

## **Collaborative Learning for Enhancing Student Academic Achievement in Online Grammar Class: an Experimental Study**

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### **Abstract**

Collaborative learning is an activity to work in small groups or teams that allows students to develop mutual cooperation in learning. This study aims to highlight the effectiveness of collaborative learning in improving student academic achievement. It was carried out with a quantitative method, and the pretest-posttest experimental design was applied. There were sixty students who participated in this study. To assess students' achievement, online grammar pretest and posttest were distributed. In addition, a collaborative learning questionnaire was administered to elicit students' responses to collaborative learning. Based on the paired-samples t-test result, it was found that the pretest and posttest mean scores were significantly different ( $t_{(59)} = -5.977, p < .05$ ). This indicated that there was a higher mean score for the posttest after the implementation of collaborative activities. Most students responded that collaborative learning activities improved academic performance, and teamwork helped them to receive input from their peers as well as provide better results in completing the tasks than working individually. It is recommended that various collaborative activities should be designed to motivate university students in learning grammar.

**Keywords:** *Collaborative Learning, Online Learning, Achievement, Grammar Pretest, and Posttest*



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### **INTRODUCTION**

The Covid-19 pandemic has created a great challenge for the educational system worldwide. In some parts of the world, this situation has led to the transition from face-to-face classroom activities to online learning activities. Even though online education is not a novel concept and has almost become a part of everyday life, particularly during this current pandemic situation, better preparation for having a successful online learning class is necessary. The teaching and learning process is virtually carried out by using a variety of online learning tools such as Google Classroom, Google Form, Google Drive, Zoom, WhatsApp, and so forth. These are helpful for sharing online materials, conducting synchronous and asynchronous learning, and enabling students to submit paperless tasks. In addition, teaching and learning are not fundamentally based on the idea of transferring knowledge. Teachers or instructors are highly recommended to motivate students to work collaboratively to help students gain experience to work within a learning community where teachers do not act in an authoritative manner but rather act as students' peers and encourage students to learn autonomously.

Collaborative learning covers pairs or small groups to interact during learning activities and works best for college students (Barkley *et al.*, 2005). It is also frequently used as an instructional approach for online courses (Lee, Bonk, Magjuka, Su, & Liu, 2006). Students are encouraged to work collaboratively since, based on social constructivism theory, the collaborative process is fundamental to a learning experience (Vygotsky, 1978). Applying collaborative activities in teaching and learning helps students to develop mutual cooperation in overcoming problems during their studies. In the context of an online course, learning becomes collaborative since students make use of online learning tools to communicate and exchange information with their peers and teachers or instructors.

A number of existing literature summarize the evidence that collaborative learning promotes and improves teaching and learning in online classes, for example, the investigation of students' perception of collaborative learning (Faja, 2013; Hernández-Sellés, Muñoz-Carril, & González-Sanmamed, 2015; and Stoytcheva, 2018). The findings of these studies revealed that collaborative activities showed positive

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impacts on online learning and improved academic performances. The integration of online learning tools with collaborative activities or tasks has also been researched in grammar class. Kovacic's study (2012), which focused on the experience of using Web 2.0 tools through grammar-based e-tivities (i.e., online pedagogical activities performed by individuals or teams of students), concluded that the integration of Web 2.0 is an alternative to conventional grammar teaching where the application of technology in learning could enhance the learning experience. Another study conducted by Khalil (2018) also reported that Google Applications (e.g., Google Docs and Google Form) supported a collaborative learning environment in grammar courses, and the majority of students could check teachers' written feedback and access course material easily.

Collaborative learning is considered relevant to be applied to support students' learning in online grammar classes. Traditional grammar teaching emphasizes more on the teacher's explanation of grammar rules and students' activity in completing a number of grammar exercises, and this mostly occurs in a classroom situation. Working collaboratively by making use of online learning tools is purposefully addressed to contribute to the teaching and learning of grammar in addition to the use of textbooks and workbooks in learning activities. Therefore, this study aims to investigate the effectiveness of collaborative learning in improving academic achievement in online grammar classes.

