

Exploring Online Group Work through Connectivism Theory

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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v14-i8/21945>

DOI:10.6007/IJARBSS/v14-i8/21945

Published Date: 24 August 2024

Abstract

The COVID-19 pandemic accelerated the adoption of online group work practices in Malaysia, reshaping how students, university attendees, and professionals engage in collaborative learning within digital settings. How learners perceive and embrace this online group work is a key aspect. Connectivism theory highlights four core principles crucial to all learning experiences. In this study, connectivism theory is applied to explore learners' perceptions of diversity and openness, connectedness, autonomy, and the relationship between them. This quantitative study used a survey questionnaire with 23 items separated into three main sections. The results of 166 responses suggest that learners' perceptions of online group work are influenced by diversity and openness as well as connectedness and autonomy. Connectivism also shows a moderate and strong positive significant association across variables. Thus, online group work should incorporate these principles to explore the perception of learners.

Keywords: Online Group Work, Connectivism, Perception, Diversity & Openness, Connectedness, Autonomy.

Introduction

Background of Study

Since the onset of the COVID-19 pandemic, online group work in Malaysia has undergone a significant transformation (An et al., 2023). Educational institutions, businesses, and organizations swiftly transitioned to digital platforms like Google Meet, Zoom, and Microsoft Teams, fostering collaboration and communication among group members (Vorina et al., 2022). With an emphasis on digital skills and self-directed learning, virtual classrooms, and collaborative projects have become the norm in education.

Connectivism is about learning in ever-changing environments, not just what we know but how we connect information. It says learning happens through connections with others and

external sources like databases. In decision-making, it's crucial to prioritize key information and stay flexible, adjusting our approach as new information emerges (Siemens, 2004).

Exploring online group work from a connectivism perspective involves exploring how digital networks and tools influence learning and collaboration in group settings. Connectivism highlights the significance of connections among learners, information sources, and digital resources in aiding knowledge acquisition and problem-solving. In the realm of online group work, this theory delves into how learners engage, exchange information, build knowledge, and enhance skills through digital platforms, considering elements such as diversity, openness, and technology's role in creating valuable learning experiences (Jailani et al., 2023). In Malaysia, exploring online group work through connectivism theory is particularly relevant for several reasons. Firstly, Malaysia is increasingly adopting digital technologies in education, making online group work a common practice (Zainal et al., 2020). Understanding how connectivism theory applies to online group work can enhance the effectiveness of digital learning initiatives. Secondly, Malaysia is a diverse country with students from various cultural backgrounds (Dalib et al., 2019). Connectivism theory's emphasis on networked learning and diverse information sources aligns well with the need to foster inclusivity and diversity in online group work settings. Lastly, Malaysia's focus on innovation and digital transformation in education (Cheah et al., 2012) underscores the importance of exploring modern learning theories like connectivism to meet learners' evolving needs.

Statement of Problem

Aldalalah et al. conducted a study based on connectivism theory to assess the impact of Electronic Collaborative Learning (ECL) on enhancing digital thinking skills among educators (Aldalalah et al., 2023). The researchers suggest incorporating connectivism principles into ECL to cultivate and develop digital thinking abilities in educators.

Siemens conducted detailed research on connectivism as a learning theory in the digital era, delving into its advantages, limitations, and implications for education (Siemens, 2004). The study examines how connectivism correlates with online group work by highlighting the interdependence of knowledge resources, the significance of networked learning, and the impact of technology on enhancing learning. The author discusses practical implications for educators in designing online group work activities that leverage connectivism principles effectively.

AIDahdouh (2019), investigated the individual learning experiences of higher education students in a connectivist learning environment (AIDahdouh, 2019). The research aimed to understand the patterns of node selection among students and the impact of different tasks on their learning approaches. The study emphasized the importance of understanding individual learning experiences in connectivism environments, rather than just focusing on group-level dynamics. It revealed the diversity of individual learning approaches, cognitive engagement, and skill levels, underscoring the need to support students' self-directed learning and digital literacy development.

These academic references offer comprehensive insights into implementing and exploring online group work through connectivism theory, covering digital thinking skills, theoretical

perspectives, and practical implications for educational practice. They also focused on individual learning experiences in connectivism environment.

