EXPLORING ONLINE INTERACTION THROUGH CONNECTIVISM

Nursyuhada Zakaria

Academy of Language Studies, Universiti Teknologi MARA,
Pasir Gudang Campus, 81750 Masai, Johor, Malaysia

D Rohayu Mohd Yunos

Academy of Language Studies, Universiti Teknologi MARA,
Pasir Gudang Campus, 81750 Masai, Johor, Malaysia

***Bazilah Raihan Mat Shawal**

Faculty of Language Studies and Generic Development, Universiti Malaysia Kelantan,
16300 Bachok, Kelantan, Malaysia

Liyana Ahmad Afip

Faculty of Language Studies and Generic Development, Universiti Malaysia Kelantan,
16300 Bachok, Kelantan, Malaysia

Linira Ghazali

Faculty of Language Studies and Generic Development, Universiti Malaysia Kelantan,
16300 Bachok, Kelantan, Malaysia

Kavarljit Kaur Gill

Faculty of Language Studies and Generic Development, Universiti Malaysia Kelantan,
16300 Bachok, Kelantan, Malaysia

email: syuhadazakaria@uitm.edu.my, bazilah@umk.edu.my, droha932@uitm.edu.my, liyana.a@umk.edu.my, linira@umk.edu.my, kavarljitkaur@umk.edu.my
**Corresponding author: Bazilah Raihan Mat Shawal*

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Abstract: Educational institutions worldwide have been shifting away from traditional approaches to online learning due to its abundance of advantages. Despite the advantages, online learning presents challenges especially in managing an active interaction between educators and students. This study seeks to explore students' perception of interactions in online learning from the connectivism point of view. A total of 162 participants from Universiti Malaysia Kelantan responded to the survey. Findings indicate that students perceive autonomy or learner-to-instructor interaction as the most important interaction in online learning.

Additionally, this study also found that there is a strong relationship between all fundamental factors in connectivism for online learning. The outcome of this study will help educators to better understand the importance of students' interaction with educators in promoting an active engagement among students. A prudent approach should be devised in order to provide a supportive and effective online learning ecosystem.

Keywords: connectivism, engagement strategies, online interaction, online learning, students' perception.

INTRODUCTION

Online learning has been embraced in the education system for more than two decades, initially as a blended learning approach. However, due to the lockdown and campus closure during the outbreak of coronavirus (COVID-19) many learning institutions especially in Malaysia, shifted to online learning as the main approach of teaching delivery (Kamal et al., 2020). As online learning allows the delivery of knowledge using technology and internet facilities where interactions and all teaching materials are provided to students online using appropriate learning platforms (Yusuf and Ahmad, 2020), it is the best alternative to ensure an uninterrupted teaching and learning process. Online learning has then been claimed as a blessing towards academic excellence in the face of calamity like the COVID-19 pandemic (Kamal et al., 2020), and for numerous benefits such as allowing students to access class content any time and from any place (Chakraborty and Muyia Nafukho, 2014), improving students' computer skills when they take computer-mediated classes online (Robinson and Hullinger, 2008), and being more cost effective and convenient than traditional educational environments (Han and Johnson, 2012).

Despite the benefits, online learning presents challenges especially in maintaining an active interaction between educators and students. This is supported by a study conducted by Yusuf and Ahmad (2020) involving students from a private higher learning institution in Malaysia. They reported six major challenges faced by educators in online learning and that the most significant challenge is to keep students focused during online learning. This highlights the importance of developing and delivering engaging online learning in order to gain learners' attention and to promote active interaction in online class settings. Research that can provide information on the factors that influence students' interaction will be helpful in guiding educators to improve their instructional approach online. In adapting to digital approach in teaching and learning, connectivism is acknowledged as a network learning theory as it offers a framework for comprehending how learning is practised in networked environments whilst also identifying opportunities and challenges faced by instructors in the digital age (Haris et al., 2023). Hence, this study aims to explore students' perceptions pertaining to engagement strategies in the online learning environment from the lens of connectivism. The outcome of this study is beneficial in identifying the most impactful approach that can promote students' interactions in online learning and ways to create a better online learning environment for students.

