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## Students' Virtual Learning Challenges and Learning Satisfaction during COVID-19 Pandemic: A Conceptual Framework

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### ABSTRACT

Virtual learning is an excellent way for students and teachers to interact and share information. Many educational institutions utilise virtual classrooms as their primary platform for interactive knowledge sharing. However, some students lack computer and technological abilities, lack self-motivation, or have trouble adapting to these virtual classrooms. All these factors reduce their learning satisfaction. The goal of this paper is to provide a conceptual framework to research the relationship between virtual learning challenges and students' learning satisfaction. The Shannon-Weaver Data Transmission Model and Learning Satisfaction Theory are the overarching theories underlying this investigation. The Shannon-Weaver model's technological layers are critical for integration into today's digital communication technologies, allowing the continuation of critical educational activities. "Noise" as understood in the Shannon-Weaver Data Transmission Model is used to examine students' learning satisfaction. In brief, by forming the conceptual framework, it may provide a second step for further investigation on the correlation between virtual learning challenges and students' learning satisfaction during the COVID-19 pandemic.

**Keywords:** virtual learning challenges, student learning satisfaction, Shannon-weaver data transmission model, relationship

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### Introduction

The outbreak of COVID-19 has driven every educational institution into virtual learning (Baber, 2020). Because of its ability to transcend the limits of time, place, medium, and location, virtual learning has risen to popularity as the preferred method of teaching and learning. According to Dhull and Arora (2019), virtual learning is a better substitute for classroom education, especially when traditional learning environments are not viable. While some people find virtual classrooms challenging, others find them more convenient and pleasurable than being in a traditional classroom where they find themselves exerting more effort to communicate and mingle (Lemay et al., 2021). However, virtual learning might pose some difficulty for some students due to their home setting, as well as their unfamiliarity with virtual learning platforms. As a result, these students' learning satisfaction might be affected as they face the challenges of virtual learning during the COVID-19 period.

Virtual learning (classroom) is a computer-based learning environment that allows real-time communication between teachers and students, enabling instructors to conduct live lectures, virtual office hours, and conversations with students in an interactive setting through the use of video conferencing, online whiteboards, and screen sharing. They are designed to imitate the experience of traditional classes, but with the extra benefits of document sharing, rapid feedback and interaction, which make them suitable for distance learning (Khan et al., 2021).

Students use virtual classrooms for various learning activities, such as to ensure that all their work reaches their teachers. Maximum usage of these virtual classroom features will increase knowledge productivity for all participants or students, while narrowing the gap between top performers and lower performing students. However, to what degree students agree with the condition of virtual learning experiences (Green et al., 2015) still needs more investigation. During the COVID-19 pandemic, the same issue remains (Adnan & Anwar, 2020); the students with adequate computer abilities were a lot more competent in online classroom. Even though COVID-19 outbreaks make students more skilled at using their abilities to reach each objective and aim, it cut off any face-to-face skills or activities and left us performing everything online, which inhibits productivity. On the other hand, some students may have a lack of computer and technical skills (Surkhali & Garbuja, 2020), lack of self-motivation (Usher et al., 2024), or may find difficulty in adapting (Besser et al., 2020) to the new environment of teaching and learning activities (virtual classroom), and all these factors can hinder the students' learning satisfaction.

### ***Research Statement***

To cope and live with the pandemic, many novel ideas, enhancements, and new technological implementations, such as software and programmes have been proposed to support online learning. Virtual classrooms are a fantastic opportunity for students and teachers to engage and exchange information. Many educational institutions use virtual classrooms as their major platform for interactive knowledge sharing. In addition, students in virtual classrooms may access coursework, assignments, and activities offered by their lecturers at any time and from any location. According to Gaikwad and Randhir (2016), if virtual classrooms are done properly, the outcomes will be beneficial to both the students' advancement and the educational institutions.

However, the issue is how these virtual classroom challenges relate to students' learning satisfaction among Malaysian university students. This issue arose because several studies have shown that students reject and abandon online classes due to a lack of computer literacy (knowledge) (Surkhali & Garbuja, 2020) and a lack of motivation due to social isolation, non-face-to-face interaction, connectivity challenges (Khan et al., 2021), and a low mood caused by adaptation challenges (Basar et al., 2021). As a result, the objective of this article is to provide a conceptual framework to research the relationship between virtual learning challenges and students' learning satisfaction.