Fewer studies have focused on examining the perception of learners regarding online group work through connectivism theory. Thus, these studies entail investigating how individuals within these groups perceive and engage in online group work. This involves grasping their attitudes, beliefs, motivations, challenges, and satisfaction levels regarding participation in online group tasks. Through the lens of connectivism theory, how learners navigate digital networks, access information, establish connections, and collaboratively generate knowledge within online group environments will be explored.

Objective of the Study and Research Questions

The purpose of this study is to explore learners' perceptions regarding online group work. In particular, this study aims to answer the following questions;

- How do learners perceive diversity & openness in online group work?
- How do learners perceive connectedness in online group work?
- How do learners perceive autonomy in online group work?
- Is there a relationship between all factors in online group work?

Literature Review

Connectivism

George Siemens' Connectivism Learning Theory, introduced in 2004, emphasizes the role of digital networks and connections in learning (Siemens, 2004). It proposes that knowledge is spread throughout networks, and that learning happens through the process of connecting with information sources, peers, and technology. Connectivism Learning Theory underscores the need for educators to leverage digital technologies and online platforms to create dynamic and engaging learning experiences that will prepare students to succeed in an interconnected world.

Within the perspective of modern learning, Connectivism, also referred to as distributed learning, emerges as a theory better suited for the digital age. It acknowledges the need for action without solely relying on personal learning, often utilizing information sources beyond one's immediate knowledge base. This theory recognizes that learning is not always a straight path and often involves using technology to find and use information (Mattar, 2018).

Utecht et al (2019), discuss eight principle of Siemen's Connectivism Learning Theory and offers a pathway for educators to regain relevance in an ever-evolving educational landscape (Utecht et al., 2019). Connectivity, facilitated by digital technologies and online platforms, is central to this approach, enabling educators to create dynamic learning environments that engage students in meaningful ways. By embracing Connectivism Theory, educators can leverage digital networks and collaborative tools to foster active learning experiences that transcend traditional boundaries. Through online platforms such as forum, social media and virtual communities, students can participate in global conversations, collaborate on projects, and access a wealth of resources from diverse sources. This means that connectivity not only strengthen student engagement and motivation but also provide learners with crucial skills for in this digital age. Applying Connectivism Theory to today's classrooms, Educators may

help students become continuous learners, thoughtful individuals, and engaged citizens in society.

Online Groupwork: Drawbacks and Advantages

Online group projects have been a useful resource for educators and students throughout the pandemic. Maintaining collaborative learning experiences in the face of physical distancing measures is a significant advantage. Students can work together on projects, share resources, and have group discussions from the comfort of their homes using digital platforms. Research by McKay et al findings suggest that students realize online collaborative group work as advantageous in various ways, despite facing challenges such as the global pandemic and its repercussions on remote learning (McKay et al., 2024). This unforeseen event has shed light on the effectiveness of online collaborative group work revealing its potential benefits. Despite the difficulties posed by the pandemic, students recognize the value in fostering collaboration, enhancing learning outcomes, and promoting engagement. These insights have the potential to advance our understanding and implementation, particularly in online learning environments, where it can serve as an effective tool for promoting active learning and supporting student success. However, despite its numerous advantages, online group work also presents significant challenges that could hinder its effectiveness. The challenge is to prevent free riding in group work. El Massah et al. reveals that university students perceive online collaborative group work as a valuable assignment method, at the same time notes the presence of free-rider behaviour among their peers, which remains unchanged even after completing group assignments (El Massah, 2018). This experience serves to temper their initial beliefs about collaborative work. The findings suggest that the student's preference for smaller groups led by a designated leader and regular follow-ups from instructors, indicating the importance of guidance and support throughout the group work process.

In conclusion, while online group work offers significant advantages such as flexibility, enhanced communication, and exposure to diverse perspectives, it also poses challenges related to social dynamics and unequal participation. By addressing these challenges proactively and leveraging the advantages effectively, educators can maximize the potential of online group work to promote collaborative learning and enhance the educational experience for learners.

