraduate students from one UiTM branch campus who have experienced online learning in the previous semester in the year 2021. The results of this study indicate that there are significant relationships between learning flexibility, environment and online learning. The findings also reveal that the level of online learning among undergraduate students is moderate. Moreover, it is confirmed that gender has a significant difference in online learning outcomes among students. For future research, the use of more quizzes that can stimulate understanding of learning delivered online needs to be emphasized by knowledge communicators in this revolution of the learning process.

Keywords: Environment, Learning Flexibility, Online Learning, COVID-19

INTRODUCTION

The outbreak of the coronavirus disease (COVID-19) in Wuhan as of December 2019 became a notable date for the whole world. This incident has changed the landscape of every aspect of human life exclusively. In Malaysia, the disease emerged at the end of February 2020 but the movement control order (MCO) was implemented starting on 18th March 2020 under the guidelines of the World Health Organization (WHO). Undeniably, the education sector was affected during MCO where schools were closed and higher education institutions (HEIs) cancelled all their campus events (Gewin, 2020). This

move was taken to curb the transmission of the viral disease among staff and students so that the curve of COVID-19 could be flattened. At the same time, The Ministry of Higher Education (MOHE) instructed all HEIs to conduct lectures fully online with some exceptions (MOHE, 2020). This online method requires non-traditional face-to-face interaction to use digital devices and internet-based communication (Martinez, 2020; Schinkten et al., 2016). Online learning, undoubtedly, provides more flexibility, enhanced virtual connectivity and student-centred learning (Heap, 2017; Millier, 2020; Mukhtar et al., 2020). It is remote learning where the learning process can be done anytime and anywhere. Students can also have access to their lecturers using online applications such as by using WhatsApp and Telegram. Additionally, online learning allows students to be more active and learn on their own. In contrast, the challenges of online learning could be inefficiency (Mukhtar et. al., 2020) and gadget shortages (Pitnichenko, 2020). The students were unable to acquire certain skills that require hands-on training and have limited attention span. Furthermore, online learning is somewhat costly as students need to have access to a gadget such as a smartphone or a computer.

Amidst all of this, the implementation of online learning in HEIs in Malaysia were inevitable. Universiti Teknologi MARA (UiTM) had fully implemented Open and Distance Learning (ODL) since March 2020 resulting in unprecedented challenges. The main challenges faced by UiTM students during online learning were personal issues, technical issues and family issues (Aileen Farida et al., 2021). The students experienced low motivation since they have to adapt to new methods of learning while staying remotely from their friends and lecturers and, at the same time, they also have problems with internet connection. Besides, the students also needed to do household chores that restrained their focus on their studies. These challenges have made it stressful for students to study online. Therefore, this paper aims to discuss whether learning flexibility and environment have any significant relationships with online learning activities among undergraduates in one of the UiTM branch campuses. Besides, the study will also confirm if gender has any significant difference in undergraduates' online learning during the COVID-19 pandemic.

LITERATURE REVIEW

Online Learning during COVID-19 Pandemic

The sudden outbreak of the COVID-19 pandemic forced education institutions (schools and HEIs) around the world to change instantaneously. Traditional methods of teaching which were face-to-face lectures in the classroom become impossible, thus academicians have no option but to shift entirely to online teaching and learning (Dhawan, 2020). Tareen and Haand (2020) believe the use of the latest technology in the learning process is crucial as it could enhance communication between lecturers and students efficiently. By using certain devices such as smartphones and computers, lecturers and students can communicate face to face without any interference even though they are apart from each other. Currently, online communication platforms such as WhatsApp, Telegram, Google Workspace, Zoom, WebEx, Microsoft 365 or Microsoft Teams are extremely prevalent in education. These forms of communication offer tremendous benefits for teaching and learning, particularly during the COVID-19 pandemic.

Apart from that, a survey by MOHE found that 78.4 per cent of HEIs students were found not stressed during online learning and 92.82 per cent of HEIs in Malaysia have Learning Management System (LMS) (Astro Awani, September 20, 2021). This survey proved that a majority of his students were able to face the challenges of online learning, most probably because of their age level and maturity and they have the facilities to do online learning. However, the Minister of Education, Datuk Dr Mohd Radzi Md Jidin said that only 15 per cent of students have personal computers to access their online classes during the crisis of the COVID-19 pandemic, while there was also 36.9 per cent of students who did not have any devices to access the online learning (Justin, 2020). This situation seems critical for students at primary and secondary schools as online learning for this level of students

becomes very challenging. Furthermore, as governing UiTM nowadays becomes more complex due to changes in the organization in response to internal and external forces, it requires persistence, a strong mind and high spirits among its organizational members, including the students (Salleh et al., 2017). The abrupt changes in daily routine have proven to be challenging to their lives. The staff were struggling to balance their careers with personal life. In general, they are doing office tasks while handling childcare, household chores and family demands. As a result, they experience low productivity, stress and mental health problems. While for some students, they experience distractions, low motivation and various technical issues during online learning.

