# Exploring Online Interaction through Connectivism: A Case Study of Universiti Teknologi MARA (UiTM) Learners

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## ABSTRACT

Spurred by the COVID-19 pandemic, learning dynamics have changed as learners are no longer confined to a traditional education setting. Considering the Connectivism learning theory, this study explores English as a Second Language (ESL) learners' perceptions of online learning, focusing on online interaction and Connectivism. The Connectivism learning theory provides a framework for understanding learning in the digital age, whereby the learning process happens when individuals connect and interact with information, technology, and other people virtually. A quantitative study was conducted using a five-point Likert Scale questionnaire with 22 items and distributed via Google Forms to 75 UiTM undergraduates. Results indicate that peer support is vital in learner-to-learner interaction and connectedness in online learning. Next, the instructor's teaching style, choice, and use of online platforms are critical in fostering engagement. Meanwhile, course content overview, ease of content, and activities are essential for openness in online learning or learner-to-content interaction. Significant implications of the study include the need to incorporate more collaborative learning, the importance of identifying effective online teaching strategies, and ensuring more suitable, inclusive, and accessible content for ESL learners.

**Keywords**: online learning; online interaction; Connectivism; ESL learners

## 1. Introduction

The swift advancements in technology, accelerated by the COVID-19 pandemic from 2020 to 2022, have transformed how language learning and education are delivered and experienced. For many learners who grapple with the complexities of learning English as a Second Language, innovative approaches, such as technology, are very welcome. However, although the use of technology, such as online platforms, to replace physical classroom learning experience is very much welcome, there is still the issue of student engagement. As Martin and Bolliger (2018) noted, online learners have fewer chances to be engaged with the institution. Hence, student engagement is crucial.

In addressing student engagement and the use of technology, the Connectivism learning theory is relevant as it focuses on the idea that the learning process happens when individuals connect and interact with information, technology, and other people within a networked environment. The idea, introduced in the early 21st century by theorists and educators such as George Siemens (2004) and Stephen Downes (2005), helps to explain how Internet technologies have evolved and

led to the learning and sharing of information on the internet in which is what online education encompasses in general. On the idea of receiving and trying to make sense of the information received from various platforms and sources, Siemens (2005) believes that in Connectivism, new information is continuously obtained, enabling the learners to learn more and more. Therefore, the idea of Connectivism, as seen and experienced through online interaction, offers a promising way of enhancing the learning of English as a Second Language.

On the Malaysian front, online learning has gained substantial traction since the COVID-19 pandemic, which peaked in early 2020. Educational institutions, from Primary schools to universities, were compelled to transition to remote learning to carry on with the learning sessions safely. Upon realising the possibility of the Coronavirus being around longer than expected, the Malaysian government developed several initiatives and policies to support online learning, such as creating digital content and suitable platforms for teachers and students. Training in the use of online platforms and applications was carried out to upskill and reskill employees, including for the school and university academic and supporting staff. Many Malaysian universities at the time had already been introduced to blended and e-learning; hence, the pandemic led to further expansion and fortification of online courses.

## 1.1. Statement of the problem

In the rapidly evolving landscape of education, integrating online technologies has opened up new avenues for learning, particularly for English as a Second Language (ESL) learners. The advent of digital platforms and the principles of Connectivism provide opportunities for ESL learners to engage in diverse online interactions that potentially enhance language acquisition and cultural understanding (Al-Shehri, 2011; Crawford, 2017; Alshabeb, 2020). However, despite the potential benefits, there is a gap in our knowledge of how applying Connectivism theory to online interaction specifically impacts ESL learners' language learning experiences. The absence of comprehensive research on this intersection leaves an essential question unanswered: How does incorporating Connectivist principles into online interaction affect ESL learners' perceived connectedness and diversity in online learning, autonomy in online learning, and openness in online learning?