Past Studies on Online Groupwork

There has been a review of how group work can be used to assess student learning in higher education, in particular online learning (Davies, 2009). It discusses both the advantages and challenges associated with online group work. Additionally, it evaluates different assessment tasks commonly used in online group work and suggests strategies for managing task complexity, recognizing effort, and optimizing group size. It briefly considers implementing incentives for online group members and addressing penalties for unproductive individuals. Ultimately, the paper concludes by providing recommendations for maximizing the benefits of online group work while mitigating its disadvantages in term of virtual learning.

Smith et al. conducted a study over three years, student group work experiences were compared between online (OL) and face-to-face (F2F) sections of the same graduate course. This involved a total of 14 students from the OL sections and 19 from the F2F sections who completed both surveys in the 2009 classes, while 14 F2F students and 18 OL students did the

same in the 2010 classes (Smith et al., 2011). Besides the survey, both classes were need to keep an OL journal about the working in group work as requirement. The results, which highlight the influence of digital networks on online group work experiences, are consistent with the connectivism theory. Problems like poor communication and lower satisfaction in virtual environments are manifestations of tensions between asynchronous norms and collaborative learning. These barriers make it difficult for pupils to solve problems and reinforce their negative perceptions. Instructors should take these factors into account when creating online group work assignments, making efficient use of technology to foster collaborative learning and solve practical issues. Therefore, it is essential to initiate an effective learning group work in online environment. Brindley et al. collected data from students in the Foundations course of the Master of Distance Education (MDE) program over a span of three years (15 cohorts) from University of Maryland University College (UMUC) and the University of Oldenburg (Brindley et al., 2009). This paper explores collaborative learning within smaller groups in online classrooms, specifically focusing on whether assessment impacts learner participation levels. Furthermore, this research addresses specific instructional practices that encourage student participation in small group projects, resulting in a stronger feeling of community, better skill acquisition, and improved learning outcomes.

It is critical for academics and educators to comprehend how students perceive working in online groups. It offers insightful information about the efficacy of remote collaboration and points out areas where online learning environments might be made better. Teachers can adjust their methods for online group work to better match the requirements and assumptions of students by investigating the attitudes and experiences of their students.

Conceptual Framework

The conceptual framework of the study can be seen in Figure 1. This study investigates the perception of learners on online group work. Learners of online learning need autonomy, and attention, to get satisfaction and confidence to learn further (Rahmat et al., 2021). Similarly, the connectivism theory by Siemens states that successful online learning needs to take into consideration factors such as diversity & openness, connectedness, and autonomy (Siemens, 2004). The present study uses connectivism theory to explain how online group work combines cognitive, social, and teaching presences. In addition to that, this study also adapts the items for types of presence by Aderibigbe (Aderibigbe, 2021).

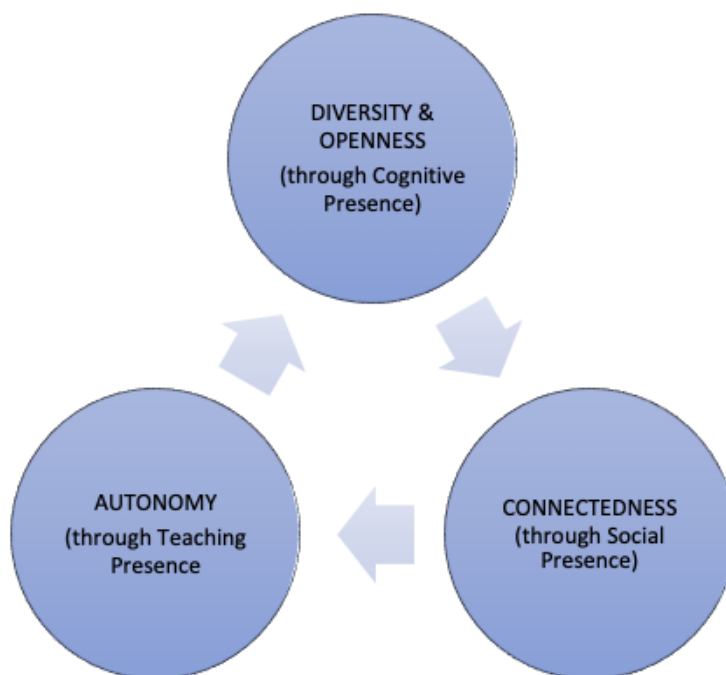


Figure 1- Conceptual Framework of the Study
Mapping Online Group Work and Connectivism

Methodology

This quantitative study is done to explore online group work among undergraduates. 166 respondents completed the survey in a purposive sample. The survey instrument employed is a 5 Likert-scale survey and is rooted from the previous works (Siemens, 2004; Aderibigbe, 2021) reveal the variables in Table 1 below. There are four sections in the survey. Section A contains information regarding the demographic profile. Section B has 7 items on Diversity and Openness. Section C and section D each contain 8 items on Connectedness and Autonomy, respectively.

