

The Influence of Autonomy in Online Learning

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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v14-i7/21944>

DOI:10.6007/IJARBSS/v14-i7/21944

Published Date: 21 July 2024

Abstract

Examining the influence of autonomy in online higher education is vital due to its crucial role in student success. This study aims to investigate factor that influence autonomy in online learning and to determine the interaction between learners-instructors-content. An online survey questionnaire was distributed to 88 students from different engineering programs, including Civil, Electrical, Mechanical, and Chemical Engineering, at Universiti Teknologi MARA, Johor Branch, Pasir Gudang Campus, and analysed using the Cronbach Alpha method. Demographic data were analysed descriptively as percentages, and 21 survey items were analysed by mean. The results indicated that learners were not independent in their online studies. They preferred to study in peer groups. Working with familiar peers motivated them to complete their assignments. The instructors' teaching style played an important role in maintaining their attention during online sessions, especially since most engineering subjects were complex. Additionally, an overview of learning outcomes helped students understand the overall topic. The findings are expected to contribute to the enhancement of online education practices for engineering students in higher education institutions in Malaysia.

Keywords: Online Learning, Autonomy, Diversity, Openness, Connectedness

Introduction

Background of Study

Online learning has revolutionized education Malysheva *et al* (2022) and has been rapidly used in universities beginning in 1990 Hofer *et al* (2021), offering accessibility and flexibility to learners worldwide. The Ministry of Education Malaysia (MOE) has launched several initiatives, such as the Malaysian Education Blueprint 2023-2025 MOHE (2021b) which aims for all students to have access to study using online by 2025. There are a few terminologies used by researchers to define online learning (Moore *et al.*, 2011). Most of them described it as online learning, distance learning, e-learning or blended learning based on its learning environment characteristics. In recent decades, educational institutes globally

have adopted online learning at an increasing and exponential rate as a means of enhancing learning and teaching (Alkhaldi *et al.*, 2024). This learning method sparks during COVID-19 era in March 2020 worldwide. According to Haleem *et al.* (2022), the popularity of online learning has soared in recent years due to its convenience and the wide array of subjects available.

This learning format allows individuals to study at their own pace, often from the comfort of their homes, making education more accessible to those with busy schedules or geographical constraints. All they need is a reliable internet connection and a device such as a laptop, tablet, or smartphone (Ramli *et al.*, 2022; Sulaiman, 2014). However, the social media era impacted the performance of the learners because it was full of attractive contents such as Facebook, TikTok, Instagram, YouTube and online shopping platforms that will distract their focus and attention.

Autonomy plays a significant role in online learning, impacting various aspects of the learning experience. Research by Jaggars and Xu (2016) suggests that autonomy in online learning can empower learners, fostering self-directedness and motivation (Fujii, 2024; Kian Tan *et al.*, 2023). Furthermore, autonomy encourages learners to take responsibility for their learning outcomes (Littlejohn and Milligan, 2017). However, it's essential to recognize that autonomy in online learning also poses challenges. Some learners may struggle with the freedom and flexibility afforded by online courses, requiring additional support and guidance to stay on track (Lee *et al.*, 2017). There is a good and bad impact on the self-esteem ability which the learners not in track of learning all the time.

Statement of Problem

Online learning has become integral to contemporary education, offering unparalleled flexibility and accessibility (Haleem *et al.*, 2022). However, amidst the proliferation of online platforms, learners face distractions, particularly from social media and entertainment sources (Koessmeier & Büttner, 2021). Understanding the pivotal role of autonomy in navigating these challenges is crucial. While autonomy has the potential to empower learners, its impact on self-regulation and focus presents significant challenges Hadwin *et al* (2022), especially in the context of online education.

Autonomy in online learning is multifaceted, influencing learner motivation Hartnett (2016), self-directedness Doo & Zhu (2024), and responsibility for learning outcomes. However, its universal embrace is not guaranteed; some learners may struggle to adapt to the freedom and flexibility inherent in online courses. This is particularly relevant for engineering students, given the complexity of their subjects and the need for focused attention (Gregg & Dabbagh, 2023). Understanding the factors that shape autonomy in online education, including the interplay between learners, instructors, and course content, is essential for optimizing the learning experience.

Moreover, Chung *et al* (2022) studied the students enrolled in an undergraduate or equivalent degree within a university, college or equivalent to higher education and found that academic performance in online learning is most strongly associated with motivation (including self-efficacy), and self-regulation. However, El Said (2021) found that students with higher GPAs performed better in online courses, and students with lower GPAs performed worse when taking courses in an online format compared to a face-to-face format. Mostly, students with low GPA were deprived of one-to-one personal support and advice offered by senior students, teaching assistants, and mentoring staff (Joosten & Cusatis, 2019).

