Student Perceptions about Online Collaborative Coursework

Tracia M. Forman[1,*] & Ava S. Miller[1]

[1]Department of Health and Biomedical Sciences, The University of Texas Rio Grande Valley, Brownsville, United States

*Correspondence: The University of Texas Rio Grande Valley, One West University Blvd., BBRHB 1.101, Brownsville, TX 78550, United States. Tel: 1-956-882-7162

Abstract

Objective:

Collaborative coursework may improve student engagement but is often viewed as problematic by both students and faculty, particularly in the online classroom. The aim of this research is to present results of a retrospective, qualitative content analysis of student related perceptions about group work in the online classroom.

Methods:

Data analysis was completed with the use of qualitative content analysis (QCA), a valid research method for describing the meaning of qualitative data in a systematic way. QCA was used to inform the following research question: What perceptions do students have about working with a group in the online classroom? Data were collected through a retrospective analysis of student responses posted to discussion board forums. Responses of students ($N = 192$) enrolled in three different courses, over two semesters were analyzed by a team of two researchers.

Results:

Findings included student reflections about group work being a stressful, negative experience, with the asynchronous environment of the online classroom increasing student anxiety about group work. Students reported different academic goals and lack of participation among group members as common issues. In addition, students reported concern with group management or organization and the fairness of group work grading practices.

Conclusions:

These results inform a discussion of best practices, skills and technology faculty can use to transform online group work into a positive learning experience for all students. Online education needs to be meaningful and responsive to meet students' needs. Research has shown group work can improve student engagement and facilitate accomplishment; however, the negotiation of group work processes can be stressful for students and faculty, particularly in the online classroom.

Keywords: collaborative coursework, group work, online learning, qualitative content analysis

1. Introduction

As online learning has progressed, research continues to evolve for the development of data driven, cognitive principles for best practice in online teaching. Collaborative coursework or group work is a viable pedagogical approach for the online classroom and enhances social and cognitive abilities. (Fisher & Wolf, 2021; Johnson, Johnson, & Smith, 2006) By working with others in a group setting, students attain common learning goals, achieve unity, realize collective accountability, and improve social skills (Johnson, 2006). Students can benefit from group related networking opportunities and the sharing of workload. To enhance the functioning and success of student collaborative group work, instructors must investigate and disseminate best practices. Online instructors must also successfully integrate these best practices of group work into the online course. Instructors who thoughtfully engage online students through collaborative group work enable them to have a satisfying learning experience they can take beyond their academic experience into their professional lives. The goal of each instructor should be to help the

online student feel empowered to take initiative and contribute in a vital way to the success of the collaborative group work.

2. Background

Online collaborative coursework has the potential to improve student engagement and facilitate achievement, establishing a community of learners (Palloff, 2007). Yet both students and instructors have reported an aversion to collaborative coursework. (Burke, 2011; Daba, Sorale, & Alvivi, 2017; Donna & Miller, 2013; Roberts & McInnerney, 2007; Robinson, 2016; Zygouris-Coe, 2012) Students complain about procrastination of fellow group members and the need to pick up the slack. Instructors report time wasted on managing groups means sacrificing time better used for individual student learning. To assess student learning, both the quality and quantity of their achievement must be measured. Meta-analysis has found working as a team improves performances regardless of the individualities of the team members or the assigned responsibilities (Schmutz, Meier, & Manser, 2019). Research indicates group coursework experience can lead to greater academic achievement, but instructors must use a well-defined approach to make group coursework both effective and meaningful for students, particularly within the online classroom. (Bardach, Lüftenegger, Yanagida, Schober, & Spiel, 2019; Jacques & Salmon, 2007; Johnson & Johnson, 1975; Rovai, 2004; Moore, 2013).

3. Purpose of the Study

The study's purpose was to complete a retrospective analysis of student perception towards collaborative course work in the online class. This research seeks to provide increased instructor understanding about the successful management of group work in the online classroom.

4. Methods

4.1 Research Design

The study research design was a retrospective, qualitative data analysis. The participants in the study were graduate students enrolled in a fully online program at a university designated as a Hispanic Serving Institution. Data were gathered from initial posts made to fulfill the requirements of a mandatory introduction discussion assignment. To fulfill the assignment requirements, students composed and posted a response to the following three questions, about their online learning experience(s):

1) Are you comfortable in the online classroom environment?

