Efficiency of Online Learning during Covid-19 Pandemic

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Abstract:- COVID-19 pandemic has had a profound effect on campuses, compelling learning systems to shift away from face-to-face engagement and toward online instruction. The purpose of this research is to investigate the effectiveness of remote learning in the event of a COVID-19 pandemic. To obtain responses, a self-administered online survey was used. After data screening, 315 data were proceeded to the next analysis. Additionally, the data were devoid of missing cases and outliers. The measuring model was evaluated for indicator and internal consistency reliability, convergent and discriminant validity. Meanwhile, the structural model was evaluated by SmartPLS version 3.2.9 utilising the bootstrapping approach. Findings revealed self-discipline and flexibility were significant towards effectiveness of online learning among students at the UiTM Kelantan, Kota Bharu Campus. The findings argue that, in the modern era, internet technologies have increased the flexibility of post secondary education in a variety of ways. Institutions should make strategic use of these new flexibility, concentrating on chances to engage students more deeply in learning that results in practical outcomes.

Keywords:- Efficiency online learning; internet connection; surrounding environment; facilities; self discipline; flexibility.

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1 Introduction

Coronavirus is a highly contagious virus that is quickly spreading throughout the human population. COVID-19 is a novel sprain that first occurred in December 2019 in Wuhan, China. Nobody could have predicted the pandemic's outcome. Students' psychosocial behaviors must shift in response to such a unique scenario. This transition has grown into a process of preserving pre-coronavirus existence while attempting to construct a new "normal" for post-coronavirus chaos in certain aspects [1]. Due to the pandemic's global scope, the solution must be local [2].

The COVID-19 has resulted in schools shut, not only in Malaysia but all over the world. According to a report in the World Economic Forum in 2020, over 1.2 billion children from 186 countries were out of the classroom (Cathy Li & Farah Lalani, 2020). With this sudden shift and distinctive rise of online learning in which teaching was undertaken on digital platforms, it showed us that education has changed dramatically

Online learning is a concept that refers to education that occurs through the use of the internet. Additionally, "E- Learning" is used to refer to it. On the other hand, online education is a subset of "distance learning," which encompasses all forms of education that take place remotely rather than in a classroom. Previously, online distance education served an ever-growing population of students who were unable to participate in traditional classroom settings. Following the expansion of COVID-19, online education has been fully deployed worldwide. Students from all around the world are increasingly engaging in online learning in order to complete their syllabus. According to [3], online education has revolutionised the face of higher education during the previous two decades. Online education has been utilised by education institutions offering undergraduate, graduate, and doctorate degrees. Students can change into classrooms everywhere they have access to the internet and electricity through online education. It is capable of delivering audio, video, email, animation, interactive training sessions, and live professor chats. It is a more varied learning environment with greater adaptability than a traditional classroom.

There are a few universities that have successfully managed online classes with numbers of online courses offered just to adapt with the situation. For example, Zhejiang University in China and Imperial College London. They used different types of platforms just to suit the demand and facilities they had.

While the use of computer technology in teaching and learning continues to rise, a recent research found that the emphasis in higher education is shifting away from "provider" and toward "learner" when it comes to enhancing individual students' learning. On the other hand, the traditional quality indicators associated with certification no longer apply to the new context of teaching and learning [4]. For instance, terminology such as "seat-time," "physical attendance," and "library holdings" do not translate well to an online environment. Utilizing outcome-based metrics in an online learning environment may be advantageous [4]. It has been claimed that learning effectiveness, which refers to the extent to which learning objectives are satisfied or learning is successful, may be a more realistic representation of the effectiveness of Internet-based teaching and learning. The data gathered during the study of learning efficiency helps colleges to expand their online course offerings. There has been a tremendous increase in study on the usefulness of online learning in recent years. According to the study's findings, the most often utilised metrics for assessing learning efficacy in higher education are learning outcomes, learning attitudes, and satisfaction [5].

In terms of educational success, learning outcomes represent factors such as student beliefs about achieving learning goals, the incidence of learning, progress in performance, and the accomplishment of results [4]. Students who did well in mixed learning environments expressed more satisfaction with their courses than students who performed badly, indicating that high achievers are more adept at adjusting to new learning contexts than their low achiever peers, according to a research of blended learning environments [6]. On the other hand, some academics feel that perceptions of learning may not necessarily correlate to actual gains in knowledge [7]. There are several outcomes in this subject. More study and empirical evidence are required to determine if perceived learning outcomes are crucial for comprehending students' learning accomplishments and their capacity to cope with a regular learning environment.