Unfortunately, Anthonysamy & Singh (2023) in his studied contrast with El Said (2021). He found that there is no relationship between self-efficacy and satisfaction with students' scholastic achievement. Therefore, this study is conducted to provide an in-depth view on the effectiveness of autonomy in online learning, specifically higher learning education.

The rapid expansion of online learning, especially in higher education, necessitates an understanding of how autonomy affects learning outcomes. This study is motivated by the need to explore the dynamics of learner autonomy in online settings, particularly within the context of engineering education in Malaysia. With the shift towards digital platforms, it is crucial to identify factors that foster effective learning experiences

Objective of the Study and Research Questions

This research paper focuses on exploring the influence of autonomy of learners on their use of online learning for engineering students in Universiti Teknologi MARA, Johor Branch, Pasir Gudang Campus, Malaysia. Specifically, this study is done to answer the following questions;

- 1) How do diversity and openness influence online learning?
- 2) How does autonomy influence online learning?
- 3) How does connectedness influence online learning?

Literature Review

Online Learning: Drawbacks and Advantages to learners

Online learning has become a prominent mode of education, especially highlighted by the COVID-19 pandemic. It offers numerous benefits and presents several challenges. For example Thamri *et al* (2022) aimed to investigate the perceptions of undergraduate students about their experience with online learning during the COVID-19 pandemic. He reported that the most frequently mentioned advantages of the online learning experience were the ability to stay at home, a smaller budget for studying, time flexibility, and access to online materials, while the most frequently mentioned disadvantages were technical problems like internet access, lack in understanding the subject, lack of interactions with friends, reduced interaction with the teacher, poor learning conditions at home and lack of discipline. This study also revealed that the preferred class format was a combination of meeting in a classroom setting and online. The use of university portals and WhatsApp were the least preferred. A well-thought-out strategy and a more active approach are required for successful integration of online learning into the curriculum

Furthermore, some point from study by Thamri *et al* (2022) was agreed by (Naseer & Perveen, 2023). According to Naseer & Zahida Perveen (2023), he stated that online learning and pieces training have benefits such as flexibility and student-centered learning, reduced costs and increased collaboration, navigation, and exchange of ideas, variety of courses and learning styles, career advancement opportunities, enhanced time management skills, and immediate feedback. On the other hand, it also has some disadvantages. Withdrawal and attrition, more time taking, easier procrastination, self-motivation, and self-engagement, online courses may create a sense of isolation and difficulty in preventing cheating, and prolonged screen exposure causes health problems.

Connectivism

Connectivism is a learning theory for the digital age that stresses the importance of networks and connections. It teaches that learning is not just about getting information but

also about understanding and using the vast amount of knowledge available online. Critical skills like thinking critically, finding information, and adapting are essential. Connectivism also shows that learning involves a continuous cycle of sharing and receiving knowledge between individuals and larger organizations, helping everyone stay up-to-date and effective in their fields (Herlo, 2017; Siemens, 2004a).

Past Studies on Online Learning

There have been numerous studies investigating the influence of autonomy in online learning. One notable study in this area is the research conducted by (Fujii, 2024). Fujii (2024) study explored the impact of autonomy support and learning preferences among Japanese university students in higher education settings post-COVID-19. The study aimed to investigate how autonomy support from instructors influences students' learning preferences (face-to-face vs. distance), use of learning strategies, and academic performance (GPA). The survey involved 849 Japanese university students across different academic years: 206 first-year, 223 second-year, 214 third-year, and 206 fourth-year students. The participants were aged between 18 to 25 years, with a mean age of 20.4 years. The study sample consisted of 27.8% male, 72.0% female, and 0.2% non-binary students. More than half of the participants studied social sciences (31%) or humanities (24%). The survey was conducted during the summer break of 2022 to minimize memory bias regarding course perceptions and impressions. Responses were anonymized and collected through a web-based form distributed via a private research company specializing in online surveys. Class format preference was assessed using a seven-point Likert scale, ranging from "1" (face-to-face suits extremely well) to "7" (online suits extremely well). Academic performance was measured using GPA, which was obtained after the spring 2022 semester. IBM SPSS Statistics version 29 was utilized for data analysis. Exploratory Factor Analysis (EFA) was conducted to assess the factor structure of scales. Internal consistency reliability coefficients, means, standard deviations, and ranges of scale values were determined. Correlation analysis was performed to identify relationships between variables. One-way ANOVA was used to evaluate the effect of factors, followed by Tukey's honestly significant difference (HSD) test for post-hoc comparisons. Significant correlations were found between perceived autonomy support, class format preference, and GPA. Students who strongly preferred face-to-face or distance learning generally performed better in their preferred format. Those with no clear preference tended to perform worse academically. The study suggests that fostering autonomy through flexible learning environments can benefit student engagement and academic outcomes. It highlights the importance of instructors understanding and supporting diverse learning preferences among students. In summary, Fujii's research underscores the significance of autonomy support and tailored learning environments in higher education, particularly in accommodating diverse student preferences post-pandemic.