2) If you have had online courses in the past what seems to work well with your learning style and what does not work so well?

3) What is your perception of group work in the online classroom?

The third question was used as the research question.

All student responses to this introduction discussion assignment for three different online graduate courses, from two consecutive academic cycles, were examined. The two members of the research team cut and pasted a total of 212 anonymous student introduction discussion response posts from the learning management system into an Excel spread sheet. Any post with information that could identify the student was deleted. In addition, if the post did not include information about the student's perception of group work, it was deleted. After completion of this cleanup process, a total of 192 ($N = 192$) student response posts were left to examine.

For the protection of human subjects, approval was obtained from the university's Institutional Review Board, prior to beginning the retrospective, anonymous data collection process. Only completely de-identified responses were used for the quantitative content analysis.

4.2 Data Analysis

Qualitative content analysis (QCA) was used for interpreting the meaning of the data derived from the student responses. This qualitative approach was chosen for the ability to collect rich, detailed data (Dhillon, 2016). The study data meets the criteria for the use of QCA, by its rich data requiring interpretation, the visual or textual nature of the data, and the method by which the data were collected (Krippendorff, 2013; Schreier, 2012). Meaning is not assumed in QCA; it is constructed. The QCA method supports researcher interpretation to decipher meaning of participant communication.

The textual data from the student responses were analyzed. Each response was segmented into individual thematic units. Researchers analyzed data both as individuals and together as a team. After completion of the analysis, the research team created and named categories or clusters of themes based on similarities among the data and sorted thematic units into named categories. An effort was made to ensure each main category captured one aspect of the qualitative material. Saturation was determined to have been achieved when additional material did not produce more insight or add more categories.

Support for the trustworthiness and validity of the data analysis is provided through the inclusion of direct quotes from participants representative of each category. Researchers structured the student responses in a data-driven way, letting the categories emerge from the material. Dependability of the results was achieved through allowing adequate time to thoroughly analyze the qualitative data and by working with and reporting responses as direct quotes. Member-checking or other types of review of findings was not possible due to the retrospective, de-identified data collection procedure used to protect the confidentiality of student comments.

5. Results

Qualitative content analysis of the student responses to the research question yielded the identification of four themes or categories. See Table 1. Each identified theme is described and several student quotes representative of each theme or category are provided.

Table 1. Results of the Qualitative Content Analysis of Student Perceptions

Theme	Explanation
Organization	Student commented about struggles with both the self-selection of group members and difficulties when instructors assigned groups.
Communication	Student comments mentioned both difficulties getting started with group communication due to lack of guidance and confusion about communication platforms.
Burden	The overwhelming number of comments were about the unfair distribution of work among group members.
Grading	Related to burden, student comments spoke about the unfairness of the group grading process. The majority of the comments relayed concern about the final course grade being impacted because another student did not do their fair share of the group work.

5.1 Theme: Organization

Students reported obstacles with group membership selection. Some students expressed difficulties with finding a group when a self-enrollment process was used. Other comments were related to obstacles associated with varied schedules and group size when membership was determined by the instructor. Students conversely expressed both the desire to choose their own group members and the dread of finding a group of peers with whom to work without instructor guidance. Examples of student comments related to organizational difficulties with online group work follow.

"My experience with group work has been positive save for difficulties with finding a group and the initial coordination of the project."

"Group projects are the only time the online environment was hard because it was hard to align everyone's schedule. Maybe for future classes, professors could do a survey and match students by like schedules to make it easier on everyone to figure out when to meet."

"I suggest the professor make groups of four. I've noticed that when the group only has four members the work is much more manageable."

5.2 Theme: Communication

Students reported frustration with the lack of interaction or feedback from some group members. Some comments discussed difficulties with the tools used for online group communication. Students identified a need for a consistent communication platform used across multiple courses. Other comments were related to students not wanting to share their personal phone numbers or email addresses to communicate with fellow group members. Examples of student comments related to communication tools follow.