## **LITERATURE REVIEW**

### **Collaborative Learning and Cooperative Learning**

Some authors point out that the terms "collaborative learning" and "cooperative learning" are often used interchangeably to mean students work in a team to work on specific tasks. Bruffee states that "while cooperative education may be appropriate for children, collaborative learning is more appropriate for college students ( cited in Barkley *et al.*,2005, p 7). Both collaborative and cooperative learning lie at the root of Vygotsky's social constructivism theory (1978) which emphasizes that it is impossible to separate learning from its social context. Furthermore, Vygotsky (1978) divides two developmental learning levels: the level of actual development and the level of potential development. The level of actual development covers the idea that a successful learner is capable of solving problems independently; meanwhile, the level of potential development (the "zone of proximal development") focuses on a key success of learning when learners are capable of working collaboratively with teachers and peers. Although collaborative and cooperative learning has much in common, there are distinct features between these two.

Collaborative learning values teamwork and checks individual learning progress as the key success of group learning. Macdonald (2003) categorizes collaborative activities as either process-oriented or product-oriented. Process-oriented comprises activities such as discussion and sharing ideas in relation to course content and may not create a product. By contrast, product-oriented leads to the creation of learning products such as projects, essays, and so forth. The implementation of collaborative learning to increase learning quality also highlights that "collaborative learning encapsulated four aspects of learning; namely, a situation, interactions, learning mechanisms, and measurements of the effects of collaboration" (Dillenbourg, 1999, p. 6). In the collaborative learning process, according to Bruffee (1993), the teacher's role is "less the traditional expert in the classroom and more the peer of students (cited in Barkley *et al.*,2005, p. 7).

Students involved in cooperative learning would split the main task into sub-tasks, work independently according to their given task and finally complete the final task by combining their work (Chatterjee, 2015). Panitz (1999) points out that cooperation allows people to interact within groups to accomplish specific task objectives. In cooperative learning, the teacher's roles are "to design and assign group

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learning tasks, manage time and resources, check to see that students are on task and that the group process is working well (Cranton, 1996; Smith, 1996, cited in Barkley *et al.*, 2005).

### **Online Collaborative Learning**

Online collaborative learning, according to Bélanger (2012), refers to "the use of asynchronous computer communication networks in promoting social setting." Added by Hoppe (2017), online environments and collaborative learning activities are considered effective within groups. Collaborative learning activities in an online classroom can be varied and may be more challenging than in-class activities. In their study on the effect of collaboration mode on team interactions, Andres and Shipps (2010) reported that technology-mediated collaboration caused great problems such as communication breakdowns, misunderstandings, and difficulties in showing learning progress. Students also experienced that online group activity is more difficult than face-to-face group activity (Koh and Hill, 2009). Scoot and Palinscar (2009) add that the use of online learning technology instructional methods is "based on different constructive principles that learners use to construct their own knowing and understanding of new concepts (cited in Alsubaie & Ashuraidah, 2017, p.12). Students and teachers are able to work collaboratively, access and use resource materials, and develop individual or group learning settings in an online course environment. Applying diverse online learning tools in collaborative activities helps facilitate students' participation and interaction during an online class.

Discussion is a type of collaborative activity that is mostly chosen by almost all college teachers in their classes (U.S.Dept.of Education, 2000 cited in Barkley *et al.*, 2005). Through discussion, students are able to generate and share their ideas and are more attentive to listening to other opinions (Barkley *et al.*, 2005). Discussion among the whole class or smaller groups online gives several advantages, such as providing time for students to brainstorm their ideas, allowing students to check course materials and other relevant sources, discussing certain topics more deeply compared to an in-class discussion, and exchanging perspectives according to the same issues (Pena-Shaff, Altman, & Stephenson, 2005).