Next, Anthonysamy & Singh (2023) conducted a detailed study on the impact of satisfaction and autonomous learning strategies on scholastic achievement during the COVID-19 lockdown in Malaysia. The study aimed to analyze how satisfaction and various autonomous learning strategies (such as self-efficacy, social interactive engagement, and study environment) influenced the scholastic achievement of university students during the COVID-19 confinement. The study involved 316 university students from targeted universities in Malaysia, specifically focusing on the urban areas in the central region, which includes Selangor and Kuala Lumpur. Responses were gathered through an online survey conducted using Google Forms, leveraging convenience sampling due to the accessibility of students

during the pandemic. The survey utilized a 10-point Likert scale to assess variables like satisfaction with online learning, self-efficacy, social interaction involvement, study environment, and scholastic achievement. Partial Least Squares-Structural Equation Modelling (PLS-SEM) was employed to analyze the relationships between constructs. This method allowed for both assessment of the outer model (validity and reliability of measurement) and the inner model (relationships between constructs). The study reported significant impacts of student interactive engagement ($\beta = 0.348$, $t = 5.45$) and study environment ($\beta = 0.314$, $t = 4.81$) on students' scholastic achievement during the lockdown. Interestingly, the study revealed no significant relationship between self-efficacy and satisfaction with students' scholastic achievement. This finding suggests that while self-efficacy and satisfaction are important factors in learning, their direct impact on academic performance during the lockdown period was not evident. The research provides insights into how different aspects of autonomous learning strategies, particularly interactive engagement and study environment, can positively influence academic outcomes in a digital learning environment. It also highlights the nuanced impacts of satisfaction and self-efficacy during times of crisis, such as the COVID-19 pandemic. The study acknowledges the limitations of convenience sampling and the focus on a specific geographic region within Malaysia. In conclusion, Anthonysamy & Singh's study contributes valuable insights into optimizing autonomous learning strategies and enhancing educational outcomes amidst challenging circumstances like the COVID-19 pandemic, particularly in the context of digital learning environments in Malaysia.

Conceptual Framework of the Study

Online learning can be more challenging than traditional learning particularly because the factors that have made face-to-face learning successful need to be included. According to Rahmat *et al* (2021), in online learning, learners also demand attention, satisfaction, relevance, and confidence. Figure 1 shows the conceptual framework of the study. This framework is rooted from Siemens (2004) connectivism theory. The theory states that online learning needs to allow learners to practice diversity & openness, autonomy and connectedness. The factors in connectivism are then scaffolded to support Martin and Bolliger (2018) types of interaction as presented in Figure 1 below.

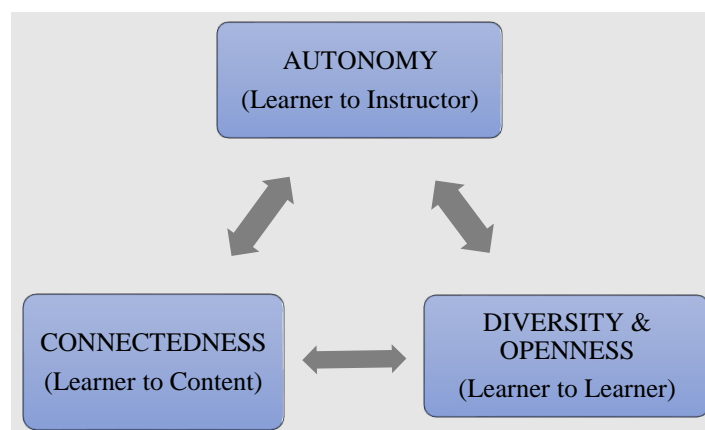


Figure 1: Conceptual Framework of the Study-The Influence of Autonomy in Online Learning (Siemens, 2004b).

Methodology

This quantitative study is done to explore factors that influence online learning. A purposive sample of 88 participants responded to the survey. The instrument used is a 5 Likert-scale survey and is rooted from Martin and Bolliger (2018) to reveal the variables in Table 1 below. The survey has 4 sections. Section A has items on demographic profile. Section B includes 6 items focused on diversity and openness. Section C features 7 items centered on autonomy, and Section D comprises 8 items on connectedness. Across all categories and types of interactions, there are 21 items in total.

Table 1

Distribution of Items in the Survey

Section	Connectivism (2004)	Type of interaction	No. of Items	Cronbach Alpha
B	Diversity & openness	Learner-to-Learner	6	.760
C	Autonomy	Learner-to-Instructor	7	.842
D	Connectedness	Learner-to-Content	8	.817
Total no. of items			21	.899

The analysis (refer to Table 1) shows a Cronbach alpha of .760 for diversity and openness, a Cronbach alpha of .842 for autonomy, and a Cronbach alpha .817 for connectedness; thus, revealing a good reliability of the instrument used. Further analysis using SPSS was conducted to provide findings addressing the research questions of this study.