Table 1
Distribution of Items in the Survey. Aderibigbe, 2021

Section	Connectivism (Siemens,2004)	Elements (Aderibigbe, 2021)	No. of Items	Cronbach Alpha
B	Diversity & Openness	Cognitive Presence	7	.724
C	Connectedness	Social Presence	8	.801
D	Autonomy	Teaching Presence	8	.936
			23	.912

The dependability of each survey variable is also shown in Table 1. According to the SPSS study, the Cronbach alphas for connectedness, autonomy, and diversity are .801, .724, and .936, respectively. These findings show that the used instrument has a high degree of reliability. (Sekaran et al., 2016). A further analysis of the study's findings is performed using SPSS to answer the research questions.

Findings

Findings for Demographic Profile

Table 2

Percentage for Gender

1	Male	44%
2	Female	56%

The demographic profile provides a summary of the gender distribution of survey respondents. According to Table 2, 44% of the respondents identified as male, while 56% identified as female.

Table 3

Percentage for Discipline

1	Science & technology	63%
2	Social Sciences	27%
3	Business	10%

Table 3 presents the distribution of respondents across different disciplines. Among the participants, 63% identified with the field of Science & Technology, while 27% belonged to the Social Sciences category. Business represented 10% of the respondents.

Table 4

Percentage for Strength of Wifi

1	Strong	40%
2	Average	55%
3	Poor	5%

A summary of respondents' perceptions of the strength of their Wi-Fi connection appears in Table 4. According to the findings, 40% of participants reported having a strong Wi-Fi signal, while the majority, constituting 55%, described their connection as average. Only a small portion of respondents, accounting for 5%, reported having a poor Wi-Fi signal. These percentages offer insight into the quality of internet connectivity experienced by participants in the study on online group work through connectivism theory. A significant proportion of respondents enjoy a strong connection, which likely facilitates smoother participation in online activities and collaboration. However, the substantial portion reporting an average connection suggests variability in internet reliability, which could impact the effectiveness of online group interactions and knowledge sharing. Additionally, the minority reporting a poor connection highlights potential challenges faced by some participants in engaging with online platforms for group work activities. Understanding the distribution of Wi-Fi strength among respondents is crucial for considering the influence of connectivity on their experiences and interactions within digital learning environments.

Table 5

Percentage for Online Learning Experience

1	Less than one year	21%
2	1 year and above	79%

Table 5 outlines the distribution of respondents based on their online learning experience. According to the findings, 21% of participants reported having less than one year of online learning experience, while the majority, comprising 79%, indicated having one year or more of experience. These percentages provide insight into the level of familiarity and proficiency that participants have with online learning environments. The substantial majority of respondents having one year or more of experience suggests a significant proportion of individuals who are accustomed to engaging in online educational activities. This level of experience likely influences their comfort and proficiency in utilizing online platforms for group work activities and aligns with the growing prevalence of online learning across various educational and professional settings. Understanding the distribution of online learning experience among respondents is essential for contextualizing their perspectives and behaviours within the study on exploring online group work through connectivism theory.

Findings for Diversity & Openness

This section presents data to answer research question 1 – How do learners perceive diversity & openness in online group work? In this study, Diversity & Openness is measured by cognitive presence.