Learning Flexibility

Many scholars suggest that online learning offers great flexibility to both lecturers and students. Mukhtar et al. (2020) suggest that the flexibility of online learning can be divided into three sub-themes which are remote learning, easy administration, accessibility and comfortability. Students can study at their own pace while the lecturers have the authority to control the process. This scenario would enhance learning activities efficiently and effectively as they can manage to study at their chosen place and on their own time with minimum supervision from the lecturers. Additionally, online learning allows students to save time in terms of travelling from home to campus (Fidalgo et al., 2020). Online learning is most preferable since students could save on travelling costs while studying comfortably in their own homes. Besides, Baghdadi (2011) believes that lecturers are more approachable during ODL compared to traditional methods of learning. During online learning, the students could post inquiries anytime through online platforms like WhatsApp and e-mails. It would be easier for lecturers to reply to the inquiries at their own pace. Therefore, it is hypothesized that:

H₁: Learning flexibility is positively related to undergraduates' online learning during the COVID-19 pandemic.

Environment

In online learning environments, learners and instructors are separated from each other due to differences in time and space. However, new technologies have made it possible for learners and instructors to interact. An online learning environment also can support the needs of different levels of online learners. The emergence of online communication platforms allows lecturers and students to choose the most preferable device such as smartphones, computers, or tabs. The students can also decide when to learn, how to plan their studies and what supplementary materials they may apply in the educational process (Song & Hill, 2017). This self-paced learning in the online surrounding enhances the students to have a sense of autonomy in the learning process. In contrast, the loss of many social aspects during online learning causes limited social interaction with peers (Anna, 2020). The diminished social aspect resulted in the students having difficulty discussing problems with classmates. They might have other digital platforms to communicate but it is not as effective as physical and face-to-face interaction. Thus, this study assumes that:

H₂: Environment is positively related to undergraduates' online learning during the COVID-19 pandemic.

Gender and Online Learning

COVID-19 has affected the global population causing major disruptions in every sector of the economy as well as the education sector (WHO, 2020). E-learning or online learning has become a

common tool for learning especially during the COVID-19 outbreak making the traditional method no longer a choice of learning for the whole world. The differences in gender and online learning experience have been reported by many authors (Cuadrado et al., 2010; Kayany & Yelsma, 2000). In line with Cuadrado et al. (2010), the way men and women differ is classified in terms of using computers, evaluating technology and making use of it. Women consider computers as a social media tool and they are more involved than men in communicative activities (Venkatesh & Morris, 2000). Studies by Boyte-Eckis et al. (2018) show that online female students are more engaged and have stronger self-regulation than males while the latter tend to hold more stable and positive attitudes as well as have better technical skills towards online learning. Hence, it can be assumed that:

H₃: There is a significant difference in undergraduates' online learning activities during the COVID-19 pandemic based on gender

Therefore, considering previous works by scholars, this study represents the response to an enquiry on whether undergraduates' online learning is influenced by learning flexibility and environment. The research framework is illustrated in Figure 1 below:

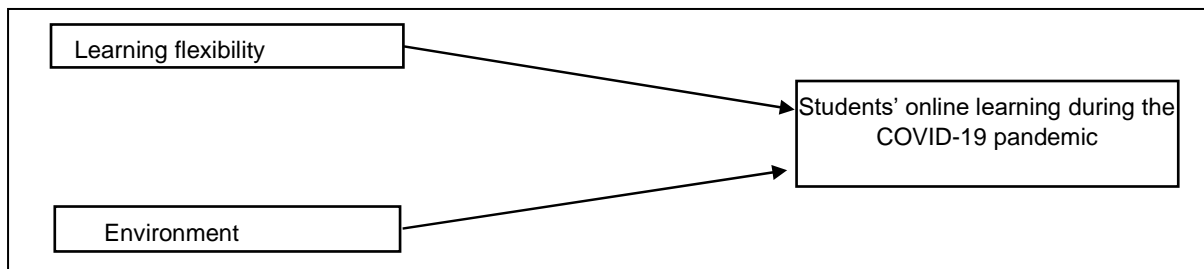


Figure 1: The relationships between learning flexibility, environment and undergraduates' online learning during the COVID-19 pandemic