Findings

Findings for Demographic Profile

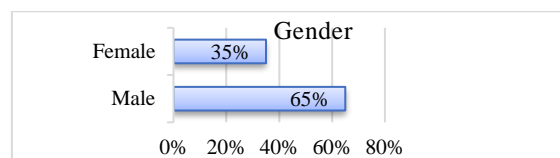


Figure 2: Percentage of Gender

The responses from each student concerning their demographics are detailed in Figure 2. Noticed that the imbalance between females (35%) and males (65%) learners. This is now common in engineering programs which report male enrollment was the highest percentages. Wan (2018) also agreed that trend in which engineering, manufacturing and construction, and at all levels except the doctorate been dominated by males.

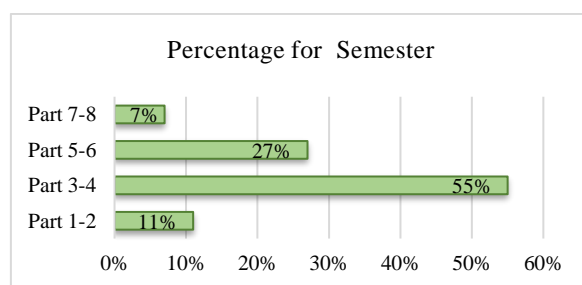


Figure 3: Percentage of Student's semester

In Figure 3, the percentages represent the distribution of students across different semesters. From the data, 11% of students are in Part 1-2, 55% are in Part 3-4, 27% are in Part 5-6, and 7% are in Part 7-8. The distribution of students varies each semester based on admission intake. Additionally, the proportion of students tends to decrease as they progress through their programs, since engineering is a challenging field of study.

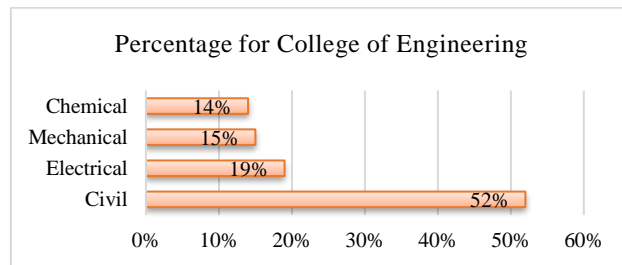


Figure 4: Percentage for College of Engineering

Figure 4 illustrates the percentage distribution of students across different departments within the College of Engineering. According to the data, 52% of students are enrolled in the Civil Engineering department, 19% in Electrical Engineering, 15% in Mechanical Engineering, and 14% in Chemical Engineering. Civil Engineering was the most popular program among students during the year the questionnaire was distributed. However, each program has its own unique curriculum, requirements, and culture, which can influence the learning experience.

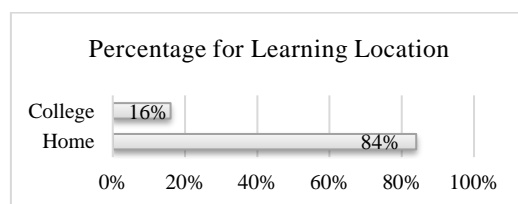


Figure 5: Percentage for Learning Location

Figure 5 presents the percentage distribution of learning locations among students. As per the data, 84% of students prefer learning from home, while 16% opt for learning within the college premises. During the year the questionnaire was conducted, students opted to study from home due to the COVID-19. Those with poor or no internet connection at home preferred to study on campus. Nowadays, most students have smartphones, and the government offers substantial mobile data privileges for students (MOHE, 2021a). The choice of learning location can significantly affect factors such as access to resources, and interaction with peers and instructors.

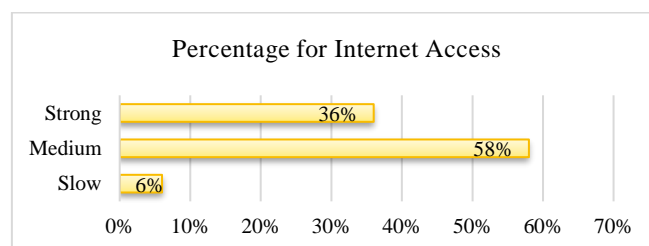


Figure 6: Percentage for Internet Access

Figure 6 illustrates the percentage distribution of internet access levels. According to the data, 6% of respondents experience slow internet access, 58% have medium-speed access, and 36% have strong internet connectivity. The shift to online learning has highlighted the digital inequality between those who have access to reliable internet infrastructure, laptops, and smartphones and those that do not (Bozkurt *et al.*, 2020).