### **Collaborative Learning and Achievement**

Achievement is defined as "the academic performance by means of standardized and/or validated measures" (Schmid *et al.*, 2014). In addition, Ollendick & Schroeder (2003) define academic achievement as "knowledge and skills that an individual learns through direct instruction" (p.1). Springer, Stanne, and Donovan (1999) conducted a meta-analysis study on the effects of small-group learning on student achievement, persistence, and attitudes and found that "students generally demonstrated greater academic achievement, expressed more favorable attitudes toward learning, and persisted through SMET courses or programs to a greater extent than their more traditionally taught counterparts" (as cited in *et al.*, 2005, p. 19). The other various researches on collaborative learning have also found that collaboration among students positively impacted their achievement (Fjermestad, 2004; Schmid *et al.*, 2014; Kumar, 2017).

### **RESEARCH METHODOLOGY**

The study applied an experimental quantitative design. According to Muijs (2004), the experimental method is defined as "a test under controlled conditions that is made to demonstrate a known truth or examine the validity of a hypothesis" (p.13). Sixty students of the English Literature Study Program who took online grammar courses participated in this study. They were 19 male students (31.7%) and 41 female students (68.3%). A grammar pretest and posttest exercise were given to the respondents. It consisted of fifty multiple-choice questions delivered through Google Form. Each question was worth 2 points.

In the first meeting, after providing the course introduction, the students were asked to complete a grammar pretest. It helped measure their initial understanding of grammar course materials. In the following meetings, they were instructed to do more collaborative activities in their grammar class, such as small group discussions and pairwork. The experiment was carried out for approximately six weeks to adjust students' learning process. At the end of the meeting, a grammar posttest through Google Form was delivered.

Besides pretest and posttest, the 5-point Likert collaborative learning questionnaire was also administered. It ranges from 1 = very low, 2 = low, 3 = medium, 4 = high to 5 = very high. This questionnaire was developed by Hernández-Sellés *et al.* (2015), consisting of eight items that aim to show the results of collaborative activities in the class.

## FINDINGS

### Descriptive Statistics

Descriptive statistics was employed as a preliminary analysis. The participant responses to each grammar pretest and posttest are presented in Table 1.

Table 1. Descriptive statistics of grammar pretest and posttest

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	60	28.00	96.00	69.4167	21.30512
Posttest	60	38.00	100.00	78.6167	17.16233
Valid N (listwise)	60				

The analysis results of descriptive statistics indicated that sixty students completed the pretest with a minimum score of 28.00 and the maximum score of 96.00 with a mean score of 69.4. The results of the posttest were higher than those of the pretest, with a minimum score of 38.00, a maximum score of 100.00, and a mean score of 78.6.

### Analysis of Paired-Samples t-Test

To determine whether or not there are significant differences between the pretest and posttest scores, a paired-samples t-test at the 5% level of significance is used. There are three following tables presented: paired samples statistics, paired-samples correlations, and paired samples test.

Table 2. Paired Samples Statistics

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	69.4167	60	21.30512	2.75048
	Posttest	78.6167	60	17.16233	2.21565

Paired samples statistics table showed that the posttests mean score was higher than that of the pretest (78.61 > 69.41). The standard deviation of both pretest and posttest were 21.30 and 17.16 consecutively. In the case of standard deviation, there was high variability for pretest than posttest. The standard error of the means measured the confidence level of estimating the means. The standard error means for both

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pretest and posttest were 2.75 and 2.21 consecutively. The smaller the standard error means, the higher the confidence level is.

Table 3. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pretest & Posttest	60	.829	.000

The correlation between two variables is a single number that describes how two dependent variables are correlated. The paired samples correlation output provided the information that grammar pretest and posttest scores were significantly positively correlated ( $r = .829$ ,  $\text{sig} = .000$ ).

Table 4. Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Pretest - Posttest	-9.20000	11.92249	1.53919	-12.27991	-6.12009	-5.977	59	.000

The paired-samples test showed the actual test result. The observed samples' mean difference was -9.20. The standard error of the difference between pretest and posttest mean scores was 1.53. The confidence interval of the difference was 95%. The degree of freedom (df) was  $n-1 = 60-1=59$ ,  $t_{\text{table}} = 2.000$ . Based on the following hypotheses:

- 1) Null hypothesis ( $H_0$ ):  $\mu_1 = \mu_2$ , which indicates that the grammar pretest and posttest means are equal
- 2) Alternative hypothesis ( $H_1$ ):  $\mu_1 \neq \mu_2$ , which indicates that the grammar pretest and posttest means are not equal

The analysis result of the paired-samples test was  $t_{(59)} = -5.977$ ,  $\text{sig} .000$  (where  $\text{sig} .000 < 0.05$ ), and therefore  $H_0$  was rejected. There was a significant mean difference between grammar pretest and posttest ( $t_{(59)} = -5.977$ ,  $p < .05$ ). This indicated that after the implementation of collaborative learning, the grammar pretest and posttest means were not equal.

