



The Prerequisite of Effective Group Works in Blended Learning Environments: A Literature Review

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Abstract. Blended learning and group learning are learning strategies that are widely applied in the contemporary educational process. However, group learning often becomes ineffective if it is not managed properly. This paper aims to analyze the practices in forming an effective group learning in blended learning, the strategy for establishing an effective group learning, and the ideal group size. The research method used in this paper is a literature review. The analysis results indicate there are requirements in order to form an effective group learning in blended learning. The requirements consist of a strategy that will enable all students to be actively and purposefully involved in achieving learning goals, supervision and assistance in completing assignments by tutors, the use of an appropriate online learning platform to accommodate group work, and timely feedback. Effective groups can be formed by structuring diverse group membership based on ability, gender, and ethnicity. Each group member is responsible for achieving individual learning goals and contributing to the group project. The appropriate group size will determine the effectiveness of group performance. The conclusion obtained is that group effectiveness in blended learning can be achieved by appointing leaders in groups, having a clear division of tasks, determining group work agendas, using appropriate platforms, and encouraging active participation of students and tutors. An effective study group has diverse members consisting of three to five people who are responsible for completing assigned tasks.

Keywords: group learning · cooperative learning · groups size · effective group work · blended learning

1 Introduction

The rapid and global spread of Covid-19 has caused a tremendous transformation in the education system from traditional classroom learning to online learning. The transformation to online learning also comes with its challenges, such as the absence of active

interaction and participation, the lack of access to communicate and exercise group work, the lack of motivation to stay engaged, and the lack of feedback that learners receive [1]. This is alarming since, in a high-tech economic society, interaction is inevitable [2]. Educational institutions must prioritize teaching the thinking skills, communication skills, and social skills necessary for participation in our increasingly complex and interdependent society and workplace. Rooted in the principles of social constructivism [3], learning is considered a socially constructed process where learners actively build their knowledge together [4–7]. To achieve learning objectives and improve academic performance, teachers need to create an environment where students can actively build their shared knowledge. One way is to form study groups. Hence, group learning activities, both online and face-to-face learning, need to be designed effectively to achieve the aforementioned purpose.

Online learning emphasizes using technology, being student-centered, and small group teaching [8]. However, there are concerns that students who study online will not acquire the same skills and learning competencies as students who study face-to-face [9].

Azlan et al. (2020) research indicate that learners prefer physical meeting and face-to-face learning. They were able to adapt to the new norm of e-learning during the Covid-19 Pandemic, and learning from home provided much flexibility. However, this condition has its challenges, such as having difficulty focusing, experiencing mental stress, not being actively involved, and facing technical problems, such as limited data packages and limited internet connection. They hope that blended learning strategies in the form of face-to-face learning and online learning can continue to be implemented after the pandemic because practical and clinical learning experiences can never be substituted.

The Covid-19 pandemic, although it has been showing a declining trend, has made blended learning an educational strategy that will be widely used in the future. Therefore, it is necessary to conduct a study to enable blended learning strategies to become effective in facilitating the achievement of learning competencies that are carried out both face-to-face and virtual. One of the studies that can be done is how to increase effective group learning in blended learning to increase the knowledge and skills of learners. Since groups become ineffective if not managed properly [10–12], thus the purpose of this paper is to analyze what are the practices in forming an effective group learning in blended learning, how to establish an effective group learning, and what is the ideal group size.

2 Method

The method used in this paper is a literature review. Sources of information used in preparing the literature review were obtained through several databases consisting of Ebsco, Google Scholar, and Science Direct. The data search strategy begins with determining the appropriate topic and is followed by using keywords with the aim of specifying the search. The keywords used to search supporting literature were “group work,” “group size,” “cooperative learning,” “effective group learning,” and “blended learning.”