Findings for Diversity and Openness

This section presents data to answer research question 1- How do diversity and openness influence online learning? In the context of this study, diversity and openness are measured by learner-to-learner interaction.

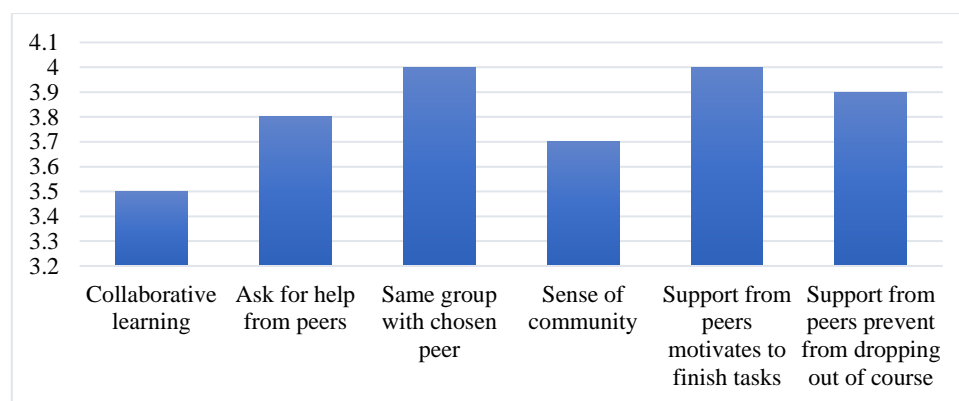


Figure 7: Mean For Diversity and Openness

Figure 7 presents the mean scores for statements related to diversity and openness in a learning environment. The mean scores indicate the level of agreement or disagreement with each statement. The highest mean is that respondent prefer to be in the same group with their chosen peer for online activities (4) and more likely to ask for help from their peers (3.8). On average, respondents agreed that collaborative learning promote peer-to-peer understanding (3.5).

Openness relates to the degree to which learners are open to interacting and collaborating with their peers. Openness to learner-to-learner interactions can impact knowledge sharing, teamwork, and overall learning experience (Ballesteros-Rodríguez *et al.*, 2022). The findings revealed that learners demonstrate a tendency to rely on group study rather than studying independently, which serves as a source of motivation for completing tasks. Stolk *et al.*, (2021) also agree with this statement. They choose to study within the same peer group because they often find similarity in the chemistry of the team when working on assignments. Encouraging and nurturing strong teamwork is crucial for producing high-quality assignments (Planas-Lladó *et al.*, 2021).

Findings for Autonomy

This section presents data to answer research question 2- How does autonomy influence online learning? In the context of this study, autonomy is measured by learner-to-instructor interaction.

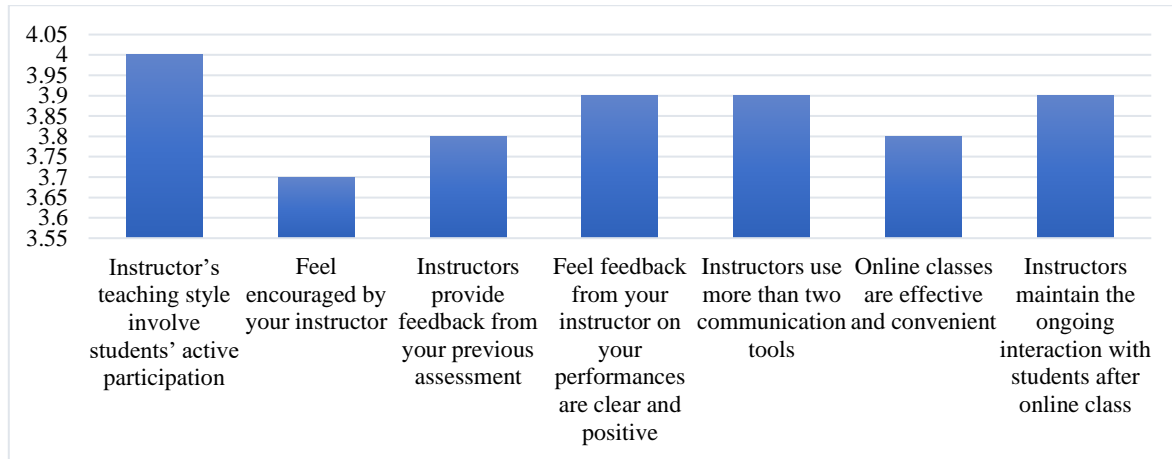


Figure 8 -Mean for Autonomy

Figure 8 shows the mean scores for statements regarding autonomy in the learning process. The highest means are the instructor's teaching style involves active student participation (4), the instructor uses more than two communication tools to stay connected with students (3.9), and the instructor maintains ongoing interaction with students after online classes (3.9). This refers to the level of autonomy or independence learners have in their interactions with instructors. It could involve aspects like the freedom to choose learning activities, the extent of instructor guidance, etc. Online learning differs from face-to-face learning because students do not meet in person. Typically, students remain muted and have their cameras off. Since instructors cannot see all their students during online sessions, their teaching style is crucial for capturing learners' attention. Therefore, online learning should be an interactive, engaging, and innovative platform. According to Rautela *et al.* (2024), using social media enhances interaction between learners and boosts student engagement in technology-mediated learning environments.