Table 6

Mean for Cognitive presence

Statement	Mean
CPQ1 At the beginning of the group work, I am lost at how to begin the discussion	2.7
CPQ2 When I work in groups online, I am confused over the different types of ideas discussed	2.8
CPQ3 When in online groups, I am amazed at how much ideas the group can come out with	3.7
CPQ4 Group work allows group exchange of information	4.2
CPQ5 My team members present new information in the group discussion	3.8
CPQ6 Group work allows team members to connect their ideas	4.1
CPQ7 At the end of the online group discussion, my team uses the new ideas we discussed.	3.9

The data presented for research question 1 delves into how learners perceive diversity and openness in online group work, measured through cognitive presence. The mean scores for statements CPQ1 to CPQ7 shed light on this perception. Initially, participants felt lost at the start of group work, indicating a degree of uncertainty in initiating discussions (CPQ1, mean: 2.7). This feeling extends to a moderate level of confusion regarding the various ideas discussed within online groups (CPQ2, mean: 2.8). However, despite these initial challenges, there is a notable positive sentiment towards the group's capacity to generate ideas, with participants expressing amazement at the number of ideas produced (CPQ3, mean: 3.7). Moreover, the data reflects a strong agreement that group work facilitates the exchange of information (CPQ4, mean: 4.2) and enables team members to present and connect new ideas (CPQ5 and CPQ6, means: 3.8 and 4.1, respectively). This suggests that while learners may encounter some initial hurdles, they view online group work as an effective platform for fostering diversity, openness, and collaboration, leading to the utilization of generated ideas by the end of discussions (CPQ7, mean: 3.9).

Findings for Connectedness

Table 7

Mean for Social presence

Statement	Mean
SPQ1 In online group discussions, I can feel how happy the team is	3.5
SPQ2 In online group discussion, I can feel how unhappy the team is	2.9
SPQ3 Being online lets me show my feelings without being seen by my friends	3.4
SPQ4 I am not shy to tell the group about my new ideas	3.6
SPQ5 I am not afraid to disagree with any ideas when I am online	3.5
SPQ6 I am not afraid to voice my opinion when I am online	3.6
SPQ7 Online group discussions allow me to communicate clearly with my team members	3.6
SPQ8 Online group discussions give me a chance to collaborate on a project with the team members	3.7

The average score obtained from the survey provides insightful information about how participants felt about being connected in the context of virtual group projects, especially when it comes to openness and diversity as measured by social presence. Responses from participants on a range of aspects of virtual group interactions show a range of reported connection levels, from moderate to high. According to the average score of 3.5 on the measure of how well respondents can determine their team's happiness, respondents expressed general satisfaction and optimism regarding their team dynamics (SPQ1). This implies that the online group setting has an underlying cohesiveness and togetherness that fosters a collaborative environment and mutual learning experiences. Furthermore, the subjects demonstrated a noteworthy level of comfort in communicating their thoughts online, as seen by the average score of 3.4 on the item that measures how easy it is to communicate sentiments without friends seeing them (SPQ3). This emphasizes how online spaces are seen as safe and encouraging places for people to express their emotions, which helps to foster psychological safety and trust among group members. Virtual group members also demonstrated an admirable amount of confidence and courage when expressing their opinions. The group's general attitude is one of openness and receptivity to different points of view, as evidenced by the mean scores of 3.6 for items like feeling uninhibited in conveying new ideas (SPQ4) and expressing disagreement with others (SPQ5), and a similar mean score of 3.6 for feeling unreserved in voicing personal opinions (SPQ6). This implies that virtual forums for group conversations function as settings for promoting critical thinking and intellectual conversation, where members are inspired to offer their special perspectives and constructively refute popular beliefs. Additionally, participants thought that online communication was useful for promoting opportunities for cooperative project work (SPQ8). The mean score of 3.7 suggest t and for facilitating transparent and easy interactions with team members (SPQ7: mean score of 3.6). It is important for online platforms to provide meaningful interaction and knowledge collaboration among group members, despite geographical and temporal limitations. The mean score for 3.7 suggest that the participants thought that online communication was useful for promoting opportunities for cooperative project work (SPQ8) while facilitating transparent and easy interaction with the team members as result of the mean score 3.6 in SPQ7. Even so, there is a noticeable difference in participants' judgments of how attached they feel to their online group work when it comes to identifying negative emotions in the dynamics of the team. The comparatively low mean

score of 2.9 on the SPQ2 item, which measures the team's ability to perceive discontent, suggests that there may be a blind spot when it comes to identifying and resolving underlying tensions or disputes within the group. This emphasizes how crucial it is to provide an accepting and compassionate online learning environment where students feel encouraged to navigate and effectively resolve interpersonal conflicts. The mean data reflect a predominantly positive perception of connectedness within online group work, there remains an imperative for continuous reflection and refinement in fostering diversity, openness, and emotional intelligence within virtual collaborative spaces.

