# Perception of Odl Relationship between Autonomy and Other Components in Connectivism in Online Learning

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## ABSTRACT

The swift transition to online learning amid the COVID-19 pandemic has markedly impacted global educational practices and augmented the utilisation of online learning platforms. A method purported to be efficient in time and space represents a solitary experience for numerous learners. This paper analyses and evaluates the relationship between autonomy and other components6 of connectivism in online learning. This study investigates learners' perceptions of online presence in virtual classrooms. This research is based on Siemens' (2005) theory of connectivism. The theory posits that practical online lessons require autonomy, connectedness, diversity, and openness. This quantitative study employed a survey questionnaire comprising four main sections and 21 items to address the research questions. The findings from 135 undergraduate participants indicate a significant correlation among autonomy, connectedness, diversity, and openness in online presence. This shows the necessity of incorporating these principles into online learning design.

**Keywords:** online learning, connectivism, learner autonomy, openness, connectedness

## INTRODUCTION

### Background of Study

The literature defines online learning through several key elements: technology, time, interactivity, physical distance, educational context, synonymous terms, and associated challenges (Singh & Thurman, 2019). Online learning, or e-learning, denotes interactive technology accessible from any location, either synchronously or asynchronously, for educational objectives. Online learning serves as a mechanism to enhance the student-centredness, innovation, and flexibility of the teaching and learning process. The program encompasses online courses, examinations, gamified quizzes, and certification training. Singh and Thurman (2019) define online learning as an educational experience conducted through synchronous or asynchronous methods utilising various internet-enabled devices. Synchronous learning involves students participating in live lectures and real-time interactions, facilitating immediate feedback exchange. Synchronous learning methods are typically supported by media, including e-mail, recorded videos, and discussion boards, allowing for offline participation by learners and instructors (Hrastinski, 2008).

The network learning theory known as 'connectivism,' developed for online education, has gained significant popularity. Siemens first published "Connectivism: A Learning Theory for the Digital Age" online in 2005, with subsequent developments by Downes in 2005, 2006, and 2012. Educators recognise connectivism for its potential to enhance understanding and management of teaching and learning through digital technologies. This aligns with the connectivism theory, which posits that learning arises from engagement with interconnected knowledge through social interaction, experience, observation, and institutions (Siemens, 2005). In 2018, Martin

and Bolliger posited that a positive online learning environment can be established by comprehending the social interactions among learners, instructors, and materials.

Autonomy primarily denotes learners' capacity to assume responsibility for their education, including the planning, executing, and evaluating of their learning processes. Throughout the learning process and its various stages, learners engage with encountered problems, seeking appropriate solutions, progressively facilitating knowledge acquisition (Little, 2004; Littlewood, 1996; Moore, 1972; 1973; Wedemeyer, 1981). This educational format enables individuals to engage in self-paced learning, frequently from home, thereby enhancing accessibility for those with demanding schedules or geographical limitations. A reliable internet connection and a device, such as a laptop, tablet, or smartphone, are all required (Ramli et al., 2022; Sulaiman, 2014). The destruction caused by social media negatively affected learner performance due to the presence of engaging content on platforms such as Facebook, TikTok, Instagram, YouTube, and online shopping sites, which diverted their focus and attention. Specific learners may encounter difficulties with the autonomy and adaptability provided by online courses, necessitating supplementary support and guidance to maintain progress (Lee et al., 2017).

Autonomy significantly influences online learning, affecting multiple dimensions of the learning experience. Jaggars and Xu (2016) indicate that autonomy in online learning enhances learner empowerment, promoting self-directedness and motivation (Fujii, 2024; Kian Tan et al., 2023). Additionally, autonomy promotes learner accountability for their educational results (Littlejohn & Milligan, 2017). The self-esteem of learners who are not consistently engaged in their studies can be positively and negatively influenced.

This area requires examination as the future of education is directed towards a borderless model, specifically online education. There is a considerable necessity for research examining the relationship between autonomy and connectivism in online learning to identify methods for fostering student learning interests, particularly in digital environments. Learners of all ages globally need to cultivate substantial motivational factors in their online learning experiences. This study promotes further development in autonomy, openness, connectivism, and diversity among teachers/facilitators and learners to enhance the online learning experience (Adam et al., 2023).