Researches show that blending information with interactive and gamification is able to come out with better understanding and students can benefit from this type of learning. They can get better retention information and their learning times also could be faster other than increasing their productivity. Therefore, this research analyses the efficiency of online learning among undergraduate students when they have to go for digital platforms in order to finish their studies during COVID-19 pandemic.

2 Literature Review

2.1 Efficiency Online Learning

According to [8], e-learning is a method of learning through the use of electronic media. The learning environment could be referred to as a Learning Management System (LMS), a Course Management System (CMS), a Virtual Learning Environment (VLE), or even a Knowledge Management System (KMS) [9]. While [10] defined online learning as the delivery of education using a variety of technologies, including the internet, email, chat, and audio and video conferencing across computer networks. It enables the student to progress at his or her own speed and convenience. Online learning, more usually abbreviated as e-learning, is a type of distance education in which technology aids the learning process and all instructions are distributed through the internet [11][12].[13] characterizes online learning as a completely online setting, whereas blended learning is a combination of face-to-face and online instruction. Effective learning requires that students pursuing an online programme get instruction that is specific to the school. The objective is for online learning to be at least as successful as other modes of delivery used by the company, most notably face-to-face, classroom-based training. Meanwhile, [14] defines an Online Learning Environment (OLE) as a set of teaching and learning resources that are used to supplement students' educational experiences through the use of computers and the internet.

Additionally, online education is the most efficient option for students and the most environmentally friendly [11]. According to the United Kingdom's Open University, online education consumes 90 percent less electricity than traditional classes. In aggregate, this results in a more effective form of instruction through online learning and interactive content. Additionally, including individuals and companies in this style of teaching would motivate them to do their part for the environment and adhere to their own personal environmental goals. Finally, the online learning environment is incredibly favorable to understanding and productive. Today's online learning creation technologies enable developers to build engaging training content by combining instructional approaches and media. Teachers can use animation and visuals to assist students in visualizing abstract topics in an online learning environment, therefore stimulating student creativity.

2.2 Internet Connection and Efficiency Online Learning

Nowadays, the efficiency of online education can be impacted by either a poor or an outstanding internet connection. The internet, as defined by [15], is a global computer network that connects other computer networks and delivers end-user services. It is positioned and enables data and other types of information to be exchanged. The Internet is a computer network that enables users to connect to computers situated anywhere in the globe, and it has been actively used in this modern technological era. According to [16], tangible tools such as the computer (internet connection) enable online learners to engage more fully in long-distance learning. [17] discovered that a stable network architecture is critical for sustaining and improving the quality of online education.

Additionally, [18] asserts that internet utilization can enhance the effectiveness and efficiency of online learning. Enhancing learning with technology is a growing trend that has resulted in numerous possibilities for self-management learning within the benefits of autonomous education. Thus, the internet is a product of a technological era that has been embraced to increase learning. According to [18], technology exacerbates the problem of online learning by allowing for self-directed learning via the internet. [19] emphasize the importance of internet-based learning as a means of assisting students' learning and enabling them to develop the ability to be more engaged in their learning and to exchange knowledge with one another via online internet networks [20]. It is proven that lack of internet access could be great challenges for students in Southeast Asia [21] and [22] to become involved in online learning. The teachers and students, especially in rural areas, who have problems with internet connection are not capable of using emerging technology, making the online learning process a difficult and frustrating experience. Thus, internet-based learning demonstrates the connection between the internet and online education.

H1: The internet connection has a positive and significant influence on the efficiency of online learning.

2.3 Surrounding Environment and Efficiency Online Learning

In terms of psychosocial effects, online lessons may result in pupils experiencing mental tension or intellectual exhaustion [23]. This growth can be

attributable to the fast use of online education. The learning environment has a substantial effect on a student's capacity to learn in a variety of ways. Numerous variables, like sitting, lighting, noise, and even the colour scheme, can all have an influence on an individual's ability to learn. Kids who learn in a good learning environment are more motivated, engaged, and have a larger potential for learning in general than students who learn in a negative learning environment. On the other hand, the best results from online learning occur when learners actively participate and interact. There is no doubt that a healthy, comfortable, and safe environment could help to improve students' performance. [24] discovered that academic success is related to the quality of the interior environment. Additionally, [25] noted that a lack of fresh air or exposure to unusually hot, cold, dry, or humid circumstances, loud noise, even in a quiet room, and exceptionally bright or dark lighting can have a poor effect on students' academic performance and attendance during online sessions.