BACKGROUND OF THE STUDY

As the implementation of online courses is growing and will continue to be a regular practice, it demands approaches that can assure the effectiveness of its implementation. Dixson (2010) claimed that online learning can be as effective as traditional instruction, but it needs

cooperative or collaborative (active) learning as well as a strong instructor's presence. Anderson (2003) emphasised that student engagement is developed through interaction, and fostering interaction is important in online learning. This is evident as Martin and Bolliger (2018) found that learner-to-instructor engagement strategies seemed to be most valued compared to learner-to-learner interaction, and learner-to-content interaction. Similarly, Wahid et al., (2020) reported that the learner-to-instructor engagement plays the most significant role in promoting active interactions in online learning. The findings are supported by Haris et al., (2023). Their findings indicated that most students had positive views on the engagement strategies, with the learner-to-instructor interactions being the most highly valued among the three categories. This shows that engagement and interaction between both educators and learners are essential in supporting students' online learning process and promoting effective education. With regards to connectivism, Haris et al., (2023) reported that there is a strong positive correlation observed between the four fundamental elements of connectivism: connectedness, diversity, openness and autonomy.

Several studies have been carried out to explore students' interaction in online learning in Malaysian context (i.e Sidek et al., 2021; and Wahid et al., 2020), as well as through connectivism perspective (i.e Haris et al., 2023). However, most studies were carried out involving students from only a few universities in Malaysia such as UiTM and private universities with an average number of not more than 150 participants. The participants of this study, on the other hand, are students from Universiti Malaysia Kelantan. As substantial studies are needed in order to obtain more robust information regarding the issue, this study hence aims to add to the literature as well as to validate previous findings so a prudent approach can be planned out to improve the quality of online learning.

Therefore, this study is carried out to explore students' perception on engagement strategies in the online learning environment. Specifically, this study is done to answer the following questions;

How do learners perceive diversity and openness in online learning?
How do learners perceive autonomy in online learning?
How do learners perceive connectedness in online learning?
Is there a relationship between all factors in connectivism for online learning?

LITERATURE REVIEW

Connectivism

The theory of connectivism was first proposed by Siemens (2004), where he believes that learning should be consistent and relevant with the current development trends in acquiring information. In connectivism, technology is a major part of learning as it allows learners to have access to knowledge and information, which will also affect their decision-making in what, how and where they learn. Connectivism presents eight key principles: 1) Learning and knowledge are grounded in diverse perspectives; 2) Learning involves linking specialised nodes or information sources; 3) Knowledge can exist in non-human tools and systems; 4) The ability to acquire new knowledge is more important than the knowledge currently possessed; 5) Ongoing nurturing and maintenance of connections are essential for continuous learning; 6) Recognizing connections between various fields, ideas, and concepts is a fundamental skill; 7) Keeping knowledge current and accurate is the goal of all connectivist learning activities; 8) Decision-making is a learning process itself, where choosing what to learn and interpreting new information must be adapted to a constantly changing reality. What is considered correct today might be outdated tomorrow due to shifts in the information environment.

Advantages and Disadvantages of Online Learning

Educational institutions worldwide have been shifting away from traditional approaches to online learning due to its abundance of advantages. Online learning is preferred by learners as it provides them with convenience to access various resources (Ramli et al., 2022). This is especially true when learners can become more independent and resourceful with the availability of online learning tools and platforms. In addition, online learning encourages students to participate and engage in their learning better (Tareen & Haand, 2020). Due to the nature of online settings, learners are more likely to ask and answer questions during online classes, thus increasing the amount of interaction with their instructor and peers. Despite all the advantages of online learning mentioned above, learners tend to face challenges too. The challenges include poor attendance and engagement in live lectures, lack of interaction with the instructors and peers and difficulty managing task workload during online learning (Hollister et al., 2022). These factors would not only decrease students' interest in learning but also affect their overall learning experience.