Findings for Autonomy

The findings for autonomy in online group work, as presented in Section 4.4, address research question 3, which focuses on how learners perceive autonomy within this context. The aspect of diversity and openness is evaluated through teaching presence, as measured by various parameters listed in Table 9, indicating the mean scores for each item.

Table 9

Mean for Teaching Presence

Statement	Mean
TPQ1 The teacher uses suitable teaching materials to explain the topic	4.1
TPQ2 The teacher shows how to complete tasks online	4.1
TPQ3 The use of templates for tasks/homework/assignments by the teacher helped me to do the task	4.2
TPQ4 I imitate what the teacher does to complete my tasks/ assignments	3.9
TPQ5 The examples used by the teacher in class helps me understand the topic better	3.9
TPQ6 When I see the examples used by the teacher, I can visualize (see) how I should write my example	4.2
TPQ7 The explanation by the teacher about the topic is clear to me	4.0
TPQ8 The explanation by the teacher about the task/ assignment/test is clear to me	4.0

According to the data, learners perceive the use of suitable teaching materials (TPQ1) and teacher demonstrations of online task completion (TPQ2) as effective in promoting autonomy, both receiving a mean score of 4.1. The utilization of templates for tasks, homework, or assignments by the teacher (TPQ3) is perceived as aiding learners in completing tasks autonomously, with a slightly higher mean score of 4.2. There are times when learners may imitate the teacher's actions (TPQ4), and find examples used in class helpful (TPQ5), these aspects may not contribute as significantly to perceived autonomy, both receiving mean scores of 3.9. Visualizing their own examples based on those provided by the teacher (TPQ6) receives the same mean score as TPQ3, indicating that learners find this to be a helpful aid in autonomy. Learners generally find the explanations provided by the teacher about the topic (TPQ7) and tasks (TPQ8) clear, both receiving mean scores of 4, which likely contributes positively to their sense of autonomy in understanding and completing assignments. Based on the study's results, it appears that various teaching presence factors influence learners' perceptions of autonomy while participating in an online group activity.

Findings for Relationship between Factors in Online Group Work

This section presents data to answer research question 4 –Is there a relationship between all factors in online group work? The correlations between all factors in online group work are analyzed using SPSS to determine whether there is a significant association. Detailed results can be found in tables 10,11, and 12 below.

Table 10

Correlation between Diversity /Openness and Connectedness

Correlations

		DIVERSITY_O PENNESS	CONNECTED NESS
DIVERSITY_OPENNESS	Pearson Correlation	1	.442 **
	Sig. (2-tailed)		.000
	N	166	166
CONNECTEDNESS	Pearson Correlation	.442 **	1
	Sig. (2-tailed)	.000	
	N	166	166

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

Table 10 shows there is an association between Diversity/Openness and Connectedness. Correlation analysis shows that there is a moderately significant association between Diversity/Openness and Connectedness ($r=.442^{**}$) and ($p=.000$). According to Jackson (2015), a positive correlation is measured on a 0.1 to 1.0 scale, and the coefficient is significant at the .05 level. 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, there is also a moderate positive relationship between Diversity/Openness and Connectedness.

Table 11

Correlation between Connectedness and Autonomy

Correlations

		CONNECTED NESS	AUTONOMY
CONNECTEDNESS	Pearson Correlation	1	.561 **
	Sig. (2-tailed)		.000
	N	166	166
AUTONOMY	Pearson Correlation	.561 **	1
	Sig. (2-tailed)	.000	
	N	166	166

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

Table 11 shows there is an association between Connectedness and Autonomy. Correlation analysis shows that there is a moderately significant association between Connectedness and Autonomy ($r=.561^{**}$) and ($p=.000$). According to Jackson, the coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale (Jackson, 2009). 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, there is also a moderate positive relationship between Connectedness and Autonomy.