METHODOLOGY

Respondents of this study were students from one of the UiTM branch campuses who were involved in online learning for one semester in the year 2021 due to the COVID-19 pandemic that had restricted their learning in the classroom. Since this study required responses from students from one of the UiTM branch campuses, it concentrated at an individual level. The purpose of this study is to identify the level of usage of online learning among students. Other than that, the relationships between learning flexibility and environment are also identified. The focused population was 6190. Therefore, the minimum sample size required for this study, according to Krejcie and Morgan (1970), must be 362. However, this study managed to get 129 respondents or 35.73% of the required sample size. With a reference to Vanderleest (1996), the response rate for this study, which was 35.3%, is considered an adequate rate. In addition, Roscoe (1975) suggested that the suitable sample size is larger than 30 and less than 500 for most studies.

Self-administered questionnaires were used for data collection. Using convenience sampling, participants were guaranteed confidentiality and were informed that there is no right or wrong answer to the questions. In total, only 129 questionnaires were received and found usable for this analysis. In this study, all constructs were measured using established measures drawn from earlier studies, such as Tareen and Haand (2020) for online learning; Fidalgo et al. (2020) for the environment; and Tareen et al. (2020) for learning flexibility. A 5-point response scale was used for all items, from 1 = *strongly disagree* up to 5 = *strongly agree*. The 5-point response scale was used by considering Chomeya's (2010) notion that the scale allows the respondents to answer the middle scale, which is '3' because

they might think that answering the ‘neutral’ answer did not affect any disadvantages to data analysis of the research. Furthermore, 5, 7 or 10-point response scales are all equivalents for analytical tools such as structural equation models or confirmatory factor analysis (Dawes, 2008).

The skewness values for all variables were within the range of -0.182 to 0.186 and considered acceptable as pointed out by Sharma and Ojha (2020). For the kurtosis values, all fall within the acceptable range of data to be normally distributed which is -2 to +2. The values were within -0.348 and -0.245. Since the measure of skewness and kurtosis were within the appropriate cut-off values (Sharma et al., 2020), it can be concluded that the data distribution is normally distributed. The reliability of each construct was also examined to ensure internal consistency. These constructs have never been explored previously in studying online learning among students from this campus involving different faculties and levels of study, so, the primary concern is building internal consistency or the extent to which the items consisting of one another are united. The Cronbach’s alpha coefficient was used to test for internal consistency. According to Nunnally and Bernstein (1994), the appropriate Cronbach’s alpha coefficient for internal consistency must be above 0.7, while items rated below the recommended alpha level of 0.7 must be removed so that construction reliability can be improved. All constructs used in this study have achieved an acceptable level of reliability. First, there were 5 questions about online learning (dependent variable) which showed high reliability with Cronbach’s alpha value at 0.841 which was in the range of $0.8 < 0.9$. The value of Cronbach’s alpha was very good and all the questions under this section can be accepted and positively correlated. There were five questions to measure learning flexibility in this research questionnaire. The value of Cronbach’s alpha for this section was 0.780 which was in the range of $0.7 < 0.8$ and acceptable for its internal consistency. The value of Cronbach’s alpha for the next independent variable, environment, was 0.808 which was in the range of $0.8 < 0.9$. This value is considered very good. Since all the constructs under investigation were above 0.70, hence given all the benchmarks, the constructs were found to be reliable.

RESULTS AND DISCUSSIONS

Frequency Analysis

Regarding the respondents’ gender, 77% were female while 23% were male with a majority of the respondents being between the ages of 21 to 24. Other than that, 77% of the respondents were bachelor’s degree students, 22% were diploma students and 1% were pre-diploma students. From the population, it was found that a majority of them (50%) were students from the Faculty of Business and Management, followed by those from the Faculty of Information Management with 37%, the Faculty of Art and Design (7%) and the Faculty of Accountancy (6%). Lastly, most respondents were found to use smartphones for online learning (47%), followed by the use of laptops (37%), desktop computers (12%) and tablets (4%). By referring to Rahiem (2020), students will only use any online learning device which is compatible with them and they will share the device with other family members due to the limitations of having online learning devices.