Past Studies on Online Learning

Many studies have been done to investigate the effectiveness of online learning. Specifically, researchers have been looking at how online learning can help students in learning and also the challenges faced during online learning. There have been many past studies on students' perceptions towards online learning. The study by Giday & Perumal (2024) is done to assess and evaluate students' perceptions and ratings towards online learning platforms they attended. In the study, 101 postgraduate and Ph.D. scholars from an institution in India responded to the online survey administered. The study found a positive correlation between online learning and educational system quality, ease of use and their overall satisfaction. Even though the study was unable to provide strong statistical evidence, the implications of the study were significant to be highlighted. It is important for developers and educators to offer good quality materials and resources and ensure ease of use for the learning platforms used to sustain students' interest and engagement to online learning.

Another similar research was conducted by Saidalvi et al. (2021) on students' perception towards their online learning experiences. An online survey was administered to 486 undergraduate students majoring in Engineering and Business Studies. The findings revealed that even though students mainly had adequate devices for online learning, they perceived online learning as ineffective and preferred face-to-face learning. In addition, they also faced difficulties to understand the subject matter and adapt with the changes in assessments. From these findings, course designers need to design and plan courses effectively to sustain students' interest in learning the course. Educators should also include some interesting lessons and activities to attract student attendance and participation in class sessions.

Conceptual Framework

Perhaps one of the important elements for online learning success is that students need to feel the relevance of what they are learning. This relevance can then snowball to providing confidence to the learners (Rahmat, et.al, 2021). This study (refer to figure 1) combines Siemens (2004) factors for connectivism and types of interaction by Martin & Bolliger (2018). According to Siemens (2004), in online learning, learners need to have diversity and openness, autonomy and connectedness. The factors in connectivism are scaffolded with the types of interaction by Martin & Bolliger (2018) to show the framework in Figure 1 below.

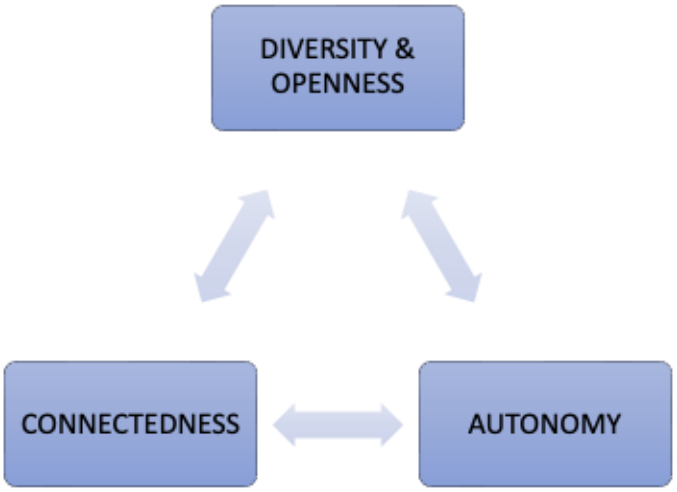

Figure 1 Conceptual Framework of the Study Online Interaction and Connectivism

METHODOLOGY

This quantitative study is done to explore students' perception of interactions that influence online learning. A purposive sample of 162 participants completed the survey, which utilised a 5-point Likert scale based on the framework developed by Martin & Bolliger (2018). The survey, detailed in Table 1 below, consists of four sections designed to identify the relevant variables. Section A has items on demographic profile. Section B touches on diversity and openness, Section C looks at autonomy, and Section D has items on connectedness.

Table 1: Distribution of Items in the Survey

Section	Connectivism (Siemens, 2004)	Type of interaction	No of items	Cronbach alpha
B	Diversity & Openness	Learner-to-learner	6	.834
C	Autonomy	Learner-to-Instructor	7	.929
D	Connectedness	Learner-to-Content	8	.918
		Total no. of item	21	.957

The analysis shows a Cronbach alpha of .834 for Diversity & Openness, a Cronbach alpha of .929 for Autonomy, and a Cronbach alpha of .918 for Connectedness; thus, revealing a good reliability of the instrument chosen/used. Further analysis using SPSS is done to present findings to answer the research questions for this study.