**Analysis of Collaborative Learning Questionnaire Items**

A collaborative learning questionnaire developed by Hernández-Sellés *et al.* (2015) covers assessment and learning results related to collaborative learning consisting of eight items. It ranges from 1 = very low, 2 = low, 3 = medium, 4 = high to 5 = very high.

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Table 5. Frequency of collaborative work to facilitate grammar learning

Questionnaire Items	Very low		Low		Medium		High		Very high	
	f	%	f	%	f	%	f	%	f	%
1) Collaborative learning has helped me achieve a good academic performance.			1	1.7	21	35.0	25	41.7	13	21.7
2) Teamwork has allowed me to build-up my knowledge through other peers' input			2	3.3	18	30.0	23	28.3	17	28.3
3) I have learned more about interacting with my teammates than working alone.	3	5.0	6	10.0	17	28.3	24	40.0	10	16.7
4) Interacting with my teammates, I have improved the ratings, I would have obtained through individual work in the task	1	1.7	4	6.7	17	28.3	27	45.0	11	18.3
5) The time spent organizing group work is offset by the learning developed.	1	1.7	3	5.0	17	28.3	28	46.7	11	18.3
6) The final result of the team (the task presented) improves the task I could have done individually.			3	5.0	23	38.3	28	46.7	6	10.0
7) The team's success (the results) reflected the success of the team members.			1	1.7	3	5.0	28	46.7	28	46.7
8) Contact with the group helped me continue my studies to the point of completion (it has been a support keeping me connected to the subject and the study)	1	1.7			14	23.3	29	48.3	16	26.7

As can be seen in Table 5, students' responses to the implementation of collaborative learning mostly ranged from medium to very high. Twenty-five students reported that collaborative learning could improve their academic performance (41.7%). Some students also believed that working in groups helped them increase their learning. The items such as items 2,3, and 6 showed students' high responses to the importance of teamwork in providing input (28.3%), learning to interact with peers than working individually (40.0%), and improving better results in completing the task (46.7%). Only a few students had very low responses to the implementation of collaborative learning, shown by items 3, 4, 5, and 8, which mostly correlated with interaction with peers.

Table 6. Mean scores and standard deviations of collaborative learning

**Statistics**

	Student	Item_1	Item_2	Item_3	Item_4	Item_5	Item_6	Item_7	Item_8
N Valid	60	60	60	60	60	60	60	60	60
Missing	0	0	0	0	0	0	0	0	0
Mean		3.8333	3.9167	3.5333	3.7167	3.7500	3.6167	4.3833	3.9833
Std. Deviation		.78474	.84956	1.04908	.90370	.87576	.73857	.66617	.81286
Minimum		2.00	2.00	1.00	1.00	1.00	2.00	2.00	1.00
Maximum		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

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Table 6 revealed the mean scores and standard deviations of the collaborative learning questionnaire. The mean score ranged from 3.53 to 4.38. In general, the mean scores were high, particularly in item 7 (The team's success (the results) reflected the success of the team members) ( $M= 4.38, SD= .67$ ). This item clearly indicated that completing the tasks or projects in the group reflected the success of individuals in that group. Meanwhile, item 3 (I have learned more about interacting with my teammates than working alone represented that interaction is the key to success in learning ( $M= 3.53, SD=1.04$ ).