3 Analysis Results

Group Learning in Blended Learning

Blended learning is learning conducted partially online with some student control over the place, time, pace, and path in an integrated manner with an integrated learning experience. Online discussions can be conducted synchronous or asynchronous. Several advantages of blended learning are its ability to allow personalized learning, provide a unique education for individuals, provide opportunities for students to participate, be creative, collaborate with peers both locally and globally, and provide learning experiences and opportunities to build skills for the future [13] they have to be mechanically air conditioned to achieve the required thermal comfort for worshippers especially in harsh climatic regions. This paper describes the physical and operating characteristics typical for the intermittently occupied mosques as well as the results of the thermal optimization of a medium size mosque in the two hot-dry and hot-humid Saudi Arabian cities of Riyadh and Jeddah. The analysis utilizes a direct search optimization technique that is coupled to an hourly energy simulation program. Based on that, design guidelines are presented for the optimum thermal performance of mosques in these two cities in addition to other design and operating factors that need to be considered for mosques in general. © 2009 The Author(s). According to Brewer et al. [14], one thing that is very different about online discussions is that one tends to hear from everyone, even from less active participants in the classroom. This person is probably the most open to discussion in a space where he or she does not have to compete for a place with the more dominant participant. Li et al. [15] stated that blended learning could effectively increase knowledge but not significantly in improving skills.

Ruokonen & Ruismäki [16] stated that online and face-to-face learning can be combined effectively, and it is very important to carry out face-to-face instruction first before online learning is carried out. Integrated learning through blended learning helps students improve the classroom experience, expand innovative learning via the internet, increase effectiveness and efficiency by reducing lecture time, and provide more time for group discussions to generate creative ideas. Meanwhile, [17] stated that blended learning education, which is a combination of physical and online classes, will become an educational trend in the future.

Goldenson et al. [18] stated that small group virtual class learning guided by a senior (resident) has an impact on creating a conducive learning environment and strengthens the basic concepts of the topics studied. In this learning strategy, students initially learn the material at a basic level, and through discussions guided by senior leaders, students can formulate and develop a deeper understanding of the material. The results of research from Brannen et al. [19] indicate that the group learning strategy in face-to-face and online learning is the division of tasks and group work contracts. The division of tasks can improve the approach, communication, and perception among students. Based on the results of this study, Positive things that occur with the division of labor are experiencing fewer problems related to incomplete work or interpersonal disputes, working collaboratively to solve problems and a more frequent and regular approach to communication. In addition, the division of group tasks can significantly reduce anxiety in online learning, which is not found in face-to-face learning.

Research conducted by Ali et al. [20] 2008 shows that the completion of group assignments in blended learning is carried out through face-to-face meetings at the beginning of the assignment and continues through using online forums as an extension of the face-to-face sessions. It is recommended that online meetings should have assigned topics to be discussed, as this strategy will facilitate learners to contribute ideas and observe the developments of their ideas over a certain period of time. Other advantages of having assigned topics are groups can follow the direction of the discussion, group discussions become more organized, focused, and rich in content; furthermore, it enables learners to respond to previous comments. According to Shu & Gu [21], the pattern of group interaction in blended learning is that individual control patterns are stronger in face-to-face learning and group control patterns are stronger in online learning. The depth of interaction between students showed an increase from the beginning to the middle of the learning process, while interaction remained relatively stable from the middle to the end of the process. The group interaction is stronger when the dialogue discusses the connection between the subject and real-life application.

Another creative way of applying group learning in the context of blended learning is described in a case study conducted by Orme et al. [11]. In the case study, group learning was carried out in a research method class with a fairly large number of students, namely 350 people. The large class was a challenge in itself, and group learning in such a large class is another challenge to overcome. Based on the evaluation conducted in the previous class, participants complained about several problems in group learning, such as uneven distribution of work, logistics in organizing group work, and lack of support from academic staff. The method used to overcome this problem is problem-based learning with a focus on using the following approaches: (1) flipped classroom, where the teacher sends a recorded briefing at the beginning of every six weeks; (2) tutorials, where students have the opportunity to be tutored one hour per week by a tutor in the lab; (3) the use of a combination of physical meetings in the lab room and virtual meetings using Microsoft Teams; (4) support from Ph.D. students as tutors; and (5) providing face-to-face individual assessment and feedback. The results of this case study indicate a satisfactory evaluation of the participant's performance on the module and especially on the qualitative transformation of their works. The increase in grades that occurs shows a strong relationship with the new approach used.

Forming an Effective Group

It is human nature to study his environment and other people around him through information-based interactions, focusing on facts or personal opinions and feelings [14]. Lev Vygotsky, a figure in social constructivist learning theory, states that social interaction is the most important factor that can trigger a person's cognitive development. The learning process will occur efficiently and effectively if children learn cooperatively with other children in a supportive atmosphere and environment, under the guidance of someone who is more capable, such as educators and adults [22]. This theory then gave birth to several learning models, including the cooperative learning model, peer interaction learning model, group learning model, and problem-solving learning model.