[26] highlighted interruptions, a lack of support from family, friends, and employers, a time constraint, and a student's commitment to learn as hurdles to online learning for students in their study. Furthermore, the family environment has a positive impact on students' academic success and efficiency online learning. [27] revealed that a student's growth and academic success are influenced by the home learning environment. They also discovered that the quality of a student's home learning environment has a substantial impact on academic achievement and is predictive of academic achievement. As a result, creating a high-quality home learning environment is an important step in improving pupils' academic performance. This is in accordance with other research, such as [28], which found that the home environment factor helps students improve their online learning effectiveness.

H2: The surrounding environment has a positive and significant influence on the efficiency of the online learning

2.4 Self-Discipline and Efficiency Online Learning

E-learning is currently a rapidly developing means of education in every part of the world [20]. It is capable of expediting teaching and extending the duration of the learning process. In Malaysia, the efficiency of e-learning among school pupils may differ from that of IPT students, for whom e-learning is beneficial. It was discovered that few studies on high school students have been conducted on distant education via e-learning systems. On the other hand, students' capacity to manage their distance learning activities, such as studying at home, might have an effect on the effectiveness of e-learning. Self-discipline, in the context of distance education, refers to a person's capacity to regulate their emotions. Additionally, it is the capacity for personal development and the ability to overcome shortcomings. Without a question, self-discipline is vital for life success, and it must be developed early in order to become a habit [29]. In academia, self-discipline refers to students' determination to improve their studies. Self-discipline is the capacity to do what one should be doing. Individuals must consider a variety of aspects when enhancing their self-discipline. Furthermore, student involvement and interaction in instructional events help to create a more effective learning environment [30]. The engagement and participation of advanced learners in learning activities, according to [31] will determine the efficacy of an online learning programme and will affect students' positive views toward and satisfaction with online learning education. According to [32][33], the degree to which online learners interact and participate in online education is predictive of their capacity to continue in their studies, with a correlation between progression and retention.

It has been demonstrated that self-discipline has a substantial influence on pupils' academic development throughout their lives [34][35][36]. [36] examined the influence of self-control on academic achievement in two investigations. Both researchers emphasised the need for self-discipline and self-control in accomplishing bigger objectives, as well as the capacity to reject misrepresentations [35]. In daily life, students must learn self-discipline in order to resist their natural emotions and focus on the intended goal. From a student's perspective, self-discipline means focusing on acts that promote academic accomplishment, such as finishing school assignments on time, updating notes, and paying attention in class. The majority of high school kids find gaming, watching interesting television, and connecting with friends on social media to be more pleasurable than studying. To boost academic success, students should devote more time to school than to entertainment [36].

H4: Self-discipline has a positive and significant influence on the efficiency of online learning

2.5 Facilities and Efficiency Online Learning

Learning facilities are required to motivate students to learn, particularly during online education. Students' motivation to study will increase if they are supplied with improved and suitable learning facilities and a supportive home environment. The school's involvement in providing optimal facilities and the family's assistance in offering additional attention, both physical and non-physical, may help create an environment of comfort for kids, encouraging them to be more motivated to study [37]. [38] also expressed that complete learning facilities are able to help students to learn better.

In terms of educational facilities, they must include learning spaces that facilitate the learning process, in addition to providing safe, comfortable and exciting learning settings [39]. [40] discovered that a lack of facilities was one of the most difficult e-learning problems. Facilities variables were measured according to the following dimensions: absence of advanced equipment, lack of welfare facilities, and lack of suitable facilities in the courses in this study. In other discussions, learner initiate their own learning processes by using the many electronic educational platforms and availability facility such as computer or laptop, internet connectivity and space for e learning process. According to [41], remote learning entails having a minimum amount of interaction between facilitators and learners, as a result of which it depends more on electronic communication. This implies that facilities and resources must be made accessible for learners to utilize in order for them to be successful in their learning programme on their own time.