### **Literature Review**

#### ***Virtual Classroom Challenges***

According to Nordin and Nordin (2020), online learning during the Malaysia Movement Control Order (MCO) is effective in increasing higher school enrollment. Regardless of prior experience with e-learning platforms or the ability to incorporate these emerging information technologies into one's educational journeys, the COVID-19 pandemic has tested academics' and students' readiness to adopt and use these emerging information technologies in their online learning activities (Allam et al., 2020). According to Alawamleh et al., (2020), because educational facilities were shuttered during the pandemic, universities resorted to continuing lectures online for their students by utilising services such as Google Meet.

While virtual classrooms can help students and lecturers gain and maintain interactive knowledge exchange, they can also disrupt and destroy interactive information interchange. Virtual classrooms provide educators with a wide range of tools to replace traditional in-person teaching methods and to help students complete tasks (Khan et al., 2021). However, students may face challenges in using virtual

classrooms due to a lack of computer knowledge and some technical issues, as well as a lack of self-motivation and adaptability.

One of the limitations of virtual classrooms is the lack of computer skills and technical challenges met by students who do not have the requisite resources to finish the job assigned by instructors. Students who lack computer skills are likely to miss more courses and be less successful at obtaining information than students who have a strong understanding of how to use computers. Educators are experimenting with various forms of e-learning tools to put pupils at ease and get the most out of these tools (Nassoura, 2020). However, despite the educators' best efforts, some students may continue to experience technological challenges as some struggle to get a stable internet connection and gadgets that support the programmes needed to complete and submit course assignments without any issues. The most common difficulty that cannot be avoided is connectivity issues, and some students have to continue finding a location with a better internet coverage or upgrade their present internet connection to avoid upsetting classmates or instructors during or after courses.

### ***Computer Knowledge***

According to Lumauag (2017), the students' extensive use of the internet, social media, and mobile devices seemed to point to the fact that incorporating new technologies into education would have been straightforward, and they could easily transition to a new learning environment since they have been acclimated to technology. However, students' lack of computer literacy, has been a factor in their rejection or abandoning of online courses (Li & Lee, 2016). Moreover, rejection also occurs when the technological ability of teachers and students to use virtual classrooms is insufficient (Surkhali & Garbuja, 2020).

Wei and Chou (2020) observed that students' computer/internet self-efficacy and excitement for learning influenced their online discussions/conversation scores and course satisfaction in a direct, positive way. According to Hamid et al. (2020), the success of online learning cannot be separated from the availability of supporting learning infrastructures such as stable internet access, access devices with the latest technology, and internet access devices. Nevertheless, there are students who live in areas where there is no electricity or network, making online learning difficult to implement. While students with appropriate internet access and applicable technology continue their studies without any issues, pupils without adequate internet access and technological devices are faced with many issues (Surkhali & Garbuja, 2020).

Nambiar (2020) discovered that the level of computer skill was more relevant than the number of years of technical expertise. According to this study, students with good technical training and abilities are more driven to complete online courses since technical concerns do not impede their learning experience. Furthermore, the data demonstrated that new technology orientation training, such as web-based application training, can assist students in succeeding in virtual classes (Nambiar, 2020). Adnan and Anwar (2020) found that students with prior experience in online learning as well as adequate computer ability had a lot more favourable attitude toward the online classroom.

Furthermore, research indicates that some students may not have the needed equipment to engage in online classes. They do not have access to technological gadgets such as phones, laptops, and cameras, nor do they know how to use them (Ghazali et al., 2020). The number of these devices in families is sometimes limited, making it difficult to schedule online consultations, classes, and meetings for students. Furthermore, some educators fail to recognise that a student's internet connection may be lost during an online test, while others may be inexperienced with the platform (Al-Kumaim et al., 2021). This is, therefore, a very crucial element to be investigated as many Malaysian students fall into this category.