FINDINGS AND DISCUSSION

Findings for Demographic Profile

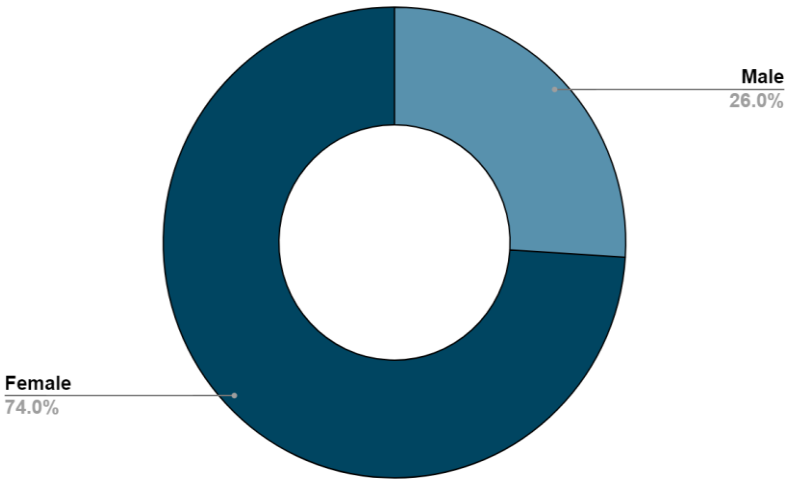

Figure 2: Percentage for Gender

According to the data provided in Figure 2, the female and male respondents' distributions skewed towards females with 74% of the population and males with only 26%.

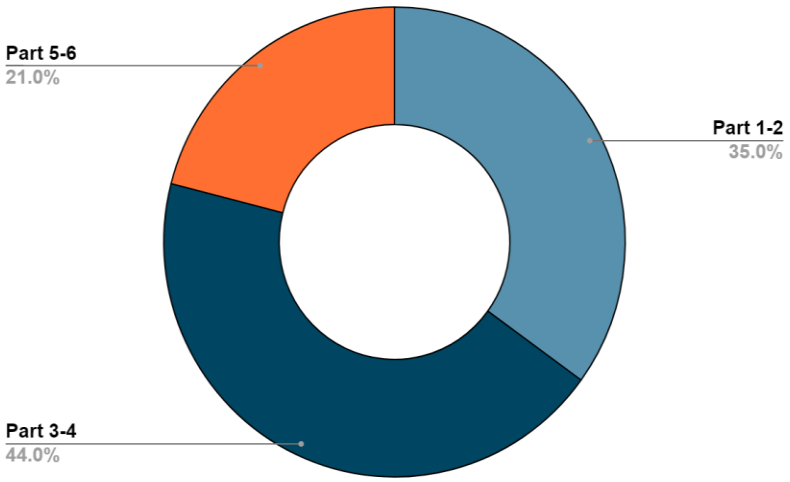

Figure 3: Percentage for Semester

Figure 3 shows the distribution of semesters among the respondents. It was found that most of the respondents were from Part 3 - Part 4 of their study years with 44%. Followed by Part 1 - Part 2 respondents with 35% and the least was from respondents in Part 5- Part 6 with 21%.

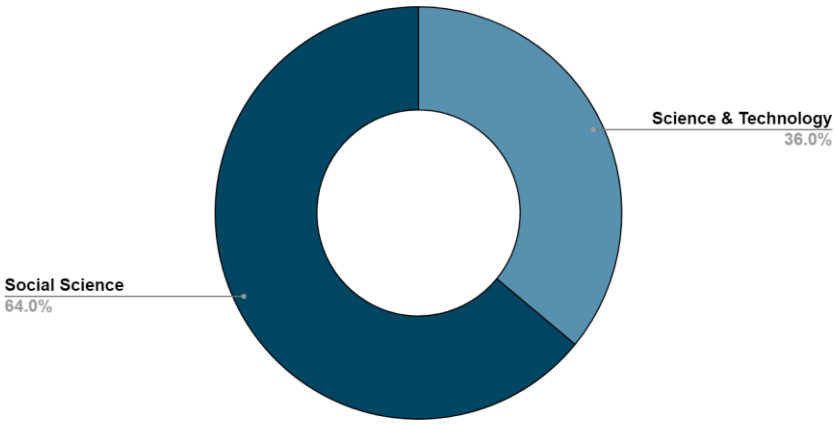

Figure 4: Percentage for Field of Study

As shown in Figure 4, the majority of the respondents (64%) are from the Social Science field. Only 36% of the population are from the Science and Technology field.