Traditional language learning methodologies often emphasise structured classroom settings and face-to-face interactions. However, the rise of online learning environments and the Connectivist paradigm challenge conventional notions of learning by advocating for networked knowledge, learner autonomy, and collaboration. ESL learners who often seek immersive language experiences could benefit from the diverse and authentic language exposure facilitated by online interactions. However, the extent to which Connectivism effectively supports ESL learners' language development in digital spaces remains to be determined.

Moreover, the online environment introduces challenges, such as issues of digital literacy, the potential for miscommunication, and concerns about isolation. These challenges can impact the quality and effectiveness of language learning experiences, particularly for ESL learners navigating these spaces in a non-native language.

In light of the expanding digital landscape and the increasing importance of English language proficiency for global communication, it is imperative to investigate how learners perceive connectedness, diversity, autonomy, and openness in online learning. Addressing this gap in the literature will provide valuable insights into how Connectivist principles can be leveraged to design compelling online learning experiences that cater to the unique needs of ESL learners,

foster cross-cultural understanding, and harness the full potential of digital technologies for language learning.

## 1.2. Objective of the study and research questions

The study explores the perceptions of online learning among Universiti Teknologi MARA (UiTM) Shah Alam undergraduates as ESL learners, particularly in online interaction and Connectivism. The study seeks to answer the following questions: 1) How do learners perceive connectedness and diversity in online learning?, 2) How do learners perceive autonomy in online learning?, and 3) How do learners perceive openness in online learning?

## 2. Literature Review

## 2.1. The theory of connectivism

Connectivism, a learning theory introduced by George Siemens in 2005, has gained attention in education due to its relevance to the digital age and the evolving nature of knowledge dissemination. This theory posits that learning is a process that occurs through connections established in digital environments, such as social networks and online platforms (Siemens, 2005). As the educational landscape becomes increasingly technology-driven, it is essential to understand the principles of Connectivism and its implications for various aspects of learning.

One of the fundamental principles of Connectivism is the idea that knowledge is distributed across networks. Siemens (2005) argues that traditional learning theories, such as Behaviourism and Constructivism, do not adequately account for technology's rapid expansion of information. In the context of language learning, this perspective has significant implications. ESL learners, for instance, can benefit from access to authentic language use on digital platforms, enabling them to connect with native speakers and engage in meaningful interactions (Falloon, 2020). Kurt (2023) said Connectivism advocates a distributed learning model in which real-time education is not confined to an individual but extends outward, incorporating platforms like social media, online communities, and extensive information databases.

Furthermore, the role of learners in Connectivism is distinct from traditional educational models. Learners are not mere recipients of knowledge but active participants in creating their learning paths. Alam (2023) explains that Connectivism encourages a self-directed approach to learning, where learners use their network connections to seek and filter information. This aspect resonates with the concept of agency in language learning. ESL learners, for instance, can curate their language learning resources and engage in online conversations to practise language skills (Godwin-Jones, 2019).

Connectivism also emphasises staying current in a rapidly changing information landscape. Siemens (2005, p.4) highlighted eight principles of Connectivism, and among them are the emphases on the "capacity to know more is more critical than what is currently known" and "currency (accurate, up-to-date knowledge) is the intent of all Connectivist learning activities" (cited in Rice, 2018). Despite that, Marttunen et al. (2021), in their article investigating how students assess the credibility and argumentative content of online sources, found that, in general, students struggle with evaluating the credibility and arguments posed in these sources, which leads to the suggestions that there should be greater emphasis on teaching students how to interpret and analyse online information critically. In the realm of language learning, this translates to

developing critical thinking skills to assess the authenticity and appropriateness of language resources and materials available on the Internet.

The application of Connectivism in language learning, particularly for ESL learners, has been explored in various studies. Both Downes (2019), in his article on development and perspectives on Connectivism as a learning theory, and Polat (2017), in a discussion of the potential of Connectivism in computer-assisted language learning (CALL), highlighted the role of digital tools in facilitating Connectivist learning and increasing interaction and knowledge sharing online.