### ***Self-Motivation***

Self-motivation is a critical factor in the acceptance of virtual classes. Self-motivation is important for a student's performance, according to Schunk et al. (2014). According to research, students are more impacted by their intrinsic motivation than external incentives (Gustiani, 2020). Although online learning has numerous advantages, it also has disadvantages such as social isolation, lack of face-to-

face interaction, connectivity issues, and so on (Khan et al., 2021). As a result, students communicate with their classmates less physically and are unable to communicate effectively in person with their classmates and lecturers, resulting in low self-motivation.

According to Cook and Artino (2016), the process of beginning and maintaining goal-directed learning activities is referred to as learning motivation. Intrinsic motivation is a factor that influences academic performance (Pelikan et al., 2021). According to a study, more than three-quarters of 268 students reported a loss in their passion for school and ability to focus, and more than half reported a decline in their sense of academic confidence (Usher et al., 2024).

Students with strong self-motivation have goals to attain, so their self-efficacy or confidence is high, and they will endeavour to achieve their objectives. Students with poor self-motivation and self-efficacy, on the other hand, lack confidence in their ability to set and achieve goals (Nurwendah & Suyanto, 2019). This shows that motivation is essential for learning, and more driven students will engage in more metacognitive activities and use more effective learning approaches (Tseng et al., 2019).

According to another study, motivated learners are more inclined to engage in complicated tasks, participate actively, celebrate learning, and adopt a deep learning strategy, resulting in enhanced performance, perseverance, and creativity (Esra & Sevilen, 2021). Contemporary viewpoints relate motivation to cognitive and emotional processes in individuals, such as ideas, beliefs, and goals, and emphasise learner-learning environment interaction (Yu & Jee, 2021). Motivation is seen as a personality trait that remains consistent throughout events and contexts. Many studies have focused on identifying lists of qualities of successful online students, and it appears that intrinsic drive is one of them (Rahman et al., 2021). Interestingly, similar studies of both online and on-campus students have discovered that online students are more intrinsically driven than their on-campus counterparts, at both the postgraduate and undergraduate levels (Fang, 2020). Thus, this study's scope includes ascertaining whether self-motivation is significantly correlated with students' learning satisfaction.

### ***Adaptability***

Besser et al., (2020) discovered that there are considerable individual differences in adaptability, and students with higher levels of this aptitude may be better positioned to thrive in unexpected and uncertain times. Adaptability predicts student participation not just directly, but also indirectly via the chain mediation of good and bad academic accomplishment (Zhang et al., 2020). According to Novikov (2020), the immediate effects of an emergency transition to online learning include lower student retention as some students fail to adjust to the new learning mode and have lower attendance, which can also be linked to unquantifiable technical issues.

Lecturers and students alike were challenged to adjust to this changing environment as conventional in-person college programmes transitioned to online and remote modes of education. Because the transition to online and remote learning was pushed by necessity, lecturers and students had little time to study, familiarise themselves, and, in some circumstances, acquire the technology required for remote instruction. This was not a planned move to online education, but rather a last-minute change that took place while a semester was in progress. As a result, many students were simply unprepared for distant teaching and learning (Copeland & Wightman, 2021).

Furthermore, Basar et al., (2021) researched the impact of the pandemic on adaptation as a challenge and the efficiency of online learning for secondary school students. They noticed that certain students are more adaptable and capable of coping than others. Finally, when compared to their previous traditional face-to-face learning experiences, participants in the study rated web-based learning as significantly less favourable in all aspects of the two educational opportunities, with significantly higher stress levels and exclusion, as well as a low mood caused by adaptation challenges (Basar et al., 2021). However, school students and university students are different in many ways, especially in the courses enrolled. Some technical courses such as engineering require traditional face-to-face classes due to technical aspects of the course. Therefore, the study may have a variety of outcomes to be further discussed.