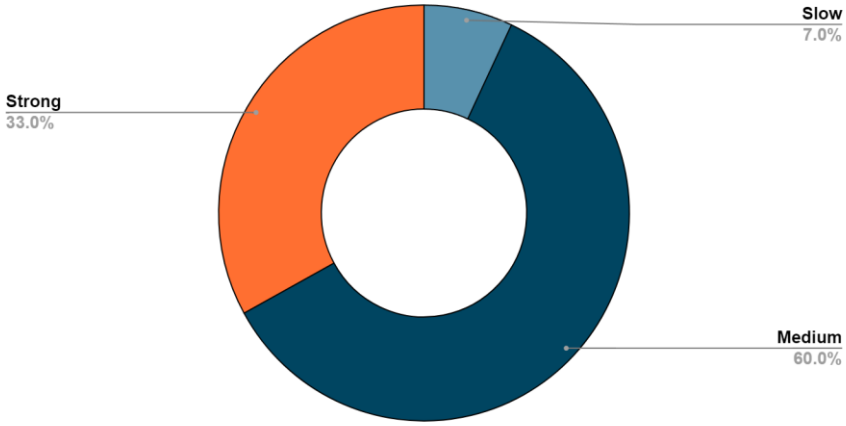

Figure 5: Percentage for Internet Access

As shown in Figure 5, most of the respondents (60%) claimed that they had medium strength of internet connection when having online class. 33% of the respondents claimed that they had a strong internet connection. Only 7% of the respondents had poor or slow internet connection when having online class.

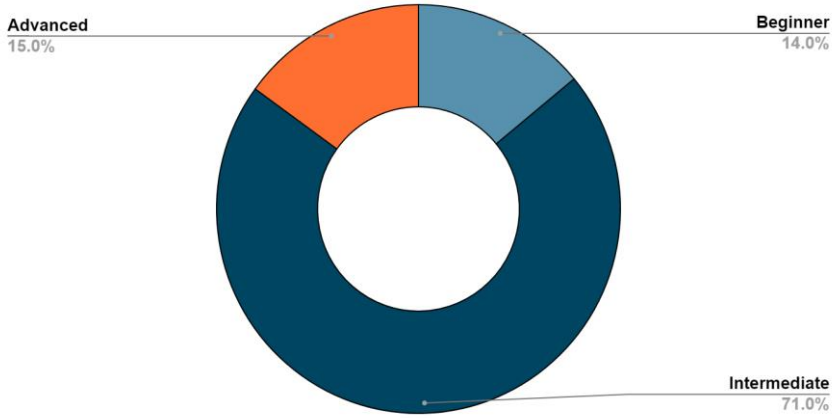

Figure 6 Percentage for ICT Skills

Finally, the respondents were also asked about their ICT Skills. As shown in Figure 6, most of the respondents (71%) categorised their skill as intermediate.15% of the respondents perceived themselves to have advanced skill when dealing with technologies. Only 14% of the respondents considered themselves as beginners in dealing with technologies.

Findings for Diversity & Openness

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

Table 2: Mean for Diversity and Openness

No	Statement	Mean
1	Does collaborative learning promote peer-to-peer understanding?	3.8
2	Are you more likely to ask for help from your peers?	3.9
3	Do you prefer to be in the same group with your chosen peer for online activities?	4
4	Do you think that the sense of community helps you to engage in online classes?	3.9
5	Do you think support from peers motivates you to finish tasks?	4.1
6	Do you think that support from peers prevents you from dropping out of course?	3.9
Mean for Diversity and Openness		3.9

Table 2 shows the mean value for diversity and openness among the respondents on six specific items from a diversity and openness construct. The mean value for personal factors is 3.9, indicating that on average, respondents perceive the learner-to-learner interaction has influenced their experience in online learning. It can be derived that the highest mean for personal factors is for item 5; where the respondents agree that support from peers motivates them to finish tasks (M= 4.1). This is followed by the second highest mean for item 3, where the respondents are certain that they prefer to be in the same group with their chosen peer for online activities (M=4). The lowest mean score is 3.8 for item 1; where the respondents perceive collaborative learning promotes peer-to-peer understanding.