Descriptive Analysis

Mean Score of Online Learning

In determining the level of online learning among respondents, they need to answer five Likert-scale questions. The mean score for online learning was 2.95. According to Terano (2015), values ranging from 2.50 to 3.49 are considered a moderate category. Therefore, the mean value for online learning is between this range and this level is considered a moderately acceptable category. The two highest mean scores go with the statement “Online learning improves my performance academically” and “Online learning enables me to accomplish tasks more easily compared to traditional face-to-face

learning” with the mean score of 3.26 and 3.10, respectively. From these findings, it can be concluded that undergraduate students felt that online learning has no distinctive difference from other learning methods such as blended learning and classroom instruction. This is in line with Chung et al. (2020) in their findings which showed students are generally prepared for online learning, satisfied with the use of distance education, and the experience gained from it is considered quite good. However, more than half of those who responded to the survey would not want to pursue online learning if they had the choice, regardless of their gender and level of education. Furthermore, Chung et al. (2020) admitted that amidst all the barriers faced by online learning among students of higher learning institutions in Malaysia, lack of Internet connection and limited broadband data is among the biggest challenges of online learning. This challenge is exacerbated especially if the lecture is delivered via live broadcast using a platform such as *Google Meet*, *Zoom* or *Webex*.

Mean Score of Learning Flexibility

The mean score for learning flexibility was 3.76. The highest mean score was 4.08 which refers to the statement “Online learning caters to individual learning needs”. It means that most of the respondents agreed that online learning assists their needs to be involved in the learning process although conducted online. The second highest mean score was 4.04 with the statement, “The video lecture has sufficient coverage about a particular topic”. This concludes that undergraduates prefer online learning as it can offer learning flexibility. According to Panigrahi et al. (2018), online learning has certain comparative advantages such as flexibility in schedules and lower costs than traditional learning. It coincides with the previous findings of Markova et al. (2017) that respondents chose flexibility in learning time (26.1%) as the reason to motivate themselves to use online mode for professional study which finding is among the top 3 out of eight reasons.

Mean Score of Environment

Lastly, to look at the respondents’ response to the environment, respondents need to answer five Likert-scale questions. The mean score for the environment as a contributing element in online learning was 3.52 with its highest mean score being 3.79 to the statement “I would need better equipment for online classes”. It means that most of the respondents agreed that any device that they have will be useful for their online learning. Online learner satisfaction is also primarily related to their capability to learn from online content, interact and communicate with others, and understand the need for success. It can be added that many factors affect the satisfaction in online learning including its surroundings (Palmer & Holt, 2009).

Pearson’s Correlation Analysis

To identify the strength of the correlation and relationship between each independent variable with the dependent variable, Pearson correlation was employed. First, the value of correlation analysis between learning flexibility (independent variable 1) and the undergraduate students’ online learning was 0.395 with a positive correlation. This value was in the 0.30-0.50 range which indicates that between learning flexibility and online learning, there is a low correlation. It also represents that learning flexibility can only give little influence on online learning activities among the respondents. With a reference to Evan (1991), flexibility is the capacity to adapt and the ability to change in many areas or dimensions, such as in terms of time, expected or unforeseen change, offensive or defensive and internal organization. Therefore, it would be fruitful when the aspects of democratizing and desirability in online learning activities are relooked so that it can highly influence enjoyment in the learning process. Although many institutions of higher learning have previously been accused of refusing to change their traditional teaching approaches, they have no choice but to switch entirely to

online teaching-learning (Dhawan et al., 2020). This statement is in line with the findings of this study which found that respondents' acceptance of online learning is moderately accepted. In addition, flexible learning is the most influential factor in online learning compared to a learning environment and also demographic factors such as gender. As mentioned by Blayone et al. (2017), online learning is often introduced as a flexible approach to education, in which flexibility can be an aspect of educational provision that is democratizing and desirable.

In terms of the relationship between environment and online learning, the value was 0.619 which represents a positive and moderate correlation. It can be interpreted that the environment can be beneficial for any online learning activities among undergraduates. This indicates that a supportive learning environment is preferred by undergraduates so that their learning process is not disrupted due to global health crises such as COVID-19. Furthermore, a study by Naji et al. (2020) proved the same interpretation that learning environment support plays an important role in facilitating change in the education system by observing student needs and providing timely scaffolding, especially for those identified as struggling or feeling isolated in online learning activities during COVID-19. This finding also matches with Thornes (2012) that the online learning environment can support the needs of students with different levels of skills. Thus, online educators can use learning analytics to explore student behaviour and learning in online learning environments to improve education design and feedback in ways that promote meaningful learning for them (Martin & Ndoye, 2016). Table 1 represents the result of the Pearson correlation coefficient of this study.