### ***Students' Learning Satisfaction***

According to Weerasinghe and Fernando (2017), the definition of student satisfaction is a short-term attitude arising from an appraisal of students' educational experience, services, and facilities. Online learning is now more widely accepted by students than it was in earlier years (Alahmari, 2017). The impact of the processes that occur during the teaching and learning sessions in which the students participated is referred to as learning satisfaction. The amount or level of excitement students have after completing learning activities can also be referred to as learning satisfaction (Chang & Chang, 2012). Furthermore, according to learning satisfaction theory, students are the consumers of educational products and have the right to invest in any educational institution they desire (Wu et al., 2015).

Satisfaction with learning is an attitudinal term that assesses the affective dimension, and a satisfied student often has pleasant e-learning experiences (Goh et al., 2017). According to Chang and Chang (2012), individuals are content when their real experience matches or exceeds their expectations, and they are unhappy when their experience falls short of their expectations. Students also expect a variety of learning activities that are designed and implemented to serve their learning needs, and these activities result in their fullest learning satisfaction towards the subject (Topalã, 2014). Learning satisfaction is important for students to gain their attention and boost their morale despite the setbacks of virtual class.

According to Chuang et al., (2020), students' cognitive and behavioural attitudes toward computer-related subjects had an effect on their satisfaction and degree of self-efficacy. Learning satisfaction is critical to motivate students to improve their academic performance. Other than that, based on a study by Ke and Kwak (2013), individual online course satisfaction and total satisfaction with web-based distance education are two characteristics of online learning satisfaction. Aside from students' variables, teachers, courses, the learning environment, some other factors can also have an impact on students' learning satisfaction (Weerasinghe & Fernando, 2017). When addressing the efficiency of the educational process, one common result of the research discussed is that students' happiness with various components of the instructional design is fundamental (Topalã, 2014).

According to Besser et al., (2020), adaptability has several benefits, including increased levels of attention and focus, increased depth of learning, and increased drive to study. Attending classes from home, during the pandemic, is undoubtedly exhausting for some students who are finding it hard to adapt, considering their environment which includes home situation, family adjustment, and coverage status. Students may be easily distracted, may not be able to give full attention, or worse, may start missing their deadlines (Coman et al., 2020). These are barriers for the students to gain knowledge and achieve their true potential and capabilities in their studies. In the study, it is also stated that online classes rely on technology, and students may have some issues, interruptions, and system errors on their computers and the internet during their classes. Adaptability is one of the crucial elements to be studied to see its relationship with students' learning satisfaction during the COVID-19 pandemic.

### **Methods**

The study was initially a capstone project in year 2021. Google scholar was used as the search engine to search for the keywords; "online learning", "online learning challenges", "virtual learning", "virtual learning challenges", "online classes", classes during COVID-19", "student learning satisfaction", "communication theory", "Shannon-weaver data transmission model", and "relationship between virtual learning and student learning satisfaction". The articles searched were restricted from year 2021 to 2016. However, some relevant articles between 2015 – 2012 were also referred to.

### ***Conceptual Framework***

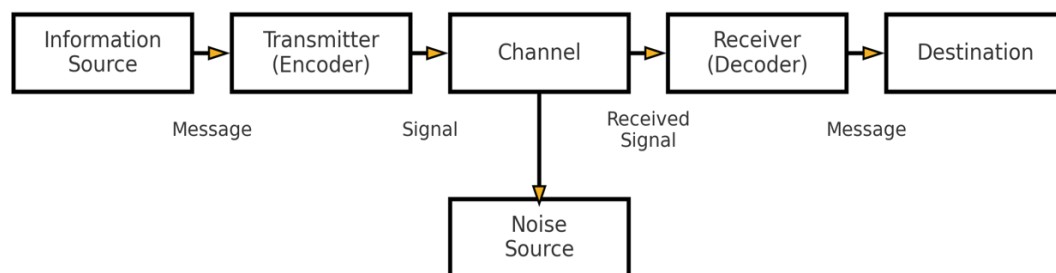
Shannon-Weaver data transmission model and learning satisfaction theories were identified as the overarching theories for this study.

### ***Shannon-Weaver Data Transmission Model***

We are currently living in the information era, in which computers and network technologies have enabled communications to transcend the constraints of time and location. This pandemic situation is the most ideal way to find out whether the perceived statements are relevant during this difficult time. The most widely used communication models at the technical level are those based on the Shannon-Weaver data transmission model (Mereu, 2016) as shown in Figure 1.