Findings for Autonomy

This section presents data to answer research question 2- How do learners perceive autonomy in online learning? In the context of this study, autonomy is measured by learner-to-instructor interaction, whether they perceive they have the autonomy in learning.

Table 3: Mean for Autonomy

No	Statement	Mean
1	Does your instructor's teaching style involve students' active participation?	4
2	Do you feel encouraged by your instructor to keep engaged in the online classroom?	3.9
3	Does your instructor provide feedback from your previous assessment?	4
4	Do you feel feedback from your instructor on your performances is clear and positive?	4.1
5	Does your instructor use more than two communication tools to stay connected with students?	4
6	Do you think that online platforms used by your instructor for your online class are effective and convenient?	4.1
7	Does your instructor maintain the ongoing interaction with students after online class?	4
Mean for Autonomy		4.0

Table 3 shows the mean value for autonomy in online learning. The total mean score for autonomy is M=4.01. The highest mean scores were observed for the statements regarding feedback provision and platform effectiveness. Specifically, learners reported that they feel feedback from their instructor on their performances is clear and positive (M=4.1), and they find the online platforms used for classes effective and convenient (M=4.1). Following closely are items 1,3,5 and 7 which are related to the instructor's teaching style involving active participation, the use of multiple communication tools and the ongoing interaction between the instructors and students after online classes, all with a mean score of 4. The lowest mean score in the construct is the statement regarding feeling encouraged by instructors to maintain engagement in the online classroom (M=3.9). Overall, these findings suggest that learners perceive a strong sense of autonomy in online learning, driven by effective feedback mechanisms, platform usability, active participation opportunities, diverse communication tools, and ongoing interaction with instructors.

Findings for communication

This section presents data to answer research question 3- How do learners perceive connectedness in online learning? In the context of this study, connectedness is measured by learner-to-content interaction, whether they perceive that the content is comprehensible and relatable.

Table 4 Mean for Connectedness

No.	Statement	Mean
1.	Do you think that the synchronous activities (i.e. online discussion) could offer immediate assistance?	3.9
2.	Do you think that the asynchronous activities (i.e. assignment) could offer immediate assistance?	3.9
3.	Do you think the activities could improve the understanding of subject-matter?	4
4.	Do you think the activities in online learning could improve your critical thinking skills?	4
5.	Do you think you can use relevant knowledge wisely in the learning process?	4
6.	Do you feel that the ease of online content is important?	4
7.	Do you feel that it is important to get an overview of the content before the class begins?	4.1
8.	Do you think that ODL gives more benefits than drawbacks?	3.9
Mean Value for Connectedness		3.98

The data presented in Table 4 represents the mean value for connectedness, as well as the scores on eight specific items from a test focusing on the connectedness construct. The mean value for the connectedness construct is 3.98, indicating that, on average, respondents perceived some level of connectedness in online learning. Taking a closer look at each individual item, it appears that the highest score was on Item 7, with a score of 4.1 indicating that respondents find it important to get an overview of the content before the class begins. The next highest score, a 4, was reflected in items 3 to 6, indicating the importance of the activities, which was perceived to improve the understanding of subject-matter and critical thinking skills. Besides, items 5 and 6, also receiving a score of 4, stressed on the perception of the students in their ability to use the relevant knowledge wisely in the learning process and the significance of the level of easiness of the online content. The least score, a 3.9, was on Item 1, 2 and 8. Item 1 and 2 signified a slightly lower confidence level in both synchronous and asynchronous activities in offering immediate assistance to the online students. Item 8, showed a slightly weaker perception regarding the notion that ODL gives more benefits than drawbacks.

Findings for Relationship between Diversity/Openness and Autonomy

This section provides data addressing Research Question 4: Is there a relationship between all factors in connectivism for online learning? To assess whether there is a significant correlation between the mean scores for diversity & openness, autonomy, and connectedness, the data were analysed using SPSS. The results are detailed separately in Table 5, 6 and 7 below.