Table 1: Result of Pearson correlation coefficient

Hypotheses	Coefficient
H1: Learning flexibility influences undergraduate students' online learning	0.395
H2: Environment influences undergraduate students' online learning	0.619

Note: **Correlation is significant at the 0.01 level (2-tailed).

ANOVA

To identify the difference between male and female UiTM undergraduate students in online learning, ANOVA and Measures of Association were executed. The result was shown in Table 4.2. From Table 4.2, the p-value was less than 0.05 representing a significant effect between male and female undergraduate students about online learning. This indicates that there is a difference in online learning practices between male and female students. Although the Eta squared value for gender and online learning was 0.12, it provides a small significant effect (McLeod, 2019). Furthermore, the level of online learning among male students was 3.44 which is higher than the mean score for online learning among female students at 2.79. The result shows that there is a significant difference between gender and online learning where male students are more interested in online learning than female students, and there is a small effect between gender and online learning. This finding also signals that there is almost no difference in online learning activities between male and female undergraduates although there is a small difference in the result of this study described earlier. Past studies (e.g. Tang et al., 2021; Chung et al, 2020; Naji et al., 2020) have confirmed that gender factor does not influence virtual learning activities and emphasis on active, interactive and collaborative learning will be critical in assisting students' self-directed learning (Chu & Tsai, 2009; Stewart, 2007; Stewart & Lowenthal, 2021). However, the findings of previous studies (e.g. Ashong, & Commander, 2012; Shen et al., 2013) found that gender has influenced online learning as obtained in this study. According to Keri (2002), males are more likely to be independent learners with a fondness for applied learning, while females are more dependent or conceptual learners with a preference for more reading and exhibited instructor

knowledge. For example, male students were found to be more pleased (42.2%) and more competent, (48.5%). This statement was also supported by Lee and Chong (2017) who states that there is a significant contribution for male and female students in online educational purpose.

Table 2: ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Online Learning * Gender	Between Groups	(Combined)	9.917	1	9.917	16.734	0.000
	Within Groups		75.263	127	0.593		
	Total		85.180	128			

Hypothesis Testing

To test the hypotheses, the significant values of learning flexibility and environment on undergraduate students' online learning were also measured. From Table 3, the significant value of learning flexibility was 0.000 which was less than the significant level of 0.05 signals that H1 is accepted and the null hypothesis is rejected. Therefore, there is a significant relationship between learning flexibility and undergraduate students' online learning. Besides, the significant value of the environment is 0.000 which was less than the significant level of 0.05. It indicates that the relationship between environment and undergraduate students' online learning is significant. H3 is also accepted and its null hypothesis as the significant value of significant difference in online learning based on gender was less than the acceptable significance level. Therefore, all proposed hypotheses are supported.

Table 3: Summary of significant values

Hypotheses	Sign.Value	Sign.Level	Result
Learning flexibility	0.000 <	0.05	Support
Environment	0.000 <	0.05	Support
Gender	0.000 <	0.05	Support

Notes: *Total Link Strength

CONCLUSION AND FUTURE RESEARCH

The main purpose of this research is to clarify the changes in learning and motivation of undergraduate students with the advent of online learning during the COVID-19 outbreak in Malaysia. Pearson correlation was employed to look at the relationship between each independent variable with the dependent variable. Based on the result for independent variable 1, there was a low relationship between learning flexibility and online learning which fell under the 0.30-0.50 range. For independent variable 2, the value for the relationship between environment and online learning was 0.619 which represented a positive and moderate correlation. Next, for gender identification, ANOVA and Measures of Association were used and presented significant effects between male and female students concerning online learning. It means that there was a difference in online learning practised between male and female students where the p-value was less than 0.05. The hypotheses result shows that there was a significant relationship between learning flexibility and undergraduate students' online learning as well as the relationship between environment and undergraduate students' online learning which both values show less than 0.05 signals. The significant value of the significant difference in online learning based on gender was less than the acceptable significant level. Therefore, all proposed hypotheses are accepted.