In short, the theory of Connectivism offers a valuable framework for understanding learning in the digital age. Its emphasis on networked knowledge, learner agency, critical thinking, and continuous learning aligns with the evolving nature of education and the opportunities provided by digital technologies. In the context of ESL learners, Connectivism principles can empower individuals to engage with authentic language use, foster collaboration, and take ownership of their learning journeys.

## 2.2. Advantages and disadvantages of online learning

Online learning, also known as e-learning, has become a viable alternative to traditional classroom education. While it offers numerous advantages, it also presents certain disadvantages that warrant consideration. This literature review examines both the benefits and drawbacks of online learning, shedding light on its implications for learners and educators.

One of the primary advantages of online learning is its flexibility. Learners can access course materials and participate in activities at their own pace and convenience (Liu et al., 2020). This flexibility is especially beneficial for individuals with diverse schedules or commitments. Besides that, digital platforms enable ESL learners to interact with authentic language content, including videos, articles, and conversations (Muftah, 2022). Exposure to real-world language use enhances language skills and cultural understanding. Next, online learning transcends physical boundaries, allowing quality education to reach learners from various locations. Sato et al. (2023) stated that the change to online learning, specifically in higher education, led to positive developments of online platforms, namely improved accessibility of resources and swift course content updates. In addition, learners who might otherwise be unable to attend traditional classes due to distance or mobility constraints can benefit from online courses. Subsequently, online platforms often offer personalised learning experiences through adaptive technologies and tailored content (Hamdan et al., 2020). Learners can progress through materials based on their learning pace and receive targeted feedback. Overall, online learning breaks down geographical barriers in education by creating accessibility to educational resources, flexibility to learn at one's own pace and schedule, cost-effectiveness, and a customised learning experience.

A significant drawback of online learning is the absence of direct, face-to-face interaction with instructors and peers, which is crucial for developing speaking and listening skills (Salih & Omar, 2021). This can lead to feelings of isolation and hinder opportunities for in-depth discussions. Moreover, online learning demands a high level of self-discipline and intrinsic motivation (Esra & Sevilen, 2021). Learners need to manage their time effectively and stay motivated without the structured environment of a physical classroom. Also, online learning heavily relies on technology, and technical issues such as Internet connectivity problems or software glitches can disrupt the learning experience (Haque et al., 2023). Lastly, online communication can be prone to misunderstandings due to the absence of nonverbal cues and immediate feedback (Alawamleh et al., 2022).

Online learning offers ESL learners advantages such as flexible learning environments, exposure to authentic language, accessibility, personalised learning, enhanced practice opportunities, and global collaboration flexibility. However, it also presents challenges related to limited oral interaction, self-discipline, technical issues, and potential miscommunication. To maximise the benefits of online learning, educators and institutions must address these disadvantages through thoughtful design and support strategies, ensuring that ESL learners can effectively develop their language skills in a digital context.

## 2.3. Past studies

Much research has focused on online learning involving Malaysian university students and Malaysian English as a Second Language learners. Kamaludin and Sundaresen (2023) examined the challenges and ensuing effects of online distance learning implemented during the critical period of the COVID-19 pandemic, where all education was conducted via emergency remote teaching (ERT). A descriptive analysis was performed on 410 comments posted in response to an Instagram video expressing a Malaysian university student's experience in online distance learning. The study found that Malaysian undergraduates faced several challenges. The first is the pedagogical challenges, such as coping with unfamiliar teaching and learning methods, which resulted in a lack of interaction with instructors and peers. Secondly, there were technological challenges, such as Internet connectivity and a lack of equipment or devices to support online learning. Third, there were social challenges, such as a lack of family support and conflicting responsibilities during this ERT period.

On the other hand, Abdul Halim et al. (2021) explored the theory of activity in online learning to investigate Malaysian students' perceptions of the operational structure (online environment), activities conducted online (learner-to-content interaction), and peer-to-peer interaction (action level) in online learning. Their study found that learners saw the ease of presentation of content as essential, preferring that the content of the class be given before the class. Additionally, it was found that peers are important in encouraging students to engage in online classes. Sokman et al. (2022) looked into 255 public university learners' perceived learning in an online environment. It was revealed that providing a conducive online learning environment is critical, especially the roles instructors play in ensuring the right tools are used and teaching styles that encourage active participation. Moreover, learner-to-learner interaction and peer support are vital as they provide a much-needed sense of community.