Table 5: Correlation between Diversity/Openness and Autonomy

Variable	1	2
1. Diversity & Openness	1	
2. Autonomy	0.773**	

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

Table 5 indicates an association between diversity/openness and autonomy. The correlation analysis reveals a highly significant association between these factors, with r=.773∗∗ and p=.000. According to Jackson (2015), a coefficient is considered significant at the 0.05 level, with positive correlations ranging from 0.1 to 1.0. A weak positive correlation falls between 0.1 and 0.3, a moderate positive correlation between 0.3 and 0.5, and a strong positive correlation between 0.5 and 1.0. Thus, the results suggest a strong positive relationship between diversity/openness and autonomy.

Table 6: Correlation between Autonomy and Connectedness

Variable	1	2
1. Autonomy	1	
2. Connectedness	0.832**	

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

Table 6 demonstrates an association between autonomy and connectedness. The correlation analysis reveals a highly significant relationship between these factors, with r=.832∗∗ and p=.000. Jackson (2015) notes that a coefficient is significant at the 0.05 level, with positive correlations ranging from 0.1 to 1.0. A weak positive correlation falls between 0.1 and 0.3, a moderate positive correlation between 0.3 and 0.5, and a strong positive correlation between 0.5 and 1.0. Therefore, the results indicate a strong positive relationship between autonomy and connectedness.

Table 7: Correlation between Connectedness and Diversity/Openness

Variable	1	2
1. Connectedness	1	
2. Diversity & Openness	0.746**	

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

Table 7 reveals an association between connectedness and diversity/openness. The correlation analysis indicates a highly significant relationship between these factors, with r=.746∗∗ and p=.000. Jackson (2015) explains that a coefficient is considered significant at the 0.05 level, with positive correlations ranging from 0.1 to 1.0. A weak positive correlation falls between 0.1 and 0.3, a moderate positive correlation between 0.3 and 0.5, and a strong positive correlation between 0.5 and 1.0. Thus, there is a strong positive relationship between connectedness and diversity/openness.

CONCLUSION AND RECOMMENDATION

Summary of Findings and Discussions

In general, findings indicate that students perceive autonomy or learner-to-instructor interaction as the most important interaction in online learning as compared to diversity and openness or learner-to-learner interaction, and connectedness or learner-to-content interaction. This is consistent with the findings of previous studies by Martin and Bolliger (2018), Wahid et al., (2020) and Haris et al., (2023). This study also found that there is a strong relationship between all fundamental factors in connectivism for online learning similar to the findings reported by Haris et al,. (2023). Hence it can be concluded that this study confirms the

importance of all four fundamental components (connectedness, diversity, openness and autonomy) that exist within the connectivism theory. The conceptual framework used in this study is fully supported. The outcome of this study will help educators to better understand the importance of students' interaction with educators in promoting an active engagement among students.

Pedagogical Implications and Suggestions for Future Research

The findings emphasise that students perceive their interaction with instructors are fundamental in establishing an active engagement in online learning. As stressed by Dixson (2010), online learning can be as effective as traditional instruction, but it needs cooperative or collaborative (active) learning as well as a strong instructor's presence. Maintaining an active interaction throughout an online lesson is indubitably a daunting task. Therefore, educators' selection of online platforms can be one of the initiatives to reduce the challenges. Choosing a convenient, practical and interactive platform that promotes a two-way interaction between students and instructors or game-based learning platform potentially increases students' engagement during the online learning. Students also value feedback they receive from instructors. Hence, educators should take giving feedback in the right manner seriously. The outcomes of this study also contribute to the direction and ideas on how support can be provided to educators to improve the engagement in online learning.

Future research on online interaction and connectivism theory may focus on various areas to advance the understanding of its implementation, and its potential to improve the effectiveness of teaching and learning online. Most of the current studies on online interaction through connectivism predominantly employed the quantitative approach and very little employed the qualitative or mixed-methods approach. Hence, future studies may contribute in terms of methodological literature so robust information can be obtained to provide a supportive and effective online learning ecosystem. Additionally, future research may also explore students' engagement from educators' perspectives and effective strategies used to promote connectedness, diversity, autonomy and openness in online learning.

Nevertheless, several limitations should be noted for future research. This study involved a small sample of participants represented by only UMK students. Given that the sample population size was small, findings reported in this study therefore cannot be generalised. This study is descriptive in nature. It does not attempt to explain the cause-and-effect relationship between students' perceptions and their engagement in online learning so confirmation cannot be made.

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