The significant contribution can be seen by conveniently managing classes by lecturers and students through remote learning whereby students can access the teaching materials needed. Lecturers can easily record the lectures and mark attendance online (Mukhtar et al., 2020). Travelling costs can also be decreased as well as other expenses. The student-centred approach can be improved by the effects of learning flexibility and environment on online learning, whereby they are urged to be self-directed asynchronously at any time or 24/7 during this COVID-19 outbreak.

Further investigation in this area is needed since this study emphasizes combining learning flexibility, environment and online learning which is less frequently examined simultaneously among undergraduates during the COVID-19 pandemic. Future research should use a qualitative method or triangulation in measuring “what” and “how” questions regarding the effects of learning flexibility and environment on online learning. The qualitative method would enhance the interpretation of the significant study findings. Consequently, longitudinal research is useful for the overall causal path to better understand how learning flexibility, environment and online learning evolve. Comparative studies of the same causal model can be used by studying other UiTM campuses and other public universities or comparing public and private universities. In addition, using other variables in future research may be able to explain online learning activities in greater detail. For example, the use of more quizzes that can stimulate the understanding of learning delivered online needs to be emphasized by knowledge communicators in this revolution of the learning process. This is in line with a study by Mann and Robinson (2009) that found 59% of university students encounter boredom with 30% experiencing boredom most or all the time during learning activities. Therefore, one of the solutions to curb this problem is by utilising educational games. The use of educational games as learning instruments is useful for the expansion of students’ cognitive, motivational, and social views according to Papastergiou (2009) and Siegle (2015). For instance, *Kahoot!* enables lecturers to extract from course content to create quizzes in which students can engage as players in a ‘game show’, thus merging gamification principles, like audio and a scoreboard with a point system, into an informal assessment method (Wang, 2015; Licorish et al., 2018). Plump and LaRosa (2017) also revealed that *Kahoot!* is easy to be used in any learning activity as it does not require lecturers and students to have any initial training to use it.

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REFERENCES

- Aileen Farida Mohd. Adam, Najlaa Nasuha Mohd Radin, Nooryuhanis Hashim & Mohd Suhaimi Sulaiman (2021). Diploma Students’ Challenges and Best Practices in *ODL At UiTM Terengganu: A Pilot Study*. *Attarbawiy: Malaysian Online Journal of Education*, 5 (1), 32-45.
- Ana Nurdini Shahrin (2021). E-learning During Covid-19: A Review of Literature. *Malaysian Journal of Media Studies*.
- Anna (2020). 5 Challenges Students Face with Online Learning and How to Overcome Them. Retrieved on 14 December 2021 from <https://meratas.com/blog/5-challenges-students-face-with-remote-learning/>