When learning is facilitated by the use of electronic resources, the process is referred to as "E-learning." Additionally, it is referred to as a means of teaching skills and knowledge to a large number of learners concurrently or sequentially via the utilisation of a network of equipped computers and devices. E-learning may be defined as the use of computers and internet access to give a variety of solutions to students in order to improve their learning and academic achievement [42]. Digital technology, as reported by [43] in their research, has become more important to students' learning experiences.

H3: The facilities have a positive and significant influence on the efficiency of online learning

2.6 Flexibility and Efficiency Online Learning

Students may decide their own learning route, speed, and instructional factors with online education. The more control learners have over their own learning environment, the more likely they are to take ownership of their education. Despite the fact that flexibility is only one of several factors that may be used to evaluate learning and teaching, [44] and [45] note that both students and lecturers have a limited amount of time to complete assignments. Time, place, content, learning styles, evaluation, interaction and collaboration, and learning tools are all flexible variables. While moving education online enables teaching and learning to take place everywhere, at any time, the velocity at which this shift is expected to occur is unprecedented and remarkable [46]. Flexible learning eliminates limits associated with time, place, and pace. While it has long been acknowledged that time management skills are necessary for learners to benefit from flexible learning, little is known about the temporal components of flexible learning [46]. Online education has been viewed as a viable option for satisfying the unique learning needs of adult learners in this regard. Self-management of learning time, sequence, and speed was identified as a critical learning preference that needed to be addressed in higher education, since there are several scenarios in which adult learners can govern their own learning or have flexibility [47].

The significance of learning styles has been recognised as a crucial area of research for enhancing learner satisfaction and academic results [44]. Students' learning was found to be impacted by their flexible study schedules [48]. Self-regulation of learning time, sequence, and speed was highlighted as a fundamental learning preference that required attention in higher education in order to enable adult learners to govern their own learning in a variety of circumstances [47]. Allowing students in online education to have a flexible study schedule has been shown to have a substantial impact on their learning [48]. H5: Flexibility has a positive and significant influence on the efficiency of online learning

3 Methodological Approach

The research design for this study was quantitative. According to [49] and [50], the quantitative technique is optimal for deductive research, objective, and outcome-oriented investigations. The nature of this study is a cross-sectional research whereby the data is collected, analyzed, and summarized statistically and conclusions are drawn at a single point in time. The revision from past studies also proved that cross-sectional study is chosen over a longitudinal study in most cases due to the resources and time limitations [51]. Hence, this study adopts a cross-sectional data approach in the data collection process.

3.1 Participants

The data was acquired from undergraduate students at UiTM Kelantan. The overall number of students at the UiTM Kelantan, Kota Bharu Campus is 1740, and [52] recommend a sample size of 315 for this study. To choose elements from the population, random sampling was used. Students from UiTM Kelantan were selected for this study as Kelantan is located in a rural area which faces huge barriers especially in dealing with online learning. Therefore, this population will give different perspectives in examining the determinants of efficiency online learning.

3.2 Data Collection and Analysis

The questionnaire was written in English and then translated into Malay to stimulate respondents' engagement and, ultimately, to achieve the desired conclusion. To confirm the translation's accuracy, a back-to-back translation was performed to eliminate any inconsistencies or potential translation faults. Data collecting will begin in early January 2022 and will take approximately two weeks to attain the needed sample size. SPSS version 22 was used to clean 315 records of missing instances and outliers. Meanwhile, Smart-PLS version 3.0 was used to analyse the measurements and structural model for this investigation.

4 Results and Analysis

4.1 Measurement Model of Efficiency Online Learning

As indicated in Table 1, the composite reliability of all constructs is more than 0.70 [50], showing that all measures are trustworthy. Because composite reliability is more suited for PLS-SEM value [53], the outcome of this investigation varies between 0.922 and 0.945, above the 0.70 cut-off [54]. All indicator loadings above the 0.60 suggested value.[53]. Three loadings, however (B1, D14, and G26), were omitted due to inadequate strength (refer Table 1). Each variable was assigned an AVE in order to establish its convergent validity, as described by [55]. Because the AVEs of all constructs are more than the 0.50 cut-off, the results suggest convergent validity.