Table 12

Correlation between Autonomy and Diversity/Openness

		AUTONOMY	DIVERSITY_O PENNESS
AUTONOMY	Pearson Correlation	1	.614**
	Sig. (2-tailed)		.000
	N	166	166
DIVERSITY_OPENNESS	Pearson Correlation	.614**	1
	Sig. (2-tailed)	.000	
	N	166	166

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

Table 12 shows there is an association between Autonomy and Diversity/Openness. Correlation analysis shows that there is a high significant association between Autonomy and Diversity/Openness ($r=.614^{**}$) and ($p=.000$). According to Jackson, the coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale (Jackson, 2009). 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, there is also a strong positive relationship between Autonomy and Diversity/Openness.

Conclusion

Summary of Findings and Discussions

According to the study, online group work was perceived positively by learners. Diversity & Openness foster an environment where all learners feel welcome regardless of their background. Thus, more engagement, collaboration, and ideas are exchanged. Diversity & Openness also promotes empathy, tolerance, and respect among group members, resulting in better group work outcomes. A study by Hofhuis et al. also found that teams with a diverse and open environment perform better (Hofhuis et al., 2016). The findings for Connectedness indicate that learners generally felt connected in online group work. They expressed satisfaction and optimism about team dynamics, highlighting a collaborative environment and mutual learning experiences. They showed comfort in online communication, emphasizing psychological safety and trust. Chen et al. point out students who are connected to their peers and feel supported are more likely to succeed (Chen et al., 2017). Additionally, learners viewed effective teaching materials, and demonstrations of online task completion by the teacher, and used templates for tasks as effective in promoting autonomy. The findings highlight the significant role of teaching presence in fostering learners' perceived autonomy in online group work within the study's context. As mentioned by Cooper-Smith et al. instructors are key in the learning process, from setting tasks and forming groups to asking and answering questions, maintaining learners focused, and grading projects (Cooper-Smith et al., 2019). A positive correlation was found between learners' perceptions of Diversity & Openness, Connectedness, and Autonomy, revealing compelling associations within online group work dynamics. Collectively, these findings emphasize the interconnected nature of these variables and the importance of building inclusive, connected, and autonomous

learning environments. This study is also supported by Jailani et al., which shows a significant correlation between connectivism and online learning experiences (Jailani et al., 2023).

Pedagogical Implications and Suggestions for Future Research

The pedagogical implications of learners' perceptions in online group work through connectivism are pivotal for creating engaging and effective learning experiences. When learners perceive online group work positively, seeing it as a platform for meaningful collaboration and knowledge exchange, it fosters their active participation and motivation. This positive perception can lead to enhanced critical thinking as learners are more inclined to question, analyze, and evaluate information collectively. Moreover, when learners perceive online group work as a space for interactive learning, where they can contribute their unique perspectives and learn from diverse viewpoints, it encourages the development of digital literacy skills and the ability to work collaboratively in digital environments. Ultimately, aligning online group work with learners' positive perceptions through connectivism can significantly impact their engagement, learning outcomes, and readiness for the dynamic challenges of the digital era.

Future research in online group work can focus on investigating ethical considerations related to online group work, such as privacy concerns, data security, digital equity, and the impact of algorithms on decision-making processes within groups, is essential. Understanding these ethical issues can help in developing guidelines, policies, and best practices to ensure a safe, fair, and inclusive online group work environment for all participants.