Findings for Connectedness

This section presents data to answer research question 3- How does connectedness influence online learning? In the context of this study, connectedness is measured by learner-to-content interaction.

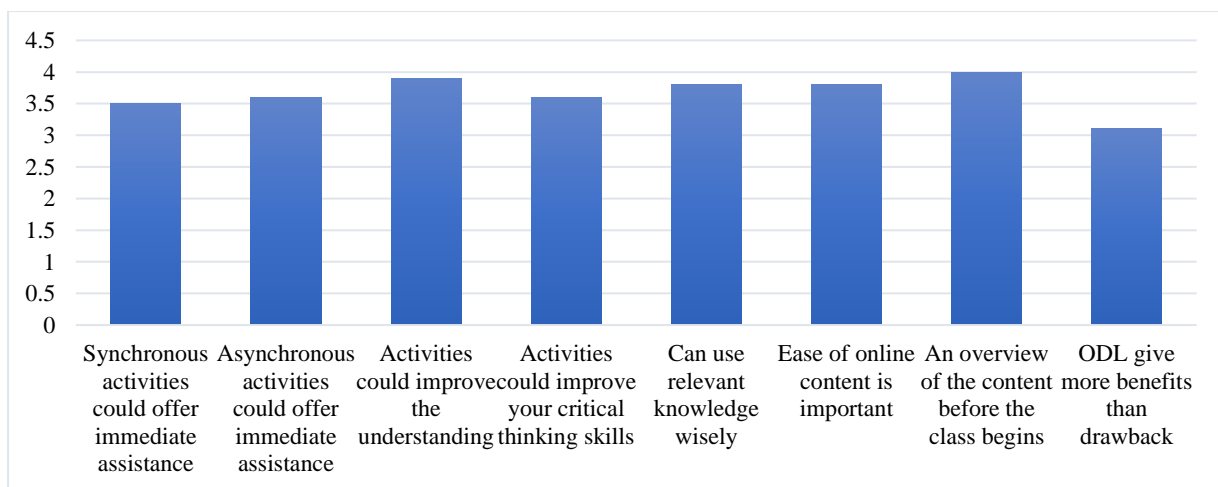


Figure 9: Mean for Connectedness

In Figure 9, the mean scores for statements related to connectedness in online learning are presented through learner to content engagement. Among the highest mean score were respondent concurred that it is important for them to get an overview of the content before the class begins (4), they believe the activities could enhance comprehension of the subject matter and use relevant knowledge wisely in the learning process (3.8). Conversely, they don't believe that ODL provides more benefits than drawbacks (3.1).

This research question likely reflects how well learners feel connected or engaged with the subject matter or content being taught. High connectedness suggests that learners find that an overview of the content before the class begins was relevant, interesting, and meaningful to their learning goals. It is crucial to explain the lesson plan or learning outcomes for each topic in the first session of class, as it provides students with an overall summary and makes it easier for them to understand what will be covered. Besides, enhancing the learning content and methods to be more online-friendly helps eliminate the communication gaps between learners and instructors (Tahir *et al.*, 2021).

Conclusion

This paper aims to explore the influence of various factors on online learning, focusing on diversity and openness, autonomy, and connectedness. The research questions guide the investigation into how these factors affect the online learning experience for students.

Summary of Findings and Discussions

From this study, the findings emphasize the importance of addressing diversity, promoting autonomy, and fostering connectedness in online learning environments. Understanding and accommodating diverse student backgrounds and perspectives can enrich the learning experience. Providing students with autonomy and control over their learning process enhances engagement and satisfaction. Additionally, fostering connectedness among students, instructors, and course materials promotes a supportive and motivating learning environment. These aspects collectively contribute to creating effective and fulfilling online learning experiences for everyone involved.

Pedagogical Implications and Suggestions for Future Research

Future studies on the influence of autonomy in online learning have the potential to significantly enhance our understanding of effective educational practices in digital environments. It is suggested that investigating the role of instructors, challenges faced by learners, cultural and individual differences, and long-term effects will provide a comprehensive view of how autonomy shapes the online learning experience.