Table 1. Descriptive Statistic and Reliability of Constructs (N=315)

Construct	Items	Loading	CR	AVE	Deleted Item
Online Learning Efficiency	B2	0.878	0.933	0.776	B1
	B3	0.892			
	B4	0.883			
	B5	0.871			
Internet Connection	C10	0.871	0.933	0.737	
	C6	0.836			
	C7	0.863			
	C8	0.888			
	C9	0.833			
Surrounding Environment	D11	0.858	0.922	0.747	D14
	D12	0.864			
	D13	0.901			
	D15	0.832			
Self-Discipline	E16	0.836	0.935	0.742	
	E17	0.887			
	E18	0.838			
	E19	0.859			
	E20	0.887			
Facilities	F21	0.871	0.927	0.718	
	F22	0.848			
	F23	0.8			
	F24	0.857			
	F25	0.859			
Flexibility	G27	0.907	0.945	0.81	G26
	G28	0.885			
	G29	0.893			
	G30	0.915			

Table 2 indicates that all indicators loaded on their own construct are higher than on any other, supporting the notion that the constructs are distinct.

Table 2. Discriminant validity of latent variables

	(1)	(2)	(3)	(4)	(5)	(6)
Facilities (1)	0.847					
Flexibility (2)	0.720	0.9				
Internet Connection (3)	0.738	0.657	0.859			
Online Learning Efficiency (4)	0.667	0.792	0.703	0.881		
Self- Discipline (5)	0.723	0.809	0.794	0.802	0.862	
Surrounding Environment (6)	0.722	0.783	0.785	0.703	0.801	0.864

*Notes: **Bold diagonal elements are the square root of AVE (Average Variance Extracted) which should exceed the off-*

diagonal inter-construct correlations for adequate discriminant validity.

4.2 Structural Model of Effectiveness of Online Learning

Next is the assessment of the structural model through bootstrapping analysis [56]. The 5000 subsamples through bootstrapping were done and the result of the structural model is as illustrated in Figure 2. The direct hypothesis for this investigation was illustrated in Table 3. From 5 hypotheses, only 2 hypotheses were accepted. Self-discipline was found positively significant with online learning efficiency at (ß= 0.355, t= 2.198, p < 0.01). Flexibility was found to be positively significant with online learning efficiency at (ß=0.428, t=2.936, p 0.01). Internet connection, surrounding environment, and facilities, on the other hand, are not significant predictors of online learning efficiency at (ß= 0.185, t=1.466, p > 0.01), (ß=-0.077, t=0.597, p > 0.01), and (ß=0.021, t=0.173, p > 0.01), respectively. The result of R^2 of the dependent paths in this study is 71.3 percent. The model, which consisted of self-discipline and flexibility, explained 71.3 percent of the online learning efficiency among students during pandemic COVID-19.

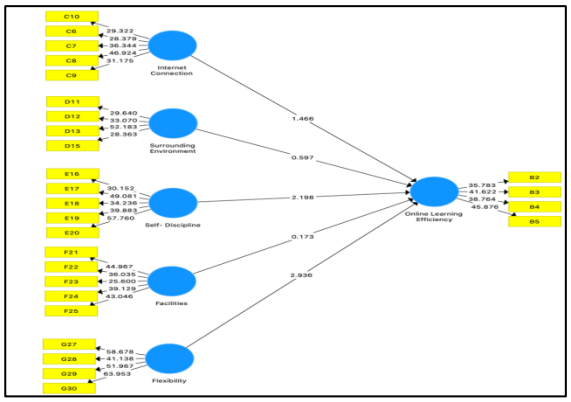


Fig. 2: Structural model for Effectiveness of Online Learning

Table 3: Direct hypotheses result of structural model

Direct hypothesis		Beta	T statistics	P values	Decision
H1	Internet connection -> online learning efficiency	0.185	1.466	0.071	Rejected
H2	Surrounding environment -> online learning efficiency	-0.077	0.597	0.275	Rejected
H3	Facilities -> online learning efficiency	0.021	0.173	0.431	Rejected
H4	Self- discipline -> online learning efficiency	0.355	2.198	0.014	Accepted
H5	Flexibility -> online learning efficiency	0.428	2.936	0.002	Accepted