"I used the Yammer app for my last group project, so I was notified of group messages and announcements, and that helped me stay on top of the group work assignments."

"I like to work alone, but if there is group work assigned, holding group meetings via webcam works well."

"A downside to group work that I have noticed is the technical problems with the use of WhatsApp for communication."

"Most of the courses I have taken so far have group message boards. I find this to be essential to keep up with assignment due dates and setting up meetings with group members."

"A strategy that I've come to find works really well, is to download the Blackboard app. I highly recommend it. I am able to keep up with group updates and assignments."

5.3 Theme: Burden

Students reported struggles with the seemingly unfair obligation of group work. Some students complained about fellow group members who did not complete assigned tasks on time. But by far the most noted complaints were about frustrations related to the failure of fellow students to contribute to the group work deliverables. Examples of comments related to the burden of online group work follow.

"Online group work requires additional time and effort compared to a campus class."

"There always seems to be one or two people in a group who end up doing all the work."

"Group projects are a nightmare online. I am one of those people who like to get things off my plate as soon as possible. In every group, there is always that person that leaves everything to the last minute."

5.4 Theme: Grading

Students reported concerns about grading. Students expressed both confusion about how group projects were to be graded and concerns about all group members earning the same grade regardless of individual effort. Examples of comments about grading for online group work follow.

"Group assignments always stress me out because grading is never clear to me."

"I personally think that grading for group work should be individual. It isn't fair to grade one student based on the work – or lack of work – by another student."

6. Discussion

6.1 Organization

6.1.1 Group Formation

The process of allowing group self-selection has been reported as beneficial by students. (Nhan & Nhan, 2019) Swanson et al. (2006) reported improved collaborative performance by self-selected groups. Students reported struggles with scheduling time to meet as a group, given their busy lives. One advantage of allowing students to choose their own group is the ability to seek out students with similar schedules. Allowing students to self-select group membership might reduce some organizational obstacles. Group self-selection may also result in groups of students with like interests and abilities. This might seem like an advantage, but a heterogeneous combination of group members with varied skills has been found to be more effective at achieving group goals. (Jacques & Salmon, 2007)

Han et al. (Han, Huh, Cho, Park, Choi, Suh, et al., 2020) used academic markers to form groups and found they related to a significant proportion of the variance related to group achievement. Other criteria to consider when assigning students to groups are achievement level, attitude, personality, gender, and ethnicity. (Race, 2013). As an instructor, it is important to keep in mind that groups composed of students with diverse backgrounds, abilities, and interests will expose students to multiple perspectives and problem-solving methods, thereby promoting students' learning. (Donna & Miller, 2013, Springer, Stanne, & Donovan, 1999) Working with others from different cultures is a type of purposeful socialization that should result in students with the ability to interact and understand their neighbors and others. (Ostrovska, Ostrovski, & Margitich, 2022) In the end, group structure should encourage positivity and collegiality, increase student satisfaction, and result in academic achievement. (Nhan & Nhan, 2019)

6.1.2 Group Size

Another reported student concern about group organization was group size. The consensus of the reviewed resources

was that three to five students per group is best. (Rovai, 2004; Jacobs, Power, & Inn, 2016; Learning POGI, 2019) There are several advantages to smaller group sizes. With a smaller group size, there is less chance of conflict due to fewer expressed opinions. Fewer students per group should also make it easier for instructors to identify any unresolved conflicts and any power or control issues within the groups. Also, with a smaller group size, each student's work is more noticeable (Race, 2013), making it easier for the instructor to identify those who might be having difficulties grasping content. However, one significant advantage of a larger group size is more students likely means wide-ranging strengths and diverse academic backgrounds. The larger group would benefit from the ability to subdivide tasks by identified member strengths. Also, a larger group size might allow one student to exclusively function as a neutral organizer for communication and member accountability. Lastly, larger group size typically involves less work for the instructor because there are fewer groups to monitor and less to grade. (Race, 2013) The takeaway is that there is no ideal group size. Group size needs to be based upon what is most appropriate for the learning objectives of the group coursework. The effectiveness of any group is dependent upon teamwork. (Johnson, Johnson, & Smith, 2006; Laal & Laal; 2012) Successful teamwork is dependent upon communication. Ultimately, effective group communication will have a greater impact on group productivity than group size.