Contribution

This study contributes to the field by providing empirical evidence on the influence of peer groups, instructor engagement, and structured learning outcomes on student autonomy. The findings offer valuable insights for educators and institutions to enhance online learning strategies, catering to the unique needs of engineering students. Additionally, the study opens avenues for further research on cultural and individual variations in online learning autonomy.

References

- Alkhaldi, A., Malik, S., Alhaimer, R., Alshaheen, A., & Lytras, M. D. (2024). Translating a value-based framework for resilient e-learning impact in post COVID-19 times: Research-based Evidence from Higher Education in Kuwait. *Heliyon*, 10(2), e24271. <https://doi.org/10.1016/j.heliyon.2024.e24271>
- Anthony, L., & Singh, P. (2023). The impact of satisfaction, and autonomous learning strategies use on scholastic achievement during Covid-19 confinement in Malaysia. *Heliyon*, 9(2), e12198. <https://doi.org/10.1016/j.heliyon.2022.e12198>
- Ballesteros-Rodríguez, J. L., De Saá-Pérez, P., García-Carbonell, N., Martín-Alcázar, F., & Sánchez-Gardey, G. (2022). The influence of team members' motivation and leaders' behaviour on scientific knowledge sharing in universities. *International Review of Administrative Sciences*, 88(2), 320–336. <https://doi.org/10.1177/0020852320921220>
- Bozkurt, A., Jung, I., Xiao, J., Vladimirsch, V., Schuwer, R., Egorov, G., Lambert, S. R., Al-Freih, M., Pete, J., Olcott, D., Rodes, V., Aranciaga, I., Bali, M., Alvarez, A. V., Roberts, J., Pazurek, A., Raffaghelli, J. E., Panagiotou, N., De Coëtlogon, P., ... Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 Pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1–126. <https://doi.org/10.5281/zenodo.3878572>
- Chung, J., McKenzie, S., Schweinsberg, A., & Mundy, M. E. (2022). Correlates of Academic Performance in Online Higher Education: A Systematic Review. *Frontiers in Education*, 7. <https://doi.org/10.3389/educ.2022.820567>
- Doo, M. Y., & Zhu, M. (2024). A meta-analysis of effects of self-directed learning in online learning environments. *Journal of Computer Assisted Learning*, 40(1), 1–20. <https://doi.org/10.1111/jcal.12865>
- El Said, G. R. (2021). How Did the COVID-19 Pandemic Affect Higher Education Learning Experience? An Empirical Investigation of Learners' Academic Performance at a University in a Developing Country. *Advances in Human-Computer Interaction*, 2021, 1–10. <https://doi.org/10.1155/2021/6649524>
- Fujii, A. (2024). Exploring autonomy support and learning preference in higher education: introducing a flexible and personalized learning environment with technology. *Discover Education*, 3(1), 26. <https://doi.org/10.1007/s44217-024-00111-z>
- Gregg, A., & Dabbagh, N. (2023). Engineering Education and Online Learning. In *International Handbook of Engineering Education Research* (pp. 479–500). Routledge. <https://doi.org/10.4324/9781003287483-27>
- Hadwin, A. F., Sukhawathanakul, P., Rostampour, R., & Bahena-Olivares, L. M. (2022). Do Self-Regulated Learning Practices and Intervention Mitigate the Impact of Academic Challenges and COVID-19 Distress on Academic Performance During Online Learning? *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.813529>
- Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3(May), 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>
- Hartnett, M. (2016). The Importance of Motivation in Online Learning. In *Motivation in Online Education* (pp. 5–32). Springer Singapore. https://doi.org/10.1007/978-981-10-0700-2_2
- Herlo, D. (2017). Connectivism, A New Learning Theory? 330–337. <https://doi.org/10.15405/epsbs.2017.05.02.41>