**Statement of Problem**

Connectivism, a concept introduced by George Siemens (2005), provides a framework for understanding how learning occurs in networked environments while acknowledging the unique opportunities and challenges of the digital age. Learners actively participate in online discussions, engage with multimedia content, collaborate with peers, and create and share knowledge.

Engaging students in online courses enhances their satisfaction, motivation to learn, and overall performance, and reduces feelings of isolation (Martin & Bolliger, 2018). According to Martin and Bolliger (2018), learner-to-instructor engagement strategies were the most valued among the three categories. In the learner-to-learner category, icebreaker discussions and collaborative work using online tools were rated as the most beneficial strategies. For learner-to-instructor engagement, students appreciated regular announcements, email reminders, and assignment grading rubrics. In the learner-content category, real-world projects and discussions guided by specific questions were highlighted as the most effective.

During the COVID-19 pandemic, online learning was widely adopted by universities in Malaysia, and it continues to be used even after the pandemic. Nearly four years later, feedback from students and educators has sparked discussions about the outcomes of online learning, this has compelled educators to examine current practices in digital education, prompting them to rethink, and debate, about how each aspect fits into the broader educational framework. In Malaysia, many studies have explored connectedness in online learning situations, using the theory of connectivism. Ali et al. (2022) found that connectivity in online learning is established through three main directions: teachers, students, and peers or friends. Leo & Neo (2023) found that students enhanced their collaborative skills, technology was more effectively utilised, and Connectivism Learning significantly improved the student learning process. Besides, from Jailani's (2023) investigation among

undergraduates, the results indicate that diversity and openness, connectedness, and autonomy positively influence online learning experiences. Furthermore, Yusof et.al (2015) discusses the use of exploratory and confirmatory factor analysis to validate the adoption of Web 2.0 through a connectivism questionnaire. Five factors, diversity, openness, autonomy, interactivity, and self-regulated strategies were identified through principal component analysis. The findings suggest that the five-factor model is suitable for second-order factor investigation (Yusof et. al., 2015). In addition, Haris et al. (2023) found that students largely held positive views on engagement strategies, with learner-to-instructor interaction being the most highly valued among the three elements. They suggest that to help educators develop professionally and successfully apply connectivism in various educational contexts, more research is required. (Haris et. al., 2023).

In a real classroom setting, to what extent does Connectivism help address challenges in online learning? What role does Connectivism play in fostering online presence? Consequently, this study explores learners' perceptions of online presence in virtual classes, focusing on autonomy, connectedness, diversity, and openness. It also examines the relationships among these elements.

### Objective of the Study and Research Questions

This study is done to explore the perception of learners on online presence in online classes. Specifically, this study is done to answer the following questions;

- How do learners perceive autonomy in online presence?
- How do learners perceive connectedness and diversity in online presence?
- How do learners perceive openness in online presence?
- Is there a relationship between autonomy, connectedness, diversity and openness in online presence?

## LITERATURE REVIEW

### Theoretical Framework

### Connectivism in Online Presence

Connectivism is a conceptual framework which views learning as a network phenomenon influenced by technology and socialisation. Connectivism is a relatively new learning theory that suggests students should practically combine ideas, theories, and general information. According to Siemens and Downes (2005), unlike behaviourism, cognitivism and constructivism, connectivism questions the value of learning as a learning theory in the development of the learner. The earlier theories (behaviourism, cognitivism and constructivism) were created in an era when information development was slow and when technology had less impact on learning. The focus was on placing learning at the centre of the cognitive development of the learner. Connectivism on the other hand stresses that learning is located in different networks and the social construction of knowledge makes the learner essential in the process of knowledge creation. (Hendricks, 2019). The learning community in the connectivist model is described as a node, which is always part of a larger network. Nodes emerge from the connection points found on a network. Nodes could also be companies, libraries, websites, publications, databases, or any other information source (Siemens, 2006)

According to Tschofen & Mackness (2012), the theory of connectivism is being tested in Massive open online courses (MOOC). MOOCs, or online courses, draw a great variety of participants from all around the world. They are open to everybody and are free. Participants are supposed to freely share their ideas, knowledge, experience, and skills so that knowledge is produced inside the network in addition to being freely transferred over the network. Though the MOOC courses follow a curriculum, students are encouraged to be autonomous and control their learning by creating their own social and conceptual connections to fit their own needs. Downs (2006, 2012), in Goldie (2016) stated that successful networks are considered to have these characteristics: diversity—the widest range of perspectives of view; autonomy of participants—the ability to take charge of one's own learning (Holec, 1981); openness—mechanisms that let viewpoints be included in the system; and connectivity—a connection between its nodes.