6.2 Communication

6.2.1 Initiation

Students reported difficulties with the initiation of group communication. McCall (2020) reported on an approach used to help mature students form connections within peer groups. Instructor guidance or facilitation of a communication method that works best to meet the needs of all students is crucial for successful group coursework (Johnson, Johnson, & Smith, 2006; Jacques & Salmon, 2007; Zygouris-Coe, 2012). Students' welcome direction regarding easy access to appropriate tools to facilitate completion of the collaborative work. (Deng, Shen, & Chan, 2021)

It is important for the instructor to require group communication to be established very early in the group coursework process (Jacques & Salmon, 2007; Bickle & Rucker, 2018; Brookfield & Preskill, 2005). One way to do this is to make a communication action plan: an initial group coursework task or deliverable. Requiring a recorded "test" meeting as an initial assignment might also be considered. This "test" meeting approach has the added advantage of creating an opportunity for students to practice with the selected communication tools. It is essential to ensure all students have equal access to the group communication platforms and the necessary instructions to effectively use the selected platforms. Lastly, it is important for groups to come up with a communication back-up plan, an alternative means of communication, in case of a platform failure. Groups should also discuss early on what the plan of action will be if a group member does not respond to a query or complete an assigned task within a reasonable amount of time.

6.2.2 Virtual Tools

Students identified a need for the use of a consistent communication platform across multiple courses. This need can be met with the provision of school-supported group-communication tools.[33] Many educational institutions provide Microsoft 365 and its many related applications to enrolled students, as part of their fixed tuition and technology fees. Additionally, many online learning management systems offer built-in collaboration tools, such as Blackboard's Collaborate or Canvas's BigBlueButton. Alternative teamwork tools that have been successfully used by students are Zoom and Slack. (Deng, Shen, & Chan, 2021) Establishing a free of charge communication method, accessible through a school platform with the use of students' school email addresses, should be a priority for all online instructors, before assigning any group coursework. The implementation of effective communication tools is essential for quality online teaching (Mokhtari, 2021).

6.3 Burden

The third theme identified in our study was the undue burden of group coursework for certain students. Group coursework was reportedly burdensome because of the unequal contribution among group members. One way an instructor can provide support and structure to reduce undue burden on students is through role assignment.

Assigning group roles can be a beneficial strategy for successful group coursework because students are more likely to stay on task. (Race, 2013) An added benefit is the interruption of conventional gendered role assignments. Hirshfield and Chachra (2015) found that in first-year engineering courses, female students tended to undertake less technical roles than their male colleagues. By assigning roles during group coursework, and by asking students to alternate these roles at different points in the semester, students can work past gendered assumptions about themselves and their group members. Costley (2021) reported the process of group work in the online course –

regardless of role taken or assigned - led to greater individual learning.

One methodology where the use of group roles is well-defined and researched is the Process Oriented Guided Inquiry Learning (POGIL) method. (Learning POGI, 2019) The POGIL method calls for groups of three or four students to work in a team on process-oriented guided-inquiry activities in which students construct their knowledge through interactions with others. Traditional POGIL roles for group members are the manager or facilitator, the recorder, the spokesperson or presenter, and the reflector or strategy analyst. (Learning POGI, 2019) While the POGIL model is a useful place to start, one may find that the tasks associated with a discipline require other kinds of roles for effective group learning. Additional roles that might be of value for an instructor to consider are the encourager, the questioner, and the proofreader (McDaniel, Frey, Fitzpatrick, & Roediger, 2014).

Instructors must be willing to reinforce assigned roles throughout the group coursework. For group cohesiveness, students must feel accountable for fulfilling the duties of their assigned roles. (Altebarmakian & Alterman, 2019) Therefore, it is critical for the instructor to step in if they see someone taking over another's role or not fulfilling their assigned role. Often, gentle reminders about who is supposed to be doing what can be useful corrective interventions, for instance, talking with students individually if their conduct seems as though it could be construed as disparaging. Instructor silence on such behavior may be read by students as approval. If a group assignment is lengthy, the instructor might want to consider mixing up roles throughout the semester. This can help students develop communication skills in a variety of areas, rather than relying on a single personal strength. (Jacobs, Power, & Inn, 2016).

