

Cooperative Learning: The Effects towards Students' Achievement

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Cooperative learning is widely recognised as a pedagogical practice that promotes socialisation and learning among students from pre-school through to tertiary level and across different subject domains. It involves students working together to achieve common goals or complete group tasks – goals and tasks that they would be unable to completed by themselves. Therefore, this study quantitatively examined the efficiency and relationship between cooperative learning methods on students' achievement in Hydraulics & Mechanics of the Material Laboratory subject and the Transportation & Environmental Engineering Laboratory subject. The data for this study was obtained through a structured questionnaire which involved sixty technical students of Universiti Tun Hussein Onn Malaysia. *Based on the descriptive analysis presented, attempts to show that the success of cooperative learning as a pedagogical practice that promotes both socialisation and learning, was overwhelmingly supported.*

Key words: *Cooperative learning, students' achievement*

Introduction

Education plays a pivotal role in maximising individuals' potentials and is a prerequisite for the meaningful and sustained national economy (Dawkins, Hurley & Noonan, 2019; Sabau, 2020). Even though the educationalists had made efforts in improving teaching-learning processes, instructional designers are still searching and experimenting to get the best methods for the optimal academic performance of the students (Mukhopadhyay, 2020). According to Dyson and Casey (2016), in the traditional approach of teaching, most of the class time is spent by teachers talking and students watching and listening, and cooperative learning appears to be discouraged. Similarly, Johnson et al., (2014) elucidated that, in individual learning, how the students perceive and interact