Slavin [12] stated that cooperative groups could work because of motivation and cognitive factors. Motivationally, the existence of cooperative goals creates pro-academic norms among learners, and pro-academic norms have a very important influence on

learners' achievement. Cognitively, there is an emphasis on the effect of the cooperation itself to achieve group goals. Slavin also warns of the emergence of free-riders who refuse to contribute while all or most of the work was done by others. This potential barrier is referred to as "diffusion of responsibility" in group work. According to Slavin, there are two ways to eliminate the diffusion of this responsibility. First, make each group member responsible for a different unit in the group task, although there is a potential that they will significantly learn about the unit they are working on while the other units do not receive the same depth. Second, ensure that learners are individually responsible for their learning; in other words, the task of the group is to make sure that everyone has learned all the subject matter.

Several studies conducted since 1961 have confirmed that the more heterogeneous or diverse a group is, the more likely it is to produce creative ideas and high-quality teamwork [23]. In group work, sharing ideas can also occur at a higher intellectual level, namely the ability to analyze, synthesize, and evaluate [14]. Research conducted by Saiboon et al. [24] indicated that compared to individual learning, small group learning is better at improving knowledge and skills. This is because, in small group learning, discussion stimulates cognitive skills, and less experienced group members can be guided by more experienced ones. In contrast to group learning, individual learning forces learners to overcome their own learning difficulties because they do not have the opportunity to discuss with their peers..

Guidelines for effective group work toward achieving expected learning goals, according to Kemp et al. in Brewer et al. [14], consist of limiting the size of group members from three to five students; forming a heterogeneous group based on the level of ability, gender, and ethnicity; carefully planning tasks, materials, and timeframes for each activity to be carried out; setting multiple rewards to motivate the group; ensuring that everyone in the group has a clear task; using cooperative learning as a supplement for review, practice, remediation, and enrichment; monitoring and assisting the group when needed; assigning grades, wherever possible, based on the personal contributions or achievements of individual group members.

Ideal Group Size

According to some experts, variations of cooperative learning are adapted to their goals, and all have heterogeneous characteristics, with the number of group members consisting of two to six people. In the Student Team Achievement Divisions (STAD) method developed by Slavin, the number of group members is four to five people. Meanwhile, Jigsaw and Group Investigation, which were developed by Aronson et al. and Thalen, respectively, have group members of five to six people. Kagan developed the Structural Think-Pair-Share and Numbered Heads Together method with two group members on Think Pair Share and three to five people on Number Head Together [22].

The meta-analysis research conducted by Apugliese & Lewis [25] said that, in general, the maximum number of members of a study group is four or five people. The search is then continued by category of groups with a maximum number of four people compared to groups with five or more members. The findings show that groups with more than five members can be as effective as groups with a maximum of four members. The impact of groups with at least five members on collaborative learning is influenced by the ratio of teachers to students and the physical placement of students to increase

interaction [25, 26]. If five or more group members sit in a row, the interaction is limited. However, if group members are seated at a round table or circular position facing each other, then this will be an effective group arrangement even with five or more members.

Treen et al. [27] also discuss the topic of ideal group size. The research examined the effect of group size and decision-making time on performance in a marketing simulation game. The results of this study indicate that the increase in the number of members is directly proportional to the increase in performance to the limit of five people. As a consequence, the results showed that the act of adding a sixth member or more to the group resulted in a decrease in performance.

A similar finding is also described in a study on social loafing in group work. The results of this study show that data analysis supports the hypothesis that the greater the size, the greater the occurrence of social loafing in group projects [10]. Therefore, it was concluded that the action of limiting the number of group members is an effective strategy that teachers could take to reduce social loafing, make it easier for group members to schedule meetings and distribute work, and help group members get to know each other. With a smaller group size, each member will feel that their contribution is more valuable toward the final result.

Furthermore, research comparing group and individual learning says that students who learn cooperatively get more learning benefits than those who study individually. However, for cooperative learning to be effective, it needs to be done in small study groups consisting of three to four members [26, 28]. This study concludes that study groups with fewer members are more effective than large groups. Heller & Hollabaugh [26] then elaborated that for the learners they studied, the optimal group members are three people because it is large enough to produce diverse ideas and approaches but also small enough so each member can contribute to the solution.