**Benefits and Drawbacks in Online Learning**

During the COVID-19 pandemic, universities have turned teaching and learning activities online. In the years 2020-2021, most universities were forced to conduct classes online, without adequate preparation and training. Teachers had to utilise whatever resources and skills were available at that time concerning the new instructional strategies. (Kamaludin & Sundarasen, 2023). After almost five years since the COVID-19 outbreak, online distance learning has become part of the teaching and learning method. Many universities have established a proportion of courses and academic programs for students who cannot attend traditional face-to-face courses. Among the main benefits of online learning environments are flexibility and student-centered learning (Mukhtar (2020). Classes can be scheduled according to the students' and teachers' feasibility and availability. It provides more autonomy in decision-making and control over the learning process. Online classes also allow students to access a wider range of courses, programs, and lectures that otherwise wouldn't be easily accessible in a traditional classroom setting. Students still can attend courses abroad while living in their own country.

Despite the significant advantages of online learning, students come into many difficulties that finally result in either limited or bad outcomes. (Al Rawashdeh & Mohammed, 2021). Dumford & Miller (2018) in their study reported that greater numbers of online courses also corresponded with less exposure to successful teaching strategies and poorer interaction quality among the students. Compared to their more conventional classroom counterpart, they were less likely to engage in collaborative learning, student-faculty interactions, and discussions with diverse others. In another study conducted in Indonesia by Thamri et al. (2022), the results reveal that technical issues with internet connection are the main concern for respondents: lack of knowledge of the subjects; lack of interaction with friends; less interaction with the teacher; inadequate home learning environment; and so on. The most crucial elements behind students' unhappiness with online learning are a lack of self-discipline and the least response is for social isolation.

**Past Studies**

**Past Studies on Connectivism in online learning**

Connectivism is an important theory in online education that emphasizes how students can connect and learn through technology. Several studies have explored how autonomy, openness and connection play an important role in this process. A study by Adam et al. (2023) examined how these three attributes motivate students in online learning environments. The researchers aimed to understand the relationship between these elements and the motivation of the students. They used surveys to collect data from a different group of participants, analyzing answers to identify trends and topics. Their result showed that high levels of autonomy and openness lead to greater commitment and motivation, which suggests implications for instructors who seek to improve online learning experiences.

Another significant study is from Alam (2023), who reviewed the existing literature on connectivism and its impact on teaching and learning. This review aimed to determine ideas from several studies to better understand how connectivist principles help to improve educational practices. Alam analysed articles reviewed by pairs, focusing on its methodologies, populations and key findings. The review revealed that a connectivist approach encourages students to take control of their learning (autonomy), lead to exchange and collaboration (opening) and improves relationships between students (connection). He highlighted the need for educators to design courses that encourage these elements to teach students effectively.

Eguara (2021) explored the autonomy of the student and the self -efficacy in the framework of the scaffold mediated by technology. The study aimed to provide evidence on how digital tools can support students to become more autonomous. This research used a qualitative design, collecting data through interviews and observations. The results indicated that when students have access to technology and orientation, they develop a stronger sense of autonomy and confidence in their skills. Eguara's work suggests that integrating technology carefully into online learning can improve students' results through the promotion of self -directed learning.

In general, these studies highlight the importance of autonomy, openness and connection in online learning environments. The research suggests that educators should prioritize these elements to improve the motivation

and commitment of students. Instructors can promote a learning community that aligns with the principles of connectivism by creating online spaces that value the collaboration and independence of the student. Each study contributes to a growing body of knowledge that reports best practices in online education, emphasizing the need for continuous exploration in these key areas.

**Past Studies on Benefits and Drawbacks in Online learning**

Online learning has become very important in recent years, with connectivism serving as a significant structure. This structure emphasizes three main components: student autonomy, opening and connection. Research shows that these components play a crucial role in increasing the effectiveness of online learning.