## **DISCUSSION**

Grammar is one of the difficult subjects to teach and learn at the university level, and collaborative learning is considerably helpful to be implemented in classroom activities. In collaborative learning, students participate in small groups activities, and university students seem to value more on collaborative activities (Barkley *et al.*, 2005). Out of many collaborative types, a discussion is mostly chosen by almost all college teachers in their classes (U.S.Dept.of Education, 2000 cited in Barkley *et al.*,2005). The discussion or other collaborative activities do not only occur during in-class activities but can also be designed as outside class activities.

This study applied a one-group pretest-posttest experimental design to know the effectiveness of collaborative learning in improving student academic achievement in online grammar classes. To measure the achievement, grammar pretest and posttest were delivered through Google Form. Paired-samples t-test was used to determine the mean difference between grammar pretest and posttest among sixty respondents. The results were shown in the form of paired samples statistics, paired-samples correlations, and paired samples tests.

Paired sample statistics provided descriptive statistics (i.e. mean and standard deviation. The comparison between pretest and posttest mean scores was 69.41 and 78.61. From paired sample correlations, grammar pretest and posttest had a significantly positive correlation ( $r = .829, sig = .000$ ). Based on the paired-samples t-test result, it was found that the pretest and posttest mean scores were significantly different ( $t_{(59)} = -5.977, p < .05$ ). It means that through collaborative learning, students could improve their academic achievement, which was shown by the different results of means of both tests (i.e., the posttest mean score was higher than that of the pretest ( $78.61 > 69.41$ )). This present study confirmed what previous researchers have investigated in connection with collaborative learning. Collaborative learning improves second language teaching and learning particularly academic achievement (Fjermestad, 2004; Faja, 2013; Schmid *et al.*, 2014; Hernández-Sellés, Muñoz-Carril, & González-Sanmamed, 2015; Stoytcheva, 2018; Springer, Stanne, & Donovan, 1999; and Kumar, 2017 ). In online grammar classes, collaborative learning was effective to be applied as it had a positive effect on classroom teaching and learning ( Kovacic, 2012; Khalil, 2018).

Regarding students' responses towards collaborative learning, students generally reported that applying collaborative activities improve academic achievement. Similarly, collaborative work is valued to facilitate learning and increase academic achievement (Hernández-Sellés, Muñoz-Carril, & González-Sanmamed, 2015). Teamwork, peer interaction, and group work are some activities performed when dealing with task completion. Through these activities, students learn to build their understanding of material content based on peers' input (Item 2), to work collaboratively (Item 3), encourage interaction among students (Item 4), to complete the task within-group community (Item 5), and so forth.

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In correspondence with online class, collaborative activities were implemented in grammar class by making use of technology to mediate teaching and learning activities. Bellanger (2021) stated that asynchronous learning is carried out via computer communication networks as part of online collaborative learning that happens in an educational setting. Some online learning tools and applications such as Google Form (i.e., to become online test worksheet), Zoom (i.e., to conduct synchronous learning), Google Drive (i.e., to store and share learning materials), WhatsApp Group (i.e., to provide means of direct communication between teachers and students) and others are essential for assisting teaching and learning process.

**CONCLUSION**

The conclusion drawn from the findings is there is an improvement in the level of student academic achievement exposed to learning activities from a significant difference in the pretest and posttest mean scores. Through various collaborative activities such as teamwork, group work, and peer interaction, students learn to be more responsible with their own learning. The teaching and learning process focuses on being student-centered whilst the teacher's role is more to act as students' peers. Collaborative learning is well applied to both online and offline classroom setting with reference to teaching and learning experiences, learning environment, and designing class activities. When designing tasks and activities to encourage students to work collaboratively, it is also necessary to know the level of students.

**LIMITATION AND FURTHER RESEARCH**

It is important to note several limitations of this study. As this study was aimed at knowing the effectiveness of collaborative learning in online grammar classes using experimental design, the findings cannot simply represent the actual implementation of collaborative learning for certain individual students. Students' perceptions and behaviors towards online grammar learning mediated through collaborative learning should also be explored. Future researchers are suggested to provide rich information regarding students' perceptions and behaviors towards collaborative learning by conducting observation and interviews. The other challenge is the success of academic achievement in online grammar classes, which can be validated by measuring the relationship between achievement and collaborative learning experience.

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