Saputra et al. (2023) examined online learning experiences for speaking activities among 30 Malaysian undergraduate ESL students at a public university. Their study concluded that using online platforms to improve speaking abilities is successful. However, some students encountered internet issues at the beginning of the speaking activities, but various strategies were used to overcome the problem. Meanwhile, Chew and Ng (2015) studied the participation style of ESL learners in face-to-face and online discussions among 48 upper-secondary school students. Overall, an online discussion setting was found to promote a more balanced and active engagement among the respondents, as their anxiety was lower when discussions were done online. Additionally, students felt that online discussions were an interesting and enjoyable approach to learning English.

## 2.4. Conceptual framework

The fear of losing connectivity is among the worries of switching from face-to-face to online learning. Learners (and even instructors) are reported to be unmotivated because of the distance.

According to Rahmat et al. (2021), the factor that motivates online learning is satisfaction. Both instructors and learners need to feel satisfied with the lesson to want to achieve more. Figure 1 shows the conceptual framework of the study. This study is rooted in Downes's theory of Connectivism (2010), which states that online learners need (a) connectedness and diversity from their peers. In addition to that, there should also be (b) autonomy for learners to feel a sense of freedom to make decisions about their learning and (c) openness when interacting with the content of the lesson. In this context, diversity relates to the importance of having broad perspectives and experiences within a learning network. On the other hand, autonomy refers to personalised or self-directed learning, while openness refers to where knowledge is freely shared, accessed, and contributed. The factors in Connectivism are then scaffolded onto Martin and Bolliger's (2018) types of interaction to reveal the framework in Figure 1. In the context of this study, (a) connectedness and diversity are achieved from learner-to-learner interaction. Next, autonomy is shown through learner-to-instructor interaction. Finally, openness is achieved through learner-to-content interaction.

Figure 1: Conceptual Framework of the study - online interaction through Connectivism



## 3. Methodology

This quantitative study investigates the perceptions of online learning among UiTM Shah Alam learners, focusing on online interaction and Connectivism. The study employed a purposive sample of 75 participants and received 75 responses. The instrument used is a 5-point Likert-scale survey rooted in Downes (2010) and Martin and Bolliger (2018) to reveal the variables in Table 1 below. The survey has four sections. Section A has items on the demographic profile. Section B has six items on connectedness and diversity. Section C has eight items on autonomy, and Section D has eight items on openness.

Table 1: Distribution of Items in the Survey

| SECTION | CONNECTIVISM (Downes, 2010) | TYPE OF INTERACTION (Martin & Bolliger,2018) | No of Items |
|---|---|---|---|
| B | CONNECTEDNESS & DIVERSITY | Learner-to-learner | 6 |
| C | AUTONOMY | Learner-to-Instructor | 8 |
| D | OPENNESS | Learner-to-Content | 8 |
| | | Total no. of Items | 22 |

Table 2 shows the survey's reliability. The analysis shows a Cronbach alpha of .893, revealing the instrument chosen or used to be reliable. Further analysis using SPSS was done to present findings and answer the research questions for this study.

Table 2: Reliability of Survey

| Cronbach's Alpha | N of Items |
|---|---|
| .893 | 22 |

## 4. Findings

### 4.1. Findings for demographic profile

This section delves into the demographic profile of the survey respondents. Understanding the demographics of the sample population is vital to gaining insights into the attributes and diversity of the individuals being examined.

Figure 2: Percentage for Gender (Q1)

| 1 | Male | 29% |
|---|---|---|
| 2 | Female | 71% |

As presented in the table above, a majority of 71% of the survey respondents are females. Meanwhile, male respondents consist of only 21% of the total respondents.