References

- An, Guo, B., Abdullah, S. M. N., & Heng, C. K. (2023). Chemistry Teacher Reflections of Online Teaching Platforms in Malaysia Secondary Schools During Covid-19 Crisis. *Journal of Chemical Education*, 100(9), 3220-3227. doi:<http://10.1021/acs.jchemed.2c01019>
- George, S. (2004). A Learning Theory for the Digital Age. *Instructional Technology and Distance Education*, 2(1), 3-10. http://www.itdl.org/Journal/Jan_05/article01.htm
- Zainal, A. Z., & Zainuddin, S. Z. (2020). Technology Adoption in Malaysian Schools: An Analysis of National Ict in Education Policy Initiatives. *Digital Education Review*, No. 37, 172-194. In. doi:<https://10.1344/der.2020.37.172-194>
- Dalib, S., Harun, M., Yusof, N., & Ahmad, K. (2019). Connecting with Culturally Diverse Others the Case of Malaysian Students' Social Interactions on Campus. *Journal of Intercultural Communication*, 19(1). doi:<https://doi.org/10.36923/jicc.v19i1.771>
- Cheah, P., & Merican, Murad, A. (2012). Education Policy: A Case Study of Digitizing Education in Malaysia. *Procedia-Social and Behavioral Sciences*, 69, 1714-1718. doi:<https://10.1016/j.sbspro.2012.12.119>
- Aldalalah, O., Alhalaq, A., & Eyadat, Y. (2023). The Effectiveness of E-Collaborative Learning in Developing Digital Thinking Skills among Teachers in the Light of Connectivism Theory. *International Journal of Information and Education Technology*, 13, 1977-1988. doi:<https://10.18178/ijiet.2023.13.12.2012>
- Mattar, J. (2018). Constructivism and Connectivism in Education Technology: Active, Situated, Authentic, Experiential, and Anchored Learning. RIED. *Revista Iberoamericana de Educación a Distancia*. doi:<http://dx.doi.org/10.5944/ried.21.2.20055>

- Utecht, J., & Keller, D. (2019). Becoming Relevant Again: Applying Connectivism Learning Theory to Today's Classrooms. *Critical Questions in Education*, 10(2), 107-119. doi:<https://eric.ed.gov/?id=EJ1219672>
- McKay, J., & Sridharan, B. (2024). Student Perceptions of Collaborative Group Work (Cgw) in Higher Education. *Studies in Higher Education*, 49(2), 221-234. doi:<https://doi.org/10.1080/03075079.2023.2227677>
- Massah, S. S. (2018). Addressing Free Riders in Collaborative Group Work: The Use of Mobile Application in Higher Education. *International Journal of Educational Management*, 32(7), 1223-1244. doi:<https://doi.org/10.1108/IJEM-01-2017-0012>
- Smith, G. G., Sorensen, C., Gump, A., Heindel, A. J., Caris, M., & Martinez, C. D. (2011). Overcoming Student Resistance to Group Work: Online Versus Face-to-Face. *The Internet and Higher Education*, 14(2), 121-128. doi:<https://doi.org/10.1016/j.iheduc.2010.09.005>
- Brindley, J. E., Blaschke, L. M., & Walti, C. (2009). Creating Effective Collaborative Learning Groups in an Online Environment. *International Review of Research in Open and Distributed Learning*, 10(3). doi:<https://doi.org/10.19173/irrodl.v10i3.675>
- Rahmat, H. N., Sukimin, S. I., Sim, S. M., Anuar, M., & Mohandas, E. S. (2021). Online Learning Motivation and Satisfaction: A Case Study of Undergraduates Vs Postgraduates. *International Journal of Asian Social Science*, 11(2), 88-97. doi:<http://dx.doi.org/10.18488/journal.1.2021.112.88.97>
- Aderibigbe, A. S. (2021). Can Online Discussions Facilitate Deep Learning for Students in General Education? *Heliyon*, 7(3). doi:<https://doi.org/10.1016/j.heliyon.2021.e06414>
- Sekaran, U., & Bougie, R. (2016). *Research Methods for Business: A Skill Building Approach*: John Wiley & Sons.
- Jackson, S. L. (2009). *Research Methods and Statistics: A Critical Thinking Approach*.
- Hofhuis, J., Rijt, V., Pernill, G. A., & Vlug, M. (2016). Diversity Climate Enhances Work Outcomes through Trust and Openness in Workgroup Communication. *SpringerPlus*, 5, 1-14. doi:<https://doi.org/10.1186/s40064-016-2499-4>
- Chen, H., Bradford, R., Lusby, B., & Fornash, A. (2017). *Promoting Students' Sense of Connectedness Using Strategic in-Class Groups*.
- Cooper-Smith, L., Davey, W., & Adamopoulos, A. (2019). *Instructors' perceptions of Their Role in Online Group Work*. Paper presented at the PROCEEDINGS OF THE 17th INTERNATIONAL CONFERENCE e-Society 2019. doi:https://10.33965/es2019_201904L026