**Figure 1**

*Shannon-Weaver Data Transmission Mode*



The technical layers of the Shannon-Weaver model are critical for integration into today's digital communication technologies, allowing the continuation of critical educational activities. Online communication technology may function as either a bridge or a barrier. Noise disrupts communication as it travels from the transmitter to the receiver. It gets its name from the thought that “noise” might interfere with our perception of a message.

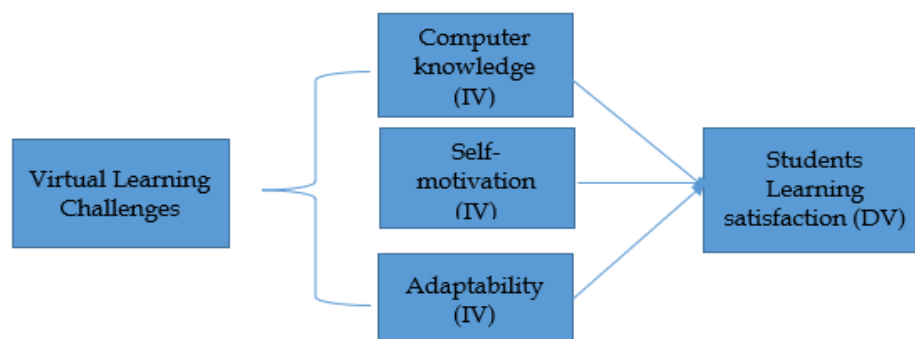
### ***Learning Satisfaction Theory***

The learning satisfaction theory originated from customer satisfaction theory, which posits that customers make purchases based on their expectations, attitudes, and intentions (Oliver, 1980). Later, during or after consumption, clients assess their experience, resulting in an impression of performance. Accordingly, in learning satisfaction theory, students are the consumers of educational products and have the right to invest in any educational institution they want (Wu et al., 2015).

Based on the integrated theories discussed, the conceptual framework constructed by the researchers is illustrated in Figure 2 below. In the virtual classroom, a lack of computer knowledge and technical issues, lack of self-motivation, and adaptability are considered as the “noise” in this model. The challenges in communication are the real challenges in virtual classrooms’ lecturers and students’ interactions that demand further investigation for students’ learning satisfaction. This conceptual framework below describes the relationship between the virtual learning challenges [the noise in Shannon-Weaver data transmission model] (Computer knowledge, self-motivation, and adaptability) and the students’ learning satisfaction. In short, students’ learning satisfaction will be investigated based on the “noise” as interpreted in Shannon-Weaver data transmission model. The connection between the two variables is represented by the line connecting the independent and dependent variables.

**Figure 2**

*Conceptual Framework*



## **Conclusion**

Virtual learning is pivotal in today's environment, especially with the COVID-19 pandemic. According to the World Wide Web Foundation (n.d.), the World Wide Web was created by Sir Tim Berners-Lee in 1989, (n.d.). For the past 3 decades, there have been substantial improvements in virtual learning opportunities, which have been further increased with the advent of high-speed internet technology. Virtual learning has evolved to become a common method of instruction (Coates et al., 2020). Several studies have also indicated that students benefit greatly from the use of virtual classrooms in Malaysia. Enhanced learning, class interaction with course content, improved attitude to learning and the online platform, a higher sense of unity among students, and less withdrawal and failure are just a few of the positive learning outcomes in online environments (Al-Sharhan et al., 2020). Even though many students favour online learning because it gives flexibility in participation, connection, and convenience, some of them do not feel at ease in a virtual classroom owing to a variety of circumstances (Chan et al., 2021). However, it is possible to conclude that virtual learning will continue to play a significant role in higher education, even after the pandemic ends.

The purpose of this study is to form a conceptual framework for the relationship between virtual learning challenges and students' learning satisfaction. If a connection can be proven to be present between the two variables, the virtual classroom experience needs to be taken seriously as education is fundamental to the development and growth of our students. If the responsible party does not take any actions in managing the virtual classroom challenges faced by the students, the future of Malaysian youths and country may be adversely affected.