The student's autonomy refers to the students' ability to take control of their own learning process. Adam et al. (2023) Explore how autonomy in online learning motivates students. They found that students who have more control over their learning choices tend to be more engaged and successful. This study suggests that institutions should encourage self-staff learning by providing choices in curriculum and evaluation methods.

Opening in learning involves sharing and accessibility of knowledge and resources. According to Tahir et al. (2021), the opening concept promotes a collaborative learning environment, where students feel comfortable sharing ideas and resources. His research points out that opening not only encourages communication between students, but also enriches the learning experience, allowing few perspectives to be integrated. This suggests that educators should create platforms for students to share their work and ideas, hence improving collective knowledge.

The connection is the third component of connectivism and refers to the relationships and networks that students create. Mukhlis et al. (2024) discuss the role of connection in digital age education. They mentioned that strong connections between students can improve motivation and learning results. Their findings imply that networks, whether through social media or online discussions, can help students feel more engaged and supported on their learning journey.

All of these components of connectivism are linked and essential to promote a productive learning environmereinforcent. The implications of these studies support the need for educators to design courses that improve student autonomy, promote the opening and build connection between students. Several methodologies, such as research and case studies, are common in this research, providing a complete view of student experiences and results.

In short, previous studies indicate that student autonomy, opening and connection significantly affects online learning. The combination of these elements can lead to more effective educational practices, benefiting students in their search for knowledge. By focusing on these components, educators can create a more engaging and supportive online learning experience.

**Conceptual Framework**

Figure 1 shows the conceptual framework of the study. This study is rooted from the theory of connectivism by Siemens (2005). The theory states that effective online lessons need to have autonomy, connectedness, diversity and openness. The components in connectivism are scaffolded onto Martin & Bolliger's (2018) online presence to reveal the framework in Figure 1 below. Learner autonomy refers to the ability of the learner to take charge of his/her own learner. Nevertheless, a successful lesson is a lesson well-planned. This means it starts with the learner-to-instructor to determine how much learner autonomy can be successfully carried out. Next, connectedness and diversity are achieved through learner-to-learner interactions. In order to feel successful in learning, learners need to have a positive experience (Rahmat,et. al, 2021).

Social presence allows for learners' interactions and are needed to allow learners to experience more in online interactions. Lastly, the interactions planned by the teacher can provide space for discussions. These discussions can encourage the use of critical thinking skills to enable learner-to-content interactions.

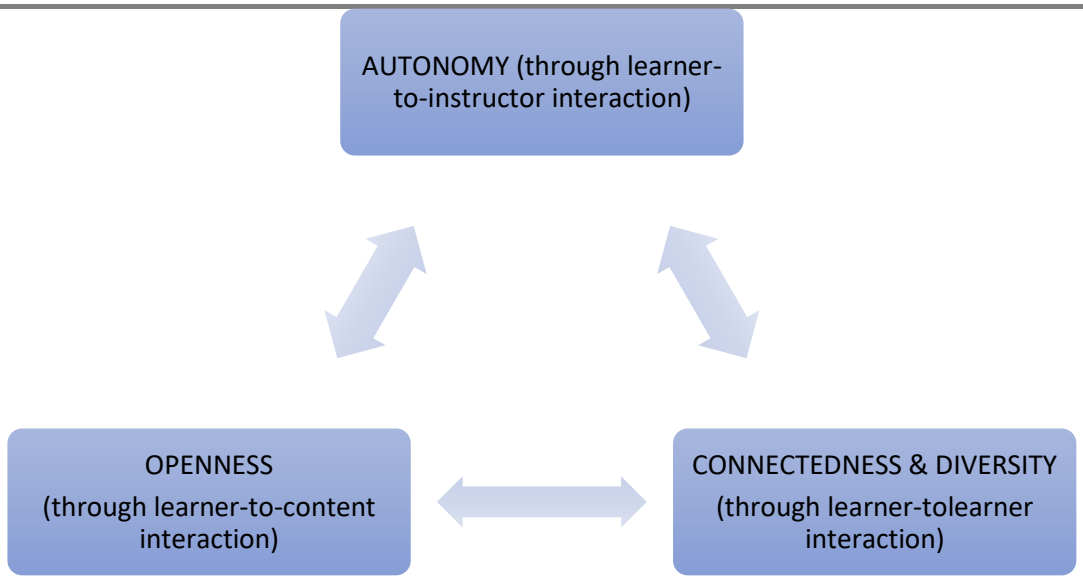


Figure 1- Conceptual Framework of the Study- Relationship between Autonomy and Other Components in Connectivism in Online Learning