- Hofer, S. I., Nistor, N., & Scheibenzuber, C. (2021). Online teaching and learning in higher education: Lessons learned in crisis situations. *Computers in Human Behavior*, 121(November 2020). <https://doi.org/10.1016/j.chb.2021.106789>
- Jaggars, S. S., & Xu, D. (2016). How do online course design features influence student performance? *Computers and Education*, 95, 270–284. <https://doi.org/10.1016/j.compedu.2016.01.014>
- Joosten, T., & Cusatis, R. (2019). A cross-institutional study of instructional characteristics and student outcomes: Are quality indicators of online courses able to predict student success? *Online Learning Journal*, 23(4), 354–378. <https://doi.org/10.24059/olj.v23i4.1432>
- Kian Tan, W., Sunar, S. M., & Su Goh, E. (2023). Analysis of the college underachievers' transformation via gamified learning experience. *Entertainment Computing*, 44(2022), 100524. <https://doi.org/10.1016/j.entcom.2022.100524>
- Koessmeier, C., & Büttner, O. B. (2021). Why Are We Distracted by Social Media? Distraction Situations and Strategies, Reasons for Distraction, and Individual Differences. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.711416>
- Littlejohn, A., & Milligan, C. (2017). Designing online courses to scaffold learning engagement. *Research in Learning Technology*, 25.
- Lee, Y. H., Hsieh, Y. C., & Hsu, C. N. (2017). Adding excitement to a dull topic: A case study on the use of gamification in an online learning environment. *Computers & Education*, 114, 297-314.
- Malysheva, O., Tokareva, E., Orchakova, L., & Smirnova, Y. (2022). The effect of online learning in modern history education. *Heliyon*, 8(7), e09965. <https://doi.org/10.1016/j.heliyon.2022.e09965>
- Martin, F., & Bolliger, D. U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning Journal*, 22(1), 205–222. <https://doi.org/10.24059/olj.v22i1.1092>
- MOHE. (2021a). Kenyataan media: Bantuan pelan data dan peranti kepada pelajar institusi pendidikan tinggi (IPT). <https://mohe.gov.my/en/broadcast/media-statements/bantuan-pelan-data-dan-peranti-kepada-pelajar-ipt>
- MOHE. (2021b). Malaysia digital economy blueprint. In Economic Planning Unit, Prime Minister Department, Putrajaya.
- Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). E-Learning, online learning, and distance learning environments: Are they the same? *Internet and Higher Education*, 14(2), 129–135. <https://doi.org/10.1016/j.iheduc.2010.10.001>
- Naseer, S., & Zahida Perveen, H. (2023). Perspective chapter: Advantages and Disadvantages of Online Learning Courses. In *Massive Open Online Courses - Current Practice and Future Trends*. IntechOpen. <https://doi.org/10.5772/intechopen.1001343>
- Planas-Lladó, A., Feliu, L., Arbat, G., Pujol, J., Suñol, J. J., Castro, F., & Martí, C. (2021). An analysis of teamwork based on self and peer evaluation in higher education. *Assessment & Evaluation in Higher Education*, 46(2), 191–207. <https://doi.org/10.1080/02602938.2020.1763254>
- Rahmat, N. H., Sukimin, I. S., Soon, S. M., Anuar, M., & S. Mohandas, E. (2021). Online Learning Motivation and Satisfaction: A Case Study of Undergraduates vs Postgraduates. *International Journal of Asian Social Science*, 11(2), 88–97. <https://doi.org/10.18488/journal.1.2021.112.88.97>

- Ramli, M.F., Majid, M., Badyalina, B., Shaari, N. F. (2022). An assessment of the internet access and accessibility initiatives on the effectiveness of online learning among students at higher learning institutions. *International Journal of Education, Psychology and Counselling*, 7(47), 164–170.
- Rautela, S., Sharma, S., & Virani, S. (2024). Learner-learner interactions in online classes during COVID-19 pandemic: the mediating role of social media in the higher education context. *Interactive Learning Environments*, 32(2), 639–654. <https://doi.org/10.1080/10494820.2022.2093917>
- Siemens, G. (2004a). Connectivism: A Learning Theory for the Digital Age. *Journal of Instructional Technology and Distance Learning*, 2(1), 1–5. http://www.itdl.org/Journal/Jan_05/article01.htm
- Siemens, G. (2004b). Elearnspace. Connectivism as a Learning Theory for the Digital Age. *Elearnspace.Org*, 1–9.
- Stolk, J. D., Gross, M. D., & Zastavker, Y. V. (2021). Motivation, pedagogy, and gender: examining the multifaceted and dynamic situational responses of women and men in college STEM courses. *International Journal of STEM Education*, 8(1), 35. <https://doi.org/10.1186/s40594-021-00283-2>
- Sulaiman, F. (2014). Online Learning in Higher Education in Malaysia : A Case Study of Students ' Future Expectations. *International Journal of Humanities and Social Science*, 4(8), 124–128.
- Tahir, N. S., Ahmad, Y., Abdul Hamid, S. N. F., Muhammad Zamri, N. E. M., Arsat, A. R., & Rahmat, N. H. (2021). Exploring Openness and Connectedness During Online Learning. *International Journal of Academic Research in Business and Social Sciences*, 11(11). <https://doi.org/10.6007/IJARBSS/v11-i11/11683>
- Thamri, T., Chitra Hasan, D., Rina, N., Hariri Gani, M., Hariri Gani, M., & Maharani Miranda, A. (2022). Advantages and Disadvantages of Online Learning During the COVID-19 Pandemic: The Perceptions of Students at Bung Hatta University. *KnE Social Sciences*. <https://doi.org/10.18502/kss.v7i6.10636>
- Wan, C.-D. (2018). Student enrolment in Malaysian higher education: is there gender disparity and what can we learn from the disparity? *Compare: A Journal of Comparative and International Education*, 48(2), 244–261. <https://doi.org/10.1080/03057925.2017.1306435>