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## **Conflict of Interest**

The authors have declared that no competing interests exist.

### Author Contribution Statement

All authors contributed to the conception, design, writing, and revision of the manuscript.

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### Ethics Statements

This article adheres to the ethical standards set by the Committee on Publication Ethics (COPE).

### References

- Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. *E-Learning & Educational Technology Journal*, 2(1), 45–51. <https://doi.org/10.33250/eetj.v2i1.45>
- Alahmari, A. (2017). The state of distance education in Saudi Arabia. *Quarterly Review of Distance Education*, 18(2), 91–98.
- Alawamleh, M., Al-Twait, L., & Al-Saht, G. (2020). The effect of online learning on communication between instructors and students during the COVID-19 pandemic. *Asian Education and Development Studies*. Advance online publication. <https://doi.org/10.1108/AEDS-06-2020-0131>
- Al-Kumaim, N. H., Mohammed, F., Gazem, N. A., Fazea, Y., Alhazmi, A. K., & Dakkak, O. (2021). Exploring the impact of transformation to fully online learning during COVID-19 on Malaysian university students' academic life and performance. *International Journal of Interactive Mobile Technologies*, 15(5), 4–20. <https://doi.org/10.3991/ijim.v15i05.20203>
- Allam, S. N. S., Hassan, M. S., Mohideen, R. S., Ramlan, A. F., & Kamal, R. M. (2020). Online-distance-learning readiness during the COVID-19 outbreak among undergraduate students. *International Journal of Academic Research in Business and Social Sciences*, 10(5), 642–657. <https://doi.org/10.6007/IJARBS/v10-i5/7233>
- Al-Sharhan, S., Al-Hunaiyyan, A., Alhajri, R., & Al-Huwail, N. (2020). Utilisation of learning-management systems among instructors and students. In N. R. Aljohani (Ed.), *Advances in electronics engineering* (pp. 15–23). Springer. [https://doi.org/10.1007/978-981-15-2696-3\\_3](https://doi.org/10.1007/978-981-15-2696-3_3)
- Baber, H. (2020). Determinants of students' perceived learning outcome and satisfaction in online learning during COVID-19. *Journal of Education and e-Learning Research*, 7(3), 285–292. <https://doi.org/10.20448/journal.509.2020.73.285.292>
- Basar, Z. M., Mansor, A. N., Jamaludin, K. A., & Alias, B. S. (2021). Effectiveness and challenges of online learning for secondary-school students: A case study. *Asian Journal of University Education*, 17(3), 119–129. <https://doi.org/10.24191/ajue.v17i3.14514>
- Besser, A., Flett, G. L., & Zeigler-Hill, V. (2020). Adaptability to a sudden transition to online learning during the COVID-19 pandemic: Understanding the challenges for students. *Scholarship of Teaching and Learning in Psychology*. Advance online publication. <https://doi.org/10.1037/stl0000198>