Overall, using assigned roles in groups provides students with a supportive structure that promotes meaningful collaborative learning. While group learning can be challenging to implement effectively, using roles can mitigate some of the challenges associated with learning in groups, while offering students the opportunity to develop a variety of communication skills that will be critical to their success throughout school and in their future professional careers.

6.4 Grading

The fourth and final theme identified in our study was grading. Grading, or assessment, in group coursework is difficult for many reasons. Before deciding upon a grading method for group work in the online course, there are two questions each instructor must ask.

1. What is being assessed? Is the collaborative process or the group deliverable being assessed?

2. How is the group work deliverable being assessed? As an individual measure or a collaborative outcome? (Lowes, 2014).

After consideration of what and how, the grading choice should be clearer for the instructor. The three most used options for grading group work are 1) same grade for all, 2) individual grades, and 3) a combination of methods.

6.4.1 Same Grade for All

With this grading option, each group member receives the same grade, regardless of their level of contribution. The rationale for the use of this method is that in real life the group often succeeds or fails together (Lowes, 2014). From an instructor standpoint, this method of assessment is the best choice when it will be difficult or perhaps impossible to determine each individual student's contribution. However, students are often dissatisfied with the same grade for all approach, if they feel not all members of the group contributed equally to the end result (Fathi, Ghobakhloo, & Syberfeldt; 2019).

6.4.2 Individual Grades

Many instructors are also apprehensive about giving all students within a group the same grades for a collaborative effort. Giving all students within a group the same grade can also result in pushback from students. (Race, 2013) The individual grading option works best when the assessment will be completed for an individual deliverable, such as an examination or reflection paper based upon the collaborative effort. With this grading option, the actual product or deliverable of the collaborative group effort would not be assessed.

6.4.3 Combination Grading

With this method of grading, the instructor uses a combination of 1) the same grade for all and 2) individual assessment. Both the individual and group effort towards the final deliverable is assessed. The rationale for the use of the combined method of grading is that it recognizes the overall value of the group coursework deliverable, and it recognizes the individual contributions of each student towards the completion of the final deliverable. (Race, 2013)

The group grade would be based upon the outcome of the group work. Individual assessment would be related to pre-determined student specific goals. (Johnson & Johnson, 1975)

For the individual assessment piece of the combination grade, it is also possible to use self-evaluation and/or peer evaluation processes. Higher education students can assess their own learning and the learning of their fellow group members. (Johnson, Johnson, & Smith, 2006) Yet for students to be meaningfully involved in self and/or peer evaluation, they must fully understand the measurement's purpose and procedure. Regardless of the combination grading process used, it needs to be clear to all students at the beginning of any collaborative effort, how their final course grade will be impacted by their contribution to the group project. Complete transparency about the grading process should result in reduced student anxiety.

7. Conclusion

The results of this study indicate there are four areas of instructor focus for the implementation of group work in an online course. Instructors must seek to discover the best approaches for group organization, communication, distribution of workload, and grading. Instructive attention to these diverse facets should result in increased student satisfaction and success, the creation of a positive learning environment, and the promotion of student engagement and connection. It is nevertheless a challenge to discover the best approaches to motivate and inspire students towards the common purpose of maximizing learning for all members of the group, while meeting the learning objectives of the group coursework assignment(s).

The limitations to this study are that the student participants were enrolled in courses at one university and had experienced group work with multiple instructors. In addition, the retrospective, de-identified data collection and analysis procedures made it impossible to check the results for truthfulness. Therefore, future studies should aim to replicate the results in a larger scale setting or multiple sites to confirm the findings.

Lastly, this study primarily focused on student perceptions related to past experiences with group work in an online course. The discussion offered recommendations for best practices. Further study is needed to investigate the impact of the suggested best practices on student success and group function. Another area of potential research is the effectiveness of different technologies used in a group-work setting. It is only through continued analysis of high-quality educational data, and an attempt to discover the wide-ranging influencing factors, that the design and deployment of online course activities may be determined as both efficient and effective. The scope of future research in best pedagogical practices for online learning is limitless.