Figure 3: Percentage of Disciplines (Q2)

| 1 | Science & Technology | 8% |
|---|---|---|
| 2 | Social Sciences | 28% |
| 3 | Business | 7% |
| 4 | Others | 57% |

The survey also requested information regarding the respondents' discipline backgrounds. As listed in Figure 3 above, 57% of the respondents came from disciplines other than Science and Technology, Social Sciences, and Business. Next, 28% of the respondents indicated they are from a Social Sciences background. Meanwhile, a small percentage of 8% and 7% of respondents are from the Science and Technology and Business disciplines, respectively.

Figure 4: Percentage for Age (Q3)

| 1 | 18–20 years old | 13% |
|---|---|---|
| 2 | 21–25 years old | 83% |
| 3 | 26 years old and above | 4% |

The third item for the demographic profile pertains to the respondents' age. As presented in Figure 4, a large majority (83%) of the respondents are between 21 to 25 years old. The next age group, 18 to 20 years old, comprises 13% of the respondents. Only 4% of the respondents are 26 years old and above.

### 4.2. Findings for connectedness and diversity in online learning

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

Figure 5: Mean for Learner-to-learner Interaction

| Statement | | Mean |
|---|---|---|
| L2LQ1 | Does collaborative learning promote peer-to-peer understanding? | 3.9 |
| L2LQ2 | Are you more likely to ask for help from your peers? | 4.1 |
| L2LQ3 | Do you prefer to be in the same group with your chosen peer for online activities? | 4.4 |
| L2LQ4 | Do you think the sense of community helps you engage in online classes? | 4.0 |
| L2LQ5 | Do you think support from peers motivates you to finish tasks? | 4.4 |
| L2LQ6 | Do you think that support from peers prevents you from dropping out of the course? | 4.3 |

Survey findings reveal that respondents prefer to be in the same group as their chosen friends for online activities, as indicated by the response mean score of 4.4. Similarly, respondents agree (mean score 4.4) that peer support motivates them to finish tasks. Moreover, respondents also agree (mean score 4.3) that peer support prevents them from dropping out of the course. Additionally, the survey found that respondents agree they are more likely to ask for help from their peers (mean score 4.1). Closely related is the respondents' agreement that the sense of community helps them to engage in online classes (mean score 4.0). Lastly, regarding whether collaborative learning promotes peer-to-peer understanding, a mean score of 3.9 shows that respondents agree more with this notion.

## 4.3. Findings for Autonomy in Online Learning

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

The table below lists the mean scores of the learner-to-instructor interaction. The responses were analysed by taking the average (mean) according to the item in the questionnaire. The respondents' mean varied from 3.3 to 4.1, as shown in the table. The highest mean score of 4.1 corresponds to item 1 (the learners perceived the instructor's teaching style as encouraging active participation) and item 6 (learners found the online platforms used by the instructor for the online class to be effective and convenient). The following mean scores of 4.0 were item 5 (instructors who used more than two communication tools to stay connected with the learners) and item 7 (instructors who maintained ongoing interaction with the learners even after the class had concluded). Items 3 (feedback on previous assessments) and 4 (clarity and positivity of feedback) obtained the same mean score of 3.9. The lowest mean score of 3.3 was item 8 (ODL promoting participation and interaction).

Figure 6: Mean for Learner-to-instructor Interaction

| Statement | | Mean |
|---|---|---|
| L2IQ1 | Does your instructor's teaching style involve students' active participation? | 4.1 |

| L2IQ2 | Do you feel encouraged by your instructor to keep engaged in the online classroom? | 3.8 |
| L2IQ3 | Does your instructor provide feedback from your previous assessment? | 3.9 |
| L2IQ4 | Do you feel feedback from your instructor on your performances is clear and positive? | 3.9 |
| L2IQ5 | Does your instructor use more than two communication tools to stay connected with students? | 4.0 |
| L2IQ6 | Do you think that online platforms used by your instructor for your online class are effective and convenient? | 4.1 |
| L2IQ7 | Does your instructor maintain ongoing interaction with students after online classes? | 4.0 |
| L2TQ8 | Do you think ODL promotes greater participation and interaction among learners and instructors? | 3.3 |

These findings highlight various aspects of the instructor's teaching style, online communication methods, and the effectiveness of online learning platforms. Overall, students perceive the instructor's approach positively in encouraging engagement, providing feedback, using communication tools, and maintaining interaction beyond class sessions. However, there might be room for improvement in promoting greater participation and interaction in the context of Open and Distance Learning.