5 Conclusion and Recommendations

Most universities have made major changes to their learning systems as a result of the pandemic COVID-19, moving away from face-to-face meetings and toward remote online education. Students who were unable to participate in traditional classroom settings were previously serviced by online distance education, which has grown in popularity over the years and is expected to continue to do so. Because of the implementation of COVID-19, online education has become extensively accessible all around the globe, even in developing countries. In order to complete their course work, students from all over the globe are increasingly turning to online learning to finish their tasks. Numerous factors have influenced this outcome. The effectiveness of online learning, on the other hand, is still debatable. Through this study, a significant pathway was found and identified, and it has a significant influence on the efficiency of online learning. Additionally, the researchers discovered that both the self-discipline of pupils as well as the flexibility of adult learners were key determinants in determining the success of online learning. This resulted in the conclusion that student performance at the course's completion was not contingent upon their initial proficiency levels. As a consequence, self-discipline is the most critical factor affecting learners and assisting them in achieving their goals. As a result, the rising range of learning and teaching opportunities is the most evident manifestation of online learning's efficiency. Like most studies, this study has limitations. The study sample was based on UiTM Kelantan, Kota Bharu Campus only which did not represent the whole population of students from other Malaysian universities, thus limiting the generalizability of the findings. To improve the accuracy, clarity, and precision of future studies, the sample size of respondents should be increased. Future studies are suggested to obtain more samples that are representative.

References:

[1] Rahman, Zainatul Shuhaida Abdull, Nurul Labanihuda Abdull Rahman, Siti Nur Zahirah Omar, and Sardar Md Humayun Kabir. "The Impacts of COVID-19 pandemic on marginalized youth communities in Malaysia: Key issues." *Journal of Entrepreneurship and Business* 9, no. 1 (2021): 100-117. DOI: https://doi.org/10.17687/jeb.v9i1.420

[2] Ando, S. (2021). University teaching and learning in a time of social distancing: A sociocultural perspective. *Journal of Human Behaviour in the Social Environment*, 31(1-4), 435-448. https://doi.org/10.1080/10911359.2020.1814928

[3] Laing, C. L., & Laing, G. K. (2015). A conceptual framework for evaluating attrition in online courses. *E-Journal of Business Education and Scholarship of Teaching*, 9(2), 39-55.

[4] Tsang, J. T., So, M. K., Chong, A. C., Lam, B. S., & Chu, A. M. (2021). Higher Education during the Pandemic: The Predictive Factors of Learning Effectiveness in COVID-19 Online Learning. Education Sciences, 11(8), 446.

[5] Yu, Z., Gao, M., & Wang, L. (2021). The effect of educational games on learning outcomes, student motivation, engagement and satisfaction. Journal of Educational Computing Research, 59(3), 522-546.

[6] Werner, K., & Woessmann, L. (2021). The legacy of covid-19 in education. Retrieved 23 September 2021 from https://ssrn.com/abstract=3945280 or http://dx.doi.org/10.2139/ssrn.3945280

[7] Persky, A. M., Lee, E., & Schlesselman, L. S. (2020). Perception of learning versus performance as outcome measures of educational research. American journal of pharmaceutical education, 84(7).

[8] Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). e-Learning, online learning, and distance learning environments: Are they the same? *The Internet and higher education*, *14*(2), 129-135. https://doi.org/10.1016/j.iheduc.2010.10.001

[9] Ithriah, S. A., Ridwandono, D., & Suryanto, T. L. M. (2020, July). Online Learning Self-Efficacy: The Role in E-Learning Success. In *Journal of Physics: Conference Series* (Vol. 1569, No. 2, p. 022053). IOP Publishing.

[10] Dhull & Sakshi. (2017). Online Learning. *International Education & Research Journal [IERJ*], 3 (8), 32-34.

[11] Omar, S. N. Z., Bakar, A. A., Wae-esor, E., & Othman, M. F. (2021). Student's Mental Health in Pandemic Covid-19: An Empirical Evidence. *Academy of Strategic Management Journal*, 20, 1-7.

[12] Siemens, G., Gasevic, D., & Dawson, S. (2015). Preparing for the digital university: A review of the history and current state of distance, blended, and online learning. Retrieved 23 September 2021 from https://ictlogy.net/bibliography/reports/projects.php?idp=3138&lang=ca

[13] Swan, K. (2003). Learning effectiveness online: What the research tells us. *Elements of quality online education, practice and direction*, 4(1), 13-47.

[14] Choy, S. O., & Ng, K. C. (2007). Implementing wiki software for supplementing online learning. Australasian Journal of Educational Technology, 23(2).

[15] Leiner, B. M., Cerf, V. G., Clark, D. D., Kahn, R. E., Kleinrock, L., Lynch, D. C., ... & Wolff, S. (2009). A brief history of the Internet. ACM SIGCOMM Computer Communication Review, 39(5), 22-31.