References

Altebarmakian M., & Alterman R. (2019). Cohesion in online environments. *International journal of computer-supported collaborative learning, 14*(4), 443-65. https://doi.org/10.1007/s11412-019-09309-y.

Bardach L., Lüftenegger M., Yanagida T., Schober B., & Spiel C. (2019). The role of within-class consensus on mastery goal structures in predicting socio-emotional outcomes. *British journal of educational psychology, 89*(2), 239-58. https://doi.org/10.1111/bjep.12237

Bickle M. C., & Rucker R. (2018). Student-to-student interaction humanizing the online classroom using technology and group assignments. *Quarterly review of distance education, 19*(1), 1-56.

Brookfield S. D., & Preskill S. (2005). *Discussion as a way of teaching: Tools and techniques for democratic classrooms* (2nd ed.). John Wiley & Sons, Inc.

Brown B., & Thomas C. (2020). Technology used to support learning in groups. *International Journal of E-Learning & Distance Education, 35*(1), 1-34. PubMed PMID: 146818912.

Burke A. (2011). Group work: How to use groups effectively. *The Journal of Effective Teaching, 11*(2), 87-95.

Costley J. (2021). How role-taking in a group-work setting affects the relationship between the amount of collaboration and germane cognitive load. *International Journal of Educational Technology in Higher Education, 18*(1), 1-13. https://doi.org/10.1186/s41239-021-00259-w.

Daba T. M., Sorale J. E., & Alvivi S. (2017). Student perception on group work and group assignments in classroom teaching: The case of Bule Hora University second year biology students, South Ethiopia: An action research. *Educational Research and Reviews, 12*(17), 860-6. Retrieved from https://files.eric.ed.gov/fulltext/EJ1156259.pdf

Deng L., Shen Y. W., & Chan J. W. W. (2021). Supporting cross-cultural pedagogy with online tools: Pedagogical design and student perceptions. *TechTrends, 65*(5), 760-70. https://doi.org/10.1007/s11528-021-00633-5

Dhillon S. (2016). Beyond the coding process: A review of Margrit Schreier's Qualitative Content Analysis in practice. *The Qualitative Report, 21*(8), 1425-27.

Donna J. D., & Miller B. G. (2013). Using cloud-computing applications to support collaborative scientific inquiry: Examining pre-service teachers' perceived barriers to integration. *Canadian Journal of Learning and Technology, 39*(3). Retrieved from https://www.learntechlib.org/p/153328/

Fathi M., Ghobakhloo M., & Syberfeldt A. (2019). An interpretive structural modeling of teamwork training in higher education. *Education sciences, 9*(1), 1-18. https://doi.org/10.3390/educsci9010016

Fisher M., & Wolf D. (2021). Remote learning environments: Lessons learned from collaborative small group activities. *The Journal of Nursing Education, 60*(2), 120-2. https://doi.org/10.3928/01484834-20210120-13

Han J., Huh S. Y., Cho Y. H., Park S., Choi J., Suh B., et al. (2020). Utilizing online learning data to design face-to-face activities in a flipped classroom: a case study of heterogeneous group formation. *Educational technology research and development, 68*(5), 2055-71. https://doi.org/10.1007/s11423-020-09743-y.

Hirshfield L. E., & Chachra D. (2015). *Task choice, group dynamics and learning goals: Understanding student activities in teams*. 2015 IEEE Frontiers in Education Conference (FIE). 1-5.

Jacobs G. M., Power M. A., & Inn L. W. (2016). *The teachers' sourcebook for cooperative learning*. Skyhorse Publishing.

Jacques D., & Salmon G. (2007). *Learning in groups: A handbook for face-to-face and online environments* (4th ed.). Routledge.

Johnson D. W., & Johnson R. T. (1975). *Learning together and alone* (5th ed.). Allyn and Bacon.

Johnson D. W., Johnson R. T., & Smith K. A. (2006). *Active learning: Cooperation in the college classroom*. Interactions Book Company.