### 4.4. Findings for openness in online learning

This section presents data to answer research question 3: "How do learners perceive openness in online learning?" In the context of this study, this is measured by learner-to-content interaction.

Figure 7: Mean for Learner-to-content Interaction

| | Statement | Mean |
|---|---|---|
| L2CQ1 | o you think synchronous activities (i.e., online discussion) could offer nmediate assistance? | 3.9 |
| L2CQ2 | o you think the asynchronous activities (i.e., assignments) could offer nmediate assistance? | 3.7 |
| L2CQ3 | o you think the activities could improve the understanding of the ıbject matter? | 4.2 |
| L2CQ4 | o you think the activities in online learning could improve your ·itical thinking skills? | 4.1 |
| L2CQ5 | o you think you can use relevant knowledge wisely in the learning ·ocess? | 4.1 |
| L2CQ6 | o you feel that the ease of online content is important? | 4.2 |
| L2CQ7 | o you feel it is important to get an overview of the content before the ass begins? | 4.4 |
| L2TQ8 | o you think that ODL gives more benefits than drawbacks? | 3.8 |

The table above indicates the mean scores for learner-to-content interaction. It shows the mean for eight items. Item 7 recorded the highest mean of 4.4 (it is important to get an overview of the

content before the class begins). The next highest mean of 4.2 was item 3 (the activities could improve the understanding of the subject matter) and item 6 (the ease of online content is important). Items 4 (the activities in online learning could improve learners' critical thinking skills) and 5 (learners can use relevant knowledge wisely in the learning process) obtained the same mean score of 4. Item 1 mean score was 3.9 (the synchronous activities, such as the online discussion, could offer immediate assistance). Subsequently, item 8 (ODL gives more benefits than drawbacks) showed a mean score of 3.8, whereas item 2 (the asynchronous activities, such as assignments, could offer immediate assistance) received a mean score of 3.7.

Overall, the findings from this survey indicate that participants generally have positive perceptions of the effectiveness and benefits of various online learning activities. They see these activities as valuable tools for improving understanding, critical thinking skills, and practical application of knowledge. Additionally, participants emphasise the importance of accessible content and preparation before class, possibly to feel engaged with the learning. However, while online distance learning is seen as beneficial, participants are somewhat cautious about whether its benefits outweigh its drawbacks.

## 5. Conclusion

This study has highlighted several critical issues in online interaction, focusing on Connectivism in online learning among UiTM learners. Specifically, the study set out to answer the following questions: 1) How do learners perceive connectedness and diversity in online learning?, 2) How do learners perceive autonomy in online learning?, and 3) How do learners perceive openness in online learning? With that, the survey elicited feedback on learner-to-learner interaction (connectedness and diversity), learner-to-instructor interaction (autonomy), and learner-to-content interaction (openness). The study uncovered several significant findings.

Engagement and interaction between learners are influential factors in the success of online learning. The digital revolution may have presented new opportunities and challenges in these aspects. Still, the survey results suggest a common theme of the importance of having peer support in a learning setting.

Survey findings revealed that respondents prefer to be in the same group as their chosen friends for online activities. Similarly, respondents agree that support from peers motivates them to finish tasks. This is in congruence with a study by Abdul Halim et al. (2021), whereby in their study on exploring the theory of activity in online learning, survey participants agreed that they require "support from peers to finish their tasks." Likewise, the study showed that participants agree that learners would rather "be in the same group" with a friend of their choice when doing online activities. The findings also relate to Rotar's (2022) systematic review of the online student support strategies and interventions documented during the past decade. Among the strategies found in Kumar and Johnson's (2017) study was the need for peer support groups when mentoring doctoral groups online to encourage persistence for students to complete their degrees. Rotar also found through a study by Brown and Wilson (2016) focusing on 'Caring in the Online Learning Environment' that support groups, named Caring Groups in their study, were reported to be effective as they offered a safe space and cultivated social presence and engagement as an online community.