- Chan, C. M. H., Ng, S. L., In, S., Wee, L. H., & Siau, C. S. (2021). Predictors of psychological distress and mental-health resource utilisation among employees in Malaysia. *International Journal of Environmental Research and Public Health*, 18(1), 314. <https://doi.org/10.3390/ijerph18010314>
- Chang, Y., & Chang, W. Y. (Eds.). (2012). *The international journal of organizational innovation* (3rd ed., Vol. 4). IAOI.
- Chuang, N. K., Lee, P. C., & Kwok, L. (2020). Assisting students with career decision-making difficulties: Can career decision-making self-efficacy and profile help? *Journal of Hospitality, Leisure, Sport & Tourism Education*, 26, 100235. <https://doi.org/10.1016/j.jhlste.2019.100235>
- Coates, H., Shi, W., & We, J. H. (2020, March 3). Crisis is making the online-education economy go mainstream. *University World News*. <https://www.universityworldnews.com/post.php?story=20200302091409436>
- Coman, C., Țiru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective. *Sustainability*, 12(24), 10367. <https://doi.org/10.3390/su122410367>
- Cook, D. A., & Artino, A. R. (2016). Motivation to learn: An overview of contemporary theories. *Medical Education*, 50(10), 997–1014. <https://doi.org/10.1111/medu.13074>
- Copeland, T., & Wightman, A. (2021). The pandemic pivot: Change and adaptability in the virtual classroom. *Teaching and Learning Anthropology*, 4(1), 78–90. <https://doi.org/10.5070/T34151135>
- Dhull, I., & Arora, S. (2019). Online learning: A panacea in the time of COVID-19 crisis. *International Journal of Research in Engineering, IT & Social Sciences*, 9(3), 32–34.
- Esra, M. E. Ş., & Sevilen, Ç. (2021). Factors influencing EFL students' motivation in online learning: A qualitative case study. *Journal of Educational Technology and Online Learning*, 4(1), 11–22. <https://doi.org/10.31681/jetol.817655>
- Fang, X. (2020, August). The impact of online teaching on the English-learning motivation of Chinese students during COVID-19 [Conference paper]. *Proceedings of the International Symposium on Education, Culture and Social Sciences* (pp. 15–16).
- Gaikwad, A., & Randhir, V. S. (2016). E-learning in India: Wheel of change. *International Journal of E-Education, E-Business, E-Management and E-Learning*, 6(1), 40–45. <https://doi.org/10.17706/ijeeee.2016.6.1.40-45>
- Ghazali, N., Nordin, M. S., Abdullah, A., & Ayub, A. F. M. (2020). The relationship between students' MOOC-efficacy and meaningful learning. *Asian Journal of University Education*, 16(3), 89–101. <https://doi.org/10.24191/ajue.v16i3.11558>
- Goh, C., Leong, C., Kasmin, K., Hii, P., & Tan, O. (2017). Students' experiences, learning outcomes, and satisfaction in e-learning. *Journal of e-Learning and Knowledge Society*, 13(2), 117–128. <https://doi.org/10.20368/1971-8829/129>
- Green, A. J., Chang, W., Tanford, S., & Moll, L. (2015). Student perceptions of clickers and lecture-software applications in hospitality courses. *Journal of Teaching in Travel & Tourism*, 15(1), 29–47. <https://doi.org/10.1080/15313220.2014.999738>
- Gustiani, S. (2020). Students' motivation in online learning during the COVID-19 pandemic: A case study. *Holistic Journal*, 12(2), 53–60.
- Hamid, R., Sentryo, I., & Hasan, S. (2020). Online learning and its problems during the COVID-19 emergency period. *Jurnal Prima Edukasia*, 8(1), 86–95. <https://doi.org/10.21831/jpe.v8i1.32165>