Krippendorff K. (2013). *Content analysis: An introduction to its methodology* (3rd ed.). SAGE Publications, Inc.

Laal M., & Laal M. (2012). Collaborative learning: What is it? *Procedia - Social and Behavioral Sciences, 31*, 491-5. https://doi.org/10.1016/j.sbspro.2011.12.092.

Learning POGI. (2019). About the POGIL project. Retrieved from https://pogil.org/

Lieberman M. (2018). Online students don't have to work solo. Inside Higher Education. Retrieved from https://www.insidehighered.com/digital-learning/article/2018/04/25/group-projects-online-classes-create-connections-and-challenge

Lowes S. (2014). How much "group" is there in online group work. *Journal of Asynchronous Learning Networks, 18*(1), 1-14. Retrieved from https://files.eric.ed.gov/fulltext/EJ1030559.pdf

McCall D. (2020). Supporting mature aged students to develop group work skills: A review of a 2-year study of students' experience of group work within their pre-nursing program. *Journal of the Australian & New Zealand Student Services Association, 28*(2), 67-79. https://doi.org/10.30688//janzssa.2020.06

McDaniel M. A., Frey, R. F, Fitzpatrick, S. M., & Roediger, H. L. (2014). *Integrating cognitive science with innovative teaching in STEM disciplines*. Washington University in St. Louis Libraries, p147.

Mokhtari L. (2021). A case study of students' perception toward online teaching methods: Factors for success in online programs. *Turkish Online Journal of Qualitative Inquiry, 12*(8). Retrieved from https://www.tojqi.net/index.php/journal/article/view/7715/5468

Moore M. G. (2013). *Handbook of Distance Education*. Routledge.

Nhan H., & Nhan T. (2019). Different Grouping Strategies for Cooperative Learning in English Majored Seniors and Juniors at Can Tho University, Vietnam. *Education sciences, 9*(1), 59. https://doi.org/10.3390/educsci9010059

Ostrovska M., Ostrovski O., & Margitich K. (2022). The essence of intercultural educational environment. *Journal of higher education theory and practice, 22*(15), 203-14. https://doi.org/10.33423/jhetp.v22i15.5571.

Palloff R. M., & Pratt K. (2007). *Building online learning communities: Effective strategies for the virtual classroom* (2nd ed.). John Wiley & Sons, Inc.

Race P. (2013). *500 tips on group learning*. Routledge.

Roberts T. S., & McInnerney J. M. (2007). Seven problems of online group learning (and their solutions). *Educational technology & society, 10*(4), 257-68. Retrieved from https://www.researchgate.net/publication/220374945_Seven_Problems_of_Online_Group_Learning_and_Their_Solutions

Robinson H. A. (2016). Faculty experiences with collaborative learning in the online classroom. University of North Texas. Retrieved from https://pdfs.semanticscholar.org/0e42/ef84580e565532a97bae02375d907cabeeb3.pdf

Rovai A. P. (2004). A constructivist approach to online college learning. *The Internet and higher education, 7*(2), 79-93. https://doi.org/10.1016/j.iheduc.2003.10.002.

Schmutz, J. B., Meier, L. L., & Manser, T. (2019). How effective is teamwork really? The relationship between teamwork and performance in healthcare teams: A systematic review and meta-analysis. *BMJ Open, 9*. https://doi.org/10.1136/bmjopen-2018-028280

Schreier, M. (2012). *Qualitative content analysis in practice*. SAGE Publications, Inc.

Springer, L., Stanne, M. E., & Donovan, S. S. (1999). Effects of small-group learning on undergraduates in science, mathematics, engineering, and technology: A meta-analysis. *Review of Educational Research, 96*(1), 21-51.

Swanson, Z. L., Gross, N. J., & Kramer, T. (2006). Alternative modes of study group formation and student examination performance. *The Accounting Educators' Journal, 10*(2). Retrieved from https://www.aejournal.com/ojs/index.php/aej/article/view/3

Zygouris-Coe, V. (2012). Collaborative learning in an online teacher education course: Lessons learned. Proceedings from ICITE. Retrieved from http://www.icicte.org/Proceedings2012/Papers/08-4-Zygouris-Coe.pdf