[16] Bahriyeva, N. (2021). Long Distance Teaching "Elearning" Versus In-Classroom Teaching. Annals of the Romanian Society for Cell Biology, 3028-3032.

[17] Ismail, N., Mazlina, N., Wafa, S. W. W. S. S., Syed, W., Wafa, S., & Thompson, J. (2020). Online learning challenges during pandemic COVID-19 in Malaysian higher learning institution. *Universal Journal of Educational Research*, 8(12), 7151-7159.

[18] Laurillard, D. (2007). Technology, pedagogy and education: concluding comments. *Technology, Pedagogy and Education*, 16, 357-360. https://doi.org/10.1080/14759390701614496

[19] Barber, W., King, S., & Buchanan, S. (2015). Problem based learning and authentic assessment in digital pedagogy: Embracing the role of collaborative communities. Electronic Journal of E-Learning, 13(2), 59-67.

[20] Anshari, M., Alas, Y., & Guan, L. S. (2016). Developing online learning resources: Big data, social networks, and cloud computing to support pervasive knowledge. *Education and Information Technologies*, *21*(6), 1663-1677.

[21] Jalli, N. (2020, March 17). Lack of internet access in Southeast Asia poses challenges for students to study online amid COVID-19 pandemic. The Conversation. https://theconversation.com/lack-of-internet-access-in-southeast-asiaposes-challenges-for-students-to-study-online-amid-covid-19-pandemic133787.

[22] Flynn, G., & Himel, J. (2020, March 23). School closures highlight inequality in education as classes move online. Cambodianess.

https://cambodianess.com/article/school-closures-highlight-inequality-ineducation-as-classes-move-online

[23] Pereira, H., Fernandes, M., Costa, V., Amorim, L., La-Rizza, F., & Hermenegildo, R. (2014). Burnout in Portuguese Medical Students: Coping Strategies as a Mediating Variable. J Community Med Health Educ, 4(306), 2161-0711.

[24] Cochran Hameen, E., Ken-Opurum, B., & Son, Y. J. (2020). Protocol for post occupancy evaluation in schools to improve indoor environmental quality and energy efficiency. *Sustainability*, *12*(9), 3712. https://doi.org/10.3390/su12093712

[25] Zhong, L., Yuan, J., & Fleck, B. (2019). Indoor environmental quality evaluation of lecture classrooms in an institutional building in a cold climate. *Sustainability*, *11*(23), 6591. https://doi.org/10.3390/su11236591

[26] Marcial, D. E., Caballero, R. D. B., Rendal, J. B., & Patrimonio, G. A. (2015). I am offline": measuring barriers to open online learning in the Philippines. Інформаційні технології і засоби навчання, (45, вип. 1), 28-41.

[27] Sammons, P., Toth, K., Sylva, K., Melhuish, E., Siraj, I., & Taggart, B. (2015). The long-term role of the home learning environment in shaping students' academic attainment in secondary school. Journal of children's services.

[28] Erum Shahzadi and Zahoor Ahmad (2014, 11 October). A Study on Academic Performance of University Students. *International Conference on Recent Advances in Statistics*. 8(9), 3.

[29] Gorbunovs, A., Kapenieks, A., & Cakula, S. (2016). Self-discipline as a key indicator to improve learning outcomes in e-learning environment. *Procedia-Social and Behavioral Sciences*, 231, 256-262. https://doi.org/10.1016/j.sbspro.2016.09.100

[30] Huang, C. S., Yang, S. J., Chiang, T. H., & Su, A. Y. (2016). Effects of situated mobile learning approach on learning motivation and performance of EFL students. Journal of Educational Technology & Society, 19(1), 263-276.

[31] Zhang, Y., & Lin, C. H. (2020). Student interaction and the role of the teacher in a state virtual high school: what predicts online learning satisfaction? Technology, Pedagogy and Education, 29(1), 57-71. https://doi.org/10.1080/1475939X.2019.1694061

[32] Baxter, J. A., & Haycock, J. (2014). Roles and student identities in online large course forums: Implications for practice. *The International Review of Research in Open and Distributed Learning*, *15*(1).https://doi.org/10.19173/irrodl.v15i1.1593

[33] Baxter, J. (2012). Who am I and what keeps me going? Profiling the distance student. *International Review of Research in Open and Distance Learning*, *13*(4). https://doi.org/10.19173/irrodl.v13i4.1283