## METHODOLOGY

This quantitative study is done to explore motivation factors for learning among undergraduates. A purposive sample of 135 participants responded to the survey. The instrument used is a 5 Likert-scale survey and is rooted from Siemens (2005) and Martin & Bolliger (2018) to reveal the variables in table 1 below. The survey has 4 sections. Section A has items on the demographic profile. Section B has 6 items on learner-learner interaction. Section C has 8 items on learner-instructor interaction. Section D has 8 items on learner-to-content interaction.

Table 1- Distribution of Items in the Survey

| Section | Components Of Sct (Bandura, 1986) | Type Of Interaction | No Of Items | Cronbach Alpha |
|---|---|---|---|---|
| B | Connectedness & Diversity | Learner-To-Learner | 6 | .890 |
| C | Autonomy | Learner-To-Instructor | 7 | .908 |
| D | Openness | Learner-To-Content | 8 | .884 |
| | | Tot No. Of Item | 21 | .947 |

Table 1 also shows the reliability of the survey. The analysis shows a Cronbach alpha of .890 for Connectedness & Diversity, .908 for Autonomy, and .884 for Openness. The overall reliability for all 21 items is .947; , 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

Findings for Demographic Profile

Table 2- Percentage for Q1- Gender

| No | Item | Percentage |
|---|---|---|
| 1 | Male | 44% |
| 2 | Female | 56% |

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Table 2 shows the percentage for gender. 44% of the respondents are male while 56% of the respondents are female.

Table 3- Percentage for Q2- Level of Japanese Language

| No | Item | Percentage |
|---|---|---|
| 1 | Level 1 | 30% |
| 2 | Level 2 | 30% |
| 3 | Level 3 | 40% |

Table 3 shows the percentage for the level of the Japanese Language. There are three (3) levels of Japanese Language have been selected to narrow down the findings. The table shows that 30% of the respondents are pursuing their level 1 and level 2 respectively, while 40% of the respondents are for level 3.

Table 4- Percentage for Q3- Field of Study

| No | Item | Percentage |
|---|---|---|
| 1 | Science & Technology | 42% |
| 2 | Social Sciences | 58% |

In Table 4 under demographic profile, the questionnaire distributes the question into two (2) categories under the Field of Study. Based on findings, 42%of the students come from science & technology discipline, while 58% of students have a social science background.

Table 5- Percentage for Q4- Internet Access

| No | Item | Percentage |
|---|---|---|
| 1 | Slow | 6% |
| 2 | Medium | 67% |
| 3 | Strong | 27% |

Table 5 demonstrates the strength of Internet Access owned by the respondents during their virtual learning. Based on the findings, 67% of the respondents reported that they had medium Internet Access while only 6% indicated they had a poor internet connection. The remaining 27% stated that they had a strong and good connection to the internet.

Table 6- Percentage for Q5- ICT Skills

| No | Item | Percentage |
|---|---|---|
| 1 | Beginner | 13% |
| 2 | Intermediate | 78% |
| 3 | Advanced | 9% |

Table 6 displays the percentage of ICT (Information and Communication Technology) skills of respondents. A majority of respondents 78% fall under the intermediate category followed by 13% of the respondents in the category of beginner and only 9% of the respondents with high-level skills.

## FINDINGS FOR AUTONOMY

This section presents data to answer research question 1- How do learners perceive autonomy in online presence?

In the context of this study, this is measured by learner-to-instructor interactions.