- Ashong, C. Y., & Commander, N. E. (2012). Ethnicity, gender, and perceptions of online learning in higher education. *MERLOT Journal of Online Learning and Teaching*, 8(2).
- Astro Awani. (2021, September 20). Majoriti pelajar universiti tidak rasa tertekan jalani PdP dalam talian - Noraini. Astro Awani. Retrieved October 6, 2021, from <https://www.astroawani.com/berita-malaysia/majoriti-pelajar-universiti-tidak-rasa-tertekan-jalani-pdp-dalam-talian-noraini-320755>.
- Baghdadi, Z. D. (2011). Best practices in online education: Online instructors, courses, and administrators. *Turkish Online Journal of Distance Education*, 12(3), 109-117.
- Blayone, T. J., Barber, W., DiGiuseppe, M., & Childs, E. (2017). Democratizing digital learning: theorizing the fully online learning community model. *International Journal of Educational Technology in Higher Education*, 14(1), 1-16.
- Boyte-Eckis, L., Minadeo, D. F., Bailey, S. S., & Bailey, W. C. (2018). Age, Gender, and Race as Predictors of Opting for a Midterm Retest: A Statistical Analysis of Online Economics Students. *Journal of Business Diversity*, 18(1).
- Chomeya, R. (2010). Quality of Psychology Test Between Likert Scale 5 and 6 Points. *Journal of Social Sciences*, 6(3), 399-403. Retrieved 9 December, 2020.
- Chu, R. J. C., & Tsai, C. C. (2009). Self-directed learning readiness, Internet self-efficacy and preferences towards constructivist Internet-based learning environments among higher-aged adults. *Journal of Computer Assisted Learning*, 25(5), 489-501.
- Chung, E., Noor, N. M., & Vloreen, N. M. (2020). Are You Ready? An Assessment of Online Learning Readiness Among University Students. *International Journal of Academic Research in Progressive Education and Development*, 9(1), 301-317.
- Chung, E., Subramaniam, G., & Dass, L. C. (2020). Online learning readiness among university students in Malaysia amidst COVID-19. *Asian Journal of University Education*, 16(2), 46-58.
- Cuadrado, Ruiz & Montoro (2010) Are there gender differences in e-learning use and assessment? Evidence from an interuniversity online project in Europe: *Social and Behavioral Sciences 2 (2010)* 367-371.
- Dawes, J. (2008). Do data characteristics change according to the number of scale points used? An experiment using 5-point, 7-point and 10-point scales. *International journal of market research*, 50(1), 61-104.
- Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, 49(1), 5-22. <https://doi.org/10.1177/0047239520934018>.
- Evans, J. S. (1991). Strategic flexibility for high technology maneuvers: a conceptual framework. *Journal of management studies*, 28(1), 69-89.
- Fidalgo, P., Thormann, J., Kulyk, O., & Lencastre, J. A. (2020). Students' perceptions on distance education: A multinational study. *International Journal of Educational Technology in Higher Education*, 2-3. <https://doi.org/10.1186/s41239-020-00194-2>.
- Gewin V. (2020). Five tips for moving teaching online as COVID-19 takes hold. *Nature*, 580(7802), 295-296. <https://doi.org/10.1038/d41586-020-00896-7>
- Heap, T. (2017). Benefits of Studying Online (VS Face-to-Face Classroom).
- Justin, O. (16 July, 2020). Education Ministry: Over one in three students couldn't access online learning during MCO. Retrieved 31 October, 2020, from Malay Mail: <https://www.malaymail.com/news/malaysia/2020/07/16/education-ministry-over-one-in-three-students-couldnt-access-online-learnin/1885005>
- Kayany, J. M. & Yelsma, P. (2000). Displacement effects of online media in the sociotechnical contexts of households. *Journal of Broadcasting & Electronic Media*, 44, 215-229.
- Keri, G. (2002). Male and female college students' learning styles differ: An opportunity for instructional diversification. *College Student Journal*, 36(3), 433-442.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30(3), 607-610.
- Lee, C. E. C., & Chong, A. Y. W. (2017). Students' adoption of Facebook in higher education: A gender-based comparison. In *SHS Web of Conferences* (Vol. 33, p. 00010). EDP Sciences.

- 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.
- Malaysian Ministry of Higher Education. (2020). Press Release by the Malaysian Ministry of Higher Education: Pengendalian Aktiviti Akademik Di Kampus Institusi Pendidikan Tinggi Semasa dan Pasca Perintah Kawalan Pergerakan. Retrieved on October 4th, 2021 from <https://www.mohe.gov.my/hebahan/kenyataan-media/pengendalian-aktiviti-akademik-di-kampus-institusi-pendidikan-tinggi-semasa-dan-pasca-perintah-kawalan-pergerakan>
- Mann, S., & Robinson, A. (2009). Boredom in the lecture theatre: An investigation into the contributors, moderators, and outcomes of boredom amongst university students. *British Educational Research Journal*, 35(2), 243-258.
- Markova, T., Glazkova, I., & Zaborova, E. (2017). Quality issues of online distance learning. *Procedia-Social and Behavioral Sciences*, 237, 685-691.
- Martin, F., & Ndoye, A. (2016). Using learning analytics to assess student learning in online courses. *Journal of University Teaching & Learning Practice*, 13(3), 7.
- Martinez, J. (June 22, 2020). Take this pandemic moment to improve education. EduSource. Retrieved from <https://edsources.org/2020/take-this-pandemic-moment-to-improveeducation/> 633500
- McLeod, S. A. (2019). *What does effect size tell you?* Simply psychology.
- Miller, K. (2020). The benefits of online learning: 7 advantages of online degrees.
- Mukhtar, K., Javed, K., Arooj, M., & Sethi, A. (2020). Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era. *Pakistan journal of medical sciences*, 36(COVID19-S4), S27-S31. <https://doi.org/10.12669/pjms.36.COVID19-S4.2785>
- Naji, K. K., Du, X., Tarlochan, F., Ebead, U., Hasan, M. A., & Al-Ali, A. K. (2020). Engineering Students' Readiness to Transition to Emergency Online Learning in Response to COVID-19: Case of Qatar. *EURASIA Journal of Mathematics, Science and Technology Education*, 16(10).
- Nunnally, J.C. & Bernstein, I.H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Panigrahi, R., Srivastava, P. R., & Sharma, D. (2018). Online learning: Adoption, continuance, and learning outcome—A review of literature. *International Journal of Information Management*, 43, 1-14.
- Palmer, S. R., & Holt, D. M. (2009). Examining student satisfaction with wholly online learning. *Journal of computer assisted learning*, 25(2), 101-113.
- Papastergiou, M. (2009). Digital game-based learning in high school computer science education: Impact on educational effectiveness and student motivation. *Computers & Education*, 52(1), 1-12.
- Plitnichenko, L. (2020). Online Learning Challenges (& Ways to Solve Them). JellyFish.Tech. <https://jellyfish.tech/10-challenges-of-e-learning-during-covid-19>
- Plump, C. M., & LaRosa, J. (2017). Using Kahoot! in the classroom to create engagement and active learning: A game-based technology solution for eLearning novices. *Management Teaching Review*, 2(2), 151-158.
- Rahiem, M. D. (2021). Remaining motivated despite the limitations: University students' learning propensity during the COVID-19 pandemic. *Children and youth services review*, 120, 105802.
- Roscoe, J. T. (1975). *Fundamental research statistics for the behavioural sciences [by] John T. Roscoe*. New York, NY: Holt, Rinehart and Winston.
- Salleh, N. S. N. M., Amin, W. A. A. W. M., & Mamat, I. (2017). Employee Readiness, Training Design and Work Environment in Influencing Training Transfer Among Academic Staff of UiTM. *International Journal of Academic Research in Business and Social Sciences*, 7(10), 275-290.
- Schinkten, O. (2016). What is online education? Educational Technology Tutorials.
- Selvanathan, M, Nur Atikah Mohamed Hussin & Noor Alyani Nor Azaz (2020). Students learning experiences during COVID-19: Work from home period in Malaysian Higher Learning Institutions: *Teaching Public Administration*, 1-10
- Sharma, C., & Ojha, C. S. P. (2020). Statistical parameters of hydrometeorological variables: standard deviation, SNR, skewness and kurtosis. In *Advances in Water Resources Engineering and Management* (pp. 59-70). Springer, Singapore.

- Shen, D., Cho, M. H., Tsai, C. L., & Marra, R. (2013). Unpacking online learning experiences: Online learning self-efficacy and learning satisfaction. *The Internet and Higher Education*, 19, 10-17.
- Siegle, D. (2015). Technology: Learning can be fun and games. *Gifted Child Today*, 38(3), 192-197.
- Singh, V., Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). *American Journal of Distance Education*, 33(4), 289–306.
- Song, L., & Hill, J. R. (2007). A conceptual model for understanding self-directed learning in online environments. *Journal of Interactive Online Learning*, 6, 27-42. Retrieved 27 November, 2020, from <https://www.ncolr.org/jiol>
- Stewart, W. H., & Lowenthal, P. R. (2021). Distance education under duress: a case study of exchange students' experience with online learning during the COVID-19 pandemic in the Republic of Korea. *Journal of Research on Technology in Education*, 1-15.
- Tang, Y. M., Chen, P. C., Law, K. M., Wu, C. H., Lau, Y. Y., Guan, J., ... & Ho, G. T. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Computers & Education*, 168, 104211.
- Tareen, H., & Haand, M. T. (2020). A case study of UiTM post-graduate students' perceptions on online learning: Benefits & challenges. *International Journal of Advanced Research and Publications*, 4(6), 86-94.
- Terano, H. J. (2015). Development and acceptability of the simplified test with workbook in differential equations as an instructional material for engineering. *Asia Pacific Journal of Multidisciplinary Research*, 3(4), 89-94.
- Thornes, S. L. (2012). Creating an online tutorial to support information literacy and academic skills development. *Journal of information literacy*, 6(1).
- Vanderleest, H. W. (1996). What new exporters think about US government sponsored export promotion services and publications. *Multinational Business Review*, 4(2), 21.
- Venkatesh, V., & Morris, M.G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, 24, 115-139
- Wang, A. (2015). The wear out effect of a game-base student response system. *Computers & Education*, 82, 217-227.
- WHO (2020). WHO Timeline – COVID-19. Available at: <https://www.who.int/news-room/detail/27-04-2020-who-timeline-covid-19> (accessed 3 October, 2021)