The dynamics of learner-to-instructor interaction have shifted with the evolving landscape of online learning. This type of interaction and engagement between the student and the teacher no longer applies to the physical settings of the classroom. When transitioning to online learning, the

engagement between these two is no less important and is still a determining factor in learning success. The study's results suggest that the method by which the teacher manages students' online learning is vital and influences the students' acceptance and assurance in undergoing online learning. This is shown in the responses to the survey whereby learners found the online platforms used by the instructor for the online class to be effective and convenient. This viewpoint is also reflected in a study by Shackleford and Maxwell (2012) on the contribution of learner-instructor interaction in developing a sense of community in graduate online learning, where it was found that students equally valued all types of learner-instructor interaction as essential contributors to building a sense of community and consequently aiding or enhancing learning.

Learner-to-content interaction is a crucial facet of the online learning experience. The student's ability and success in navigating through the digital platforms and given interfaces and engaging with the online teaching and learning materials determine the effectiveness of online learning. The study revealed that it is vital for students to get an overview of the content before the class begins. This is also in agreement with Abdul Halim et al.'s (2021) study, which found that knowing the content of the class beforehand is necessary for the students. Also, the results suggest that ease of content and activities to improve subject matter understanding were significant in learner-to-content interaction. Similarly, Hongsuchon et al. (2022), in a quantitative study to examine the effectiveness of online learning and its benefits, discovered that interaction with content is crucial for learning success. Students must have a suitable study plan and review the learning material before studying online. This also suggests that students must be prepared and equip themselves with a practical and comprehensive online learning approach.

Based on the study's results, several pedagogical implications and suggestions for future research are included, explicitly concerning learner-to-learner interaction, learner-to-instructor interaction, and learner-to-content interaction in online learning.

Results of the study investigating this aspect of Connectivism in online learning suggest that the presence and support of peers are vital to the learner. This positive peer influence insinuates the importance of incorporating more collaborative learning activities into online learning. The positive peer influence on the motivation to learn also implies the importance of looking into the inclusion and effectiveness of peer assessment in online ESL interactions and the plausibility of integrating it into ESL courses to provide valuable feedback. Additionally, a future study could focus on the impact of pairing or grouping learners with varying proficiency levels and backgrounds in online interaction to boost language learning outcomes. Finally, due to the importance of having peers in online learning, future studies could also examine how learner-to-learner interactions influence learners' motivation and engagement, specifically focusing on exploring strategies to sustain learning motivation.

Concerning the importance of instructor interaction, survey results show that participants agree that the online platforms used by the instructor are effective and convenient. This denotes the importance of having the right mode of delivering content in online learning. Identifying effective online teaching strategies and techniques is essential to facilitate further learner-to-instructor interaction and enhance learning outcomes. Similarly, it is also vital to examine the training needs of ESL instructors to ensure even more effective online teaching and interactions in pedagogical and technological aspects. Another important and related aspect of training is the mechanism, or how instructors can best provide timely and constructive feedback in online environments.

Findings for this aspect of Connectivism in online learning indicate that it is important for learners to get an overview of the content before the class begins, have easy access to content, and have

activities that could improve understanding of the subject matter. These suggest the need for investigations into the use of adaptive learning technologies that would personalise content to individual ESL learners' needs and preferences based on their interactions in online learning settings. Next, it is equally important to explore means to ensure suitable and accessible content for ESL learners with diverse needs, including those with disabilities. Another significant future research is to look into the effectiveness of multimodal content, such as audio, video, and assorted interactive materials, that will help to increase learner engagement and support better comprehension.

The above implications of the study and suggestions for future research can provide a more profound and much more comprehensive understanding of the role of online connectivity in ESL learning for UiTM students and others.

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