Table 5- Mean for Autonomy

| Statement | Mean | SD |
|---|---|---|
| L2IQ1 Does your instructor's teaching style involve students' active participation? | 4.2 | .79266 |
| L2IQ 2 Do you feel encouraged by your instructor to keep engaged in online classroom? | 4 | .84589 |
| L2IQ3 Does your instructor provide feedback from your previous assessment? | 3.9 | .84687 |
| L2IQ4 Does your instructor's teaching style involve students' active participation? | 4.1 | .7800 |
| L2IQ5 Does your instructor use more than two communication tools to stay connected with students? | 4.1 | .81650 |
| L2IQ 6 Do you think that online platforms used by your instructor for your online class are effective and convenient? | 4.1 | .82906 |
| L2IQ7 Does your instructor maintain ongoing interaction with students after online class? | 4.1 | .76562 |

Figure 5 illustrates the mean scores for Autonomy. The highest mean score, 4.2, is for "Does your instructor's teaching style involve students' active participation?". A mean score of 4.1 is observed for the items "Does your instructor's teaching style involve students' active participation?", "Does your instructor use more than two communication tools to stay connected with students?", "Do you think that the online platforms used by your instructor for your online class are effective and convenient?", and "Does your instructor maintain ongoing interaction with students after the online class?". This result reflects a positive perception of the instructor's use of diverse communication tools, effective and convenient online platforms, and ongoing student interaction after class. The lowest mean score, 3.9, is "Do you feel encouraged by your instructor to stay engaged in the online classroom?" which indicates room for improvement in fostering a sense of encouragement for student engagement in the online classroom.

**Findings for Connectedness & Diversity**

This section presents data to answer research question 2- How do learners perceive connectedness and diversity in online presence? In the context of this study, this is measured by learner-to-learner interactions.

Table 6- Mean for Connectedness & Diversity

| Statement Code | Statement | Mean | SD |
|---|---|---|---|
| L2LQ1 | Does collaborative learning promote peer-to-peer understanding? | 3.9 | 0.77424 |
| L2LQ2 | Are you more likely to ask for help from your peers? | 3.8 | 0.86815 |
| L2LQ3 | Do you prefer to be in the same group with your chosen peer for online activities? | 4.2 | 0.80057 |
| L2LQ4 | Do you think that the sense of community helps you to engage in online class? | 3.9 | 0.81616 |
| L2LQ5 | Do you think support from peers motivates you to finish tasks? | 4.1 | 0.8417 |
| L2LQ6 | Do you think that support from peers prevents you from dropping out of course? | 4.1 | 0.89819 |

Table 6 shows the mean for connectedness and diversity. The highest mean recorded is 4.2 for L2LQ 3 "Do you prefer to be in the same group with your chosen peer for online activities?" The items L2LQ 5 "Do you think support from peers motivates you to finish tasks?" and L2LQ 6 "Do you think that support from peers prevents you from dropping out of the course?" shared the mean of 4.1. The lowest mean (3.8) is for the item L2LQ 2

"Are you more likely to ask for help from your peers?"

**Findings for Openness**

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

Table 7- Mean for Openness

| Statement | Mean | SD |
|---|---|---|
| L2CQ1 Do you think that the synchronous activities (i.e. online discussion) could offer immediate assistance? | 3.8 | .74253 |
| L2CQ 2Do you think that the asynchronous activities (i.e. assignment) could offer immediate assistance? | 3.8 | .72215 |
| L2CQ 3Do you think the activities could improve the understanding of subject-matter? | 4.1 | .68321 |
| L2CQ 4Do you think the activities in online learning could improve your critical thinking skills? | 4 | .77659 |
| L2CQ 5Do you think you can use relevant knowledge wisely in the learning process? | 4.1 | .69928 |
| L2CQ 6Do you feel that the ease of online content is important? | 4.1 | .73060 |
| L2CQ 7Do you feel that it is important to get an overview of the content before the class begins? | 4.2 | .72139 |
| L2TQ8Do, you think that ODL gives more benefits than drawbacks? | 3.8 | .87005 |

Table 7 shows the mean score for Openness. The highest mean, 4.2 is for "Do you feel that it is important to get an overview of the content before the class begin?". A mean score 4.1 represents "Do you think the activities could improve the understanding of subject-matter?", "Do you think you can use relevant knowledge wisely in the learning process?", and "Do you feel that the ease of online content is important?". While a mean score 4, is the "Do you think the activities in online learning could improve your critical thinking skills?". The lowest mean score 3.8, are "Do you think that the synchronous activities (i.e. online discussion) could offer immediate assistance?", "Do you think that the asynchronous activities (i.e. assignment) could offer immediate assistance?", and "Do you think that ODL gives more benefits than drawbacks?" indicates improvement in helping students feel more connected and capable in their study.