- Ke, F., & Kwak, D. (2013). Online learning across ethnicity and age: Participation, perception, and satisfaction. *Computers & Education*, 61, 43–51. <https://doi.org/10.1016/j.compedu.2012.09.003>
- Khan, M. A., Vivek, N., Nabi, M. K., Khojah, M., & Tahir, M. (2021). Students' perception of e-learning during COVID-19 in India. *Sustainability*, 13(1), 57. <https://doi.org/10.3390/su13010057>
- Lemay, D. J., Bazelaïs, P., & Doleck, T. (2021). Transition to online learning during the COVID-19 pandemic. *Computers in Human Behavior Reports*, 4, 100130. <https://doi.org/10.1016/j.chbr.2021.100130>
- Li, L.-Y., & Lee, L.-Y. (2016). Computer literacy and online-learning attitude of distance-education students. *Higher Education Studies*, 6(3), 147–156. <https://doi.org/10.5539/hes.v6n3p147>
- Lumauag, R. G. (2017). Learners' accessibility and adaptability to technology. *Asia Pacific Higher Education Research Journal*, 4(1), 73–83.
- Mereu, S. (2016). The communication model of a Facebook Live broadcast based on the Shannon–Weaver model: A football-club example. *Sport Science Review*, 25(5–6), 351–370. <https://doi.org/10.1515/ssr-2016-0019>
- Nambiar, D. (2020). The impact of online learning during COVID-19: Students' and teachers' perspectives. *International Journal of Indian Psychology*, 8(2), 783–793. <https://doi.org/10.25215/0802.094>
- Nassoura, A. B. (2020). Measuring students' perceptions of online learning in higher education. *International Journal of Science and Technology Research*, 9(4), 1965–1970.
- Nordin, N., & Nordin, N. (2020). Impact of COVID-19 on online learning: A Malaysian higher-education case. *Universal Journal of Educational Research*, 8(12), 7607–7615. <https://doi.org/10.13189/ujer.2020.082546>
- Novikov, P. (2020). COVID-19 emergency transition to online learning: International students' perceptions at a Russian university. *Journal of Social Studies Education Research*, 11(3), 270–302.
- Nurwendah, W., & Suyanto, S. (2019, June). Relationships among self-motivation, self-efficacy, and biology achievement. In *Journal of Physics: Conference Series* (Vol. 1233, Article 012009). IOP Publishing. <https://doi.org/10.1088/1742-6596/1233/1/012009>
- Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 17(4), 460–469. <https://doi.org/10.1177/002224378001700405>
- Pelikan, E. R., Lüftenegger, M., Holzer, J., Korlat, S., Spiel, C., & Schober, B. (2021). Learning during COVID-19: The role of self-regulated learning, motivation, and procrastination. *Zeitschrift für Erziehungswissenschaft*, 24(2), 393–418. <https://doi.org/10.1007/s11618-021-01002-x>
- Rahman, M. H. A., Uddin, M. S., & Dey, A. (2021). Online-learning motivation as a mediator during COVID-19 in Bangladesh. *Journal of Computer Assisted Learning*, 37(6), 1497–1508. <https://doi.org/10.1111/jcal.12667>
- Schunk, D. H., Meece, J. L., & Pintrich, P. R. (2014). *Motivation in education: Theory, research, and applications* (4th ed.). Pearson.
- Surkhali, B., & Garbuja, C. K. (2020). Virtual learning during the COVID-19 pandemic: Pros and cons. *Journal of Lumbini Medical College*, 8(1), 154–155. <https://doi.org/10.22502/jlmc.v8i1.363>
- Topalã, I. (2014). Attitudes toward academic learning and learning satisfaction in adult students. *Procedia – Social and Behavioral Sciences*, 142, 227–234. <https://doi.org/10.1016/j.sbspro.2014.07.583>

- Tseng, H., Yi, X., & Yeh, H. T. (2019). Learning-related soft skills among online business students: Grade-level and role differences. *Computers in Human Behavior*, 95, 179–186. <https://doi.org/10.1016/j.chb.2019.01.014>
- Usher, E. L., Golding, J. M., Han, J., Griffiths, C. S., McGavran, M. B., Brown, C. S., & Sheehan, E. A. (2024). Psychology students' motivation and learning after the shift to remote instruction during COVID-19. *Scholarship of Teaching and Learning in Psychology*, 10(1), 16–32. <https://doi.org/10.1037/stl0000267>
- Weerasinghe, I. S., & Fernando, R. L. (2017). Students' satisfaction in higher education. *American Journal of Educational Research*, 5(5), 533–539. <https://doi.org/10.12691/education-5-5-9>
- Wei, H. C., & Chou, C. (2020). Online-learning performance and satisfaction: Do perceptions and readiness matter? *Distance Education*, 41(1), 48–69. <https://doi.org/10.1080/01587919.2020.1714785>
- Wu, Y. C., Hsieh, L. F., & Lu, J. J. (2015). What's the relationship between learning satisfaction and continuing-learning intention? *Procedia – Social and Behavioral Sciences*, 191, 2849–2854. <https://doi.org/10.1016/j.sbspro.2015.04.148>
- Yu, J., & Jee, Y. (2021). Analysis of online classes in physical education during the COVID-19 pandemic. *Education Sciences*, 11(1), 3. <https://doi.org/10.3390/educsci11010003>
- Zhang, K., Wu, S., Xu, Y., Cao, W., Goetz, T., & Parks-Stamm, E. J. (2020). Adaptability promotes student engagement during COVID-19: Multiple mediating effects of academic emotion. *Frontiers in Psychology*, 11, 573954. <https://doi.org/10.3389/fpsyg.2020.573954>