4 Discussion

The results of the analysis show that group work conducted both online and offline has a significant impact on improving learning achievement. Likewise, Joyce et al. [29] indicate that cooperative learning compared to individual and competitive learning, produces more motivation. Positive energy is derived from feeling connected and from learning from each other. The interaction produces cognitive and social complexity and creates more intellectual activity. Cooperation reduces feelings of loneliness and isolation, provides an affirmative view of others, builds relationships, and increases positive feelings towards others. Cooperation, in addition to increasing learning, also increases self-esteem because the members feel valued and cared for by others and the environment.

Group learning carried out in blended learning with a clear division of tasks can cause the achievement of learning objectives to be more optimal, all learners to be actively involved in learning, and the reduction of anxiety in online learning. Increasing learner involvement in online learning, apart from group work, according to Hjej et al. [30], can also be done by incorporating more interactive activities and multimedia learning resources so that learners are actively involved in learning. Suwannaphisit et al. [31] compared traditional and blended learning effectiveness and stated that blended learning was

no less effective in achieving learning objectives. According to Huang et al. [32], group learning is part of social learning. Laal and Ghodsi in Huang et al. [32] divide the benefits of social learning into four categories, namely social, psychological, academic, and assessment benefits. Social benefits can be in the form of contributing to system development, giving social support to learners, helping to increase understanding between learners and teachers, and building a collaborative atmosphere. Psychological benefits can be in the form of increasing students' self-esteem, reducing anxiety, and developing learners' positive attitudes toward teachers. Academic benefits can improve classroom learning outcomes and critical thinking skills, ensure active involvement in learning, and increase problem-solving abilities. The benefits of the assessment are obtained through teacher observations of group work interactions in addition to the grades obtained from artifacts and other tests.

This analysis also shows that the strategy to form an effective group consists of points. Those points consist of ensuring a supportive atmosphere and environment, providing guidance by someone more capable, ensuring each group member possesses pro-academic norms, and confirming that each group member is responsible for achieving individual learning goals and contributing to the group project. This is also supported by the opinion of Brewer et al. [14] that an interaction built in group work will serve intellectual, emotional, and social purposes. Intellectually, group work aims to help participants become aware of the diversity of opinions on an issue. In order to achieve this goal, participants need to have the skills to listen, analyze the facts and opinions presented, and share ideas with other participants. Emotionally, group work aims to build self-confidence and a sense of belonging among learners. In order for this goal to be achieved, participants need to have a sensitivity that the topic or problem that needs to be solved is important to them. Socially, group work aims to build a sense of cohesion and trust in one another. For this goal to be achieved, there needs to be an understanding that differences of opinion, race, gender, and participation must be accepted and celebrated. Hence, a group should consist of diverse and heterogenous members.

The literature review on the ideal number of group members shows that the ideal number of groups is three to five people. Although there are exceptions for the number above five people with intervention in group interaction. This finding is in accordance with a study on group work conducted by Wilson et al. [33], which concluded that in forming a formal working group, a teacher should form a small group consisting of three to five people taking into account the characteristics of students who can contribute to effective group work processes and performance.

5 Limitations and Implications

The limitation of this analysis is that it has not conducted a more in-depth study of the blended learning group learning strategy during the Covid-19 pandemic due to social restrictions that still have to be carried out, especially during face-to-face group learning. The implication of this analysis is to provide educators with an effective group learning strategy to improve the achievement of learning objectives in blended learning by building an encouraging atmosphere, applying supportive group norms, and establishing the ideal group size so that learning objectives can be achieved effectively.

6 Conclusions and Suggestions

The effectiveness of group learning in blended learning can be achieved by appointing leaders in groups, having a clear division of tasks, determining group work agendas, using appropriate platforms, and encouraging active participation of students and tutors. An effective study group has diverse members consisting of three to five people who have an attitude of responsibility towards completing tasks.

Suggestion for further study is to conduct a more in-depth study related to group learning strategies during the new normal Covid-19 pandemic. Another topic that needs to be analyzed is the strategy of dividing tasks, monitoring the completion of group assignments, and building commitment so assignments can be completed in a timely manner.

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