**Findings for Relationship between autonomy, connectedness, diversity and openness in online presence**

This section presents data to answer research question 4- Is there a relationship between autonomy, connectedness, diversity, and openness in online presence? To determine if there is a significant association in the mean scores between autonomy, connectedness, diversity, and openness in online presence, data is analysed using SPSS for correlations. Results are presented separately in Tables 8,9 and 10 below.

Table 8-Correlation between Autonomy and Connectedness & Diversity

**Correlations**

| | | AUTONOMY | CONNECTEDNESSdiversity |
|---|---|---|---|
| AUTONOMY | Pearson Correlation | 1 | .660** |
| | Sig. (2-tailed) | | .000 |
| | N | 135 | 135 |
| CONNECTEDNESSdiversity | Pearson Correlation | .660** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 135 | 135 |

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

Table 8 shows there is an association between autonomy and connectedness. Correlation analysis shows that there is a high significant association between autonomy and connectedness (r=.660**) and (p=.000). According to Jackson (2015), coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a strong positive relationship between autonomy and connectedness.

Table 9-Correlation between Connectedness & Diversity and Openness

**Correlations**

| | | CONNECTEDNESSdiversity | OPENESS |
|---|---|---|---|
| CONNECTEDNESSdiversity | Pearson Correlation | 1 | .660** |
| | Sig. (2-tailed) | | .000 |
| | N | 135 | 135 |
| OPENESS | Pearson Correlation | .660** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 135 | 135 |

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

Table 9 shows there is an association between connectedness and openness. Correlation analysis shows that there is a high significant association between connectedness and openness (r=.660**) and (p=.000). According to Jackson (2015), coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a strong positive relationship between connectedness and openness.

Table 10-Correlation between Openness and Autonomy

**Correlations**

| | | OPENESS | AUTONOMY |
|---|---|---|---|
| OPENESS | Pearson Correlation | 1 | .762** |
| | Sig. (2-tailed) | | .000 |
| | N | 135 | 135 |
| AUTONOMY | Pearson Correlation | .762** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 135 | 135 |

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

Table 10 shows there is an association between openness and autonomy. Correlation analysis shows that there is a highly significant association between openness and autonomy. (r=.762**) and (p=.000). According to Jackson (2015), the coefficient is significant at the .05 level, and a positive correlation is measured on a 0.1 to 1.0 scale. A weak positive correlation would be in the range of 0.1 to 0.3, a moderate positive correlation from 0.3 to 0.5, and a strong positive correlation from 0.5 to 1.0. This means that there is also a strong positive relationship between openness and autonomy..

# CONCLUSION

### Summary of Findings and Discussions

The findings indicate a strong positive relationship between autonomy and other components of connectivism

theory, specifically connectedness, diversity, and openness in online engagement strategies. This relationship is particularly evident in the autonomy component, assessed through learner-to-instructor interaction based on learners' perceptions. Lionarakis (2006) asserts that autonomous students actively engage in learning, acquiring knowledge incrementally. Driven by autonomy and leveraging their academic skills, individuals establish goals, navigate challenges, and progressively gain knowledge (Peters, 2000; Zimmerman, 2000). Moore (2007) asserts that students exhibiting high autonomy assume responsibility for their learning process, actively engaging in it and surmounting barriers associated with geographical distance.

**Pedagogical Implications and Suggestions for Future Research**

Connectivism theory in the digital age emphasizes learner autonomy, networked interactions, critical thinking, and flexibility. The findings have significant implications for restructuring traditional instructional methods. The engagement strategies that promote interaction with the instructor were prioritized over interactions with peers and the learning materials or contexts. Online learners highly value instructor presence, recognizing the importance of regular updates from their instructors. Future research on connectivism theory may concentrate on diverse areas to enhance the comprehension of its applications and its capacity to improve teaching and learning in the digital era through examining these research topics. Research can focus on designing and facilitating instructional tactics that align with connectivist principles and practical assessment and evaluation methods tailored to networked learning environments. Further research is necessary to assist educators in their professional development and the practical application of connectivism across various educational contexts.

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