[34] Anila, M. M. (2016). Mindfulness based stress reduction for reducing anxiety, enhancing self- control and improving academic performance among adolescent students. *Indian Journal of Positive Psychology*, 7(4), 390-397. www.iahrw.com/index.php/home/journal_detail/19#list

[35] Duckworth, A. L., & Seligman, M. E. P. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science*, 16(12), 939-944. https://doi.org/10.1111/j.1467-9280.2005.01641.x

[36] Duckworth, A. L., & Seligman, M. E. P. (2006). Self-discipline gives girls the edge: Gender in self-discipline, grades, and achievement test scores. *Journal of Educational Psychology*, 98(1), 198-208. https://doi.org/10.1037/0022-0663.98.1.198

[37] Mulyani, E. A., Alpusari, M., & Putra, E. D. (2021). The Effect of Learning Facilities and Family Environment on Motivation to Learn of Prospective Elementary Teacher Education on Online Learning. Journal of Teaching and Learning In Elementary Education (JTLEE), 4(1), 86-94.

[38] Dalyono. (2001). Psikologi Pendidikan. Jakarta: Rineka Cipta.

[39] Culp, B., Oberlton, M., & Porter, K. (2020). Developing kinesthetic classrooms to promote active learning. Journal of Physical Education, Recreation & Dance, 91(6), 10-15.

[40] Segbenya, M., Bervell, B., Minadzi, V. M., & Somuah, B. A. (2022). Modelling the perspectives of distance education students towards online learning during COVID-19 pandemic. Smart Learning Environments, 9(1), 1-18.

[41] Eom, S. B., Wen, H. J., & Ashill, N. (2006). The determinants of students' perceived learning outcomes and satisfaction in university online education: An empirical

investigation. Decision Sciences Journal of Innovative Education, 4(2), 215-235.

[42] Abulibdeh, E. S., & Hassan, S. S. S. (2011). E-learning interactions, information technology self-efficacy and student achievement at the University of Sharjah, UAE. Australasian Journal of Educational Technology, 27(6).

[43] Henderson, M., Selwyn, N., & Aston, R. (2017). What works and why? Student perceptions of 'useful'digital technology in university teaching and learning. Studies in higher education, 42(8), 1567-1579.

[44] Mohamad, M., Basarud-din, S. K., & Omar, S. N. Z. (2021). Virtual Teaching and Learning Implementation During Covid19 Rmo: In Perspectives of Business School. *International Journal of Education and Pedagogy*, 3(1), 203-210. https://myjms.mohe.gov.my/index.php/ijeap/article/view/13000

[45] Vannest, K. J., Temple-Harvey, K. K., & Mason, B. A. (2009). Adequate yearly progress for students with emotional and behavioral disorders through research-based practices. Preventing School Failure: Alternative Education for Children and Youth, 53(2), 73-84.

[46] Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online university teaching during and after the Covid-19 crisis: Refocusing teacher presence and learning activity. Postdigital science and education, 2(3), 923-945.

[47] Lin, B., & Hsieh, C. T. (2001). Web-based teaching and learner control: A research review. *Computers & Education*, 37(3-4), 377-386. https://doi.org/10.1016/S0360-1315(01)00060-4

[48] Lim, D. H. (2004). The Effect of Flexible Learning Schedule on Online Learners' Learning, Application, and Instructional Perception. *Proceeding of the Academy of Human Resource Development International Conference (AHRD)* (Austin, TX, March 3-7, 2004) p1060-1066 (Symp. 49-1). https://eric.ed.gov/?id=ED492499

[49] Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches (3rd edn*). California: SAGE Publications Ltd.

[50]Hair, J. F., Black, W. C., Babin, B. J. & Anderson, R. E. (2010). *Multivariate data analysis (7th edn*). Pearson Prentice Hall (Uppersaddle River, NJ: Pearson Prentice Hall).

[51] Cavana, R., Delahaye, B., & Sekaran, U. (2001). Applied business research: Qualitative and quantitative methods. new york: John willey & sons.

[52] Krejcie, R. V. & Morgan, D. W. (1970). Determining sample size for research activities. *Educational Psychology Measurement*, (3), 607-610. https://doi.org/10.1177/001316447003000308

[53] Reinartz, W., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. International Journal of research in Marketing, 26(4), 332-344.

[54] Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. Journal of the academy of marketing science, 16(1), 74-94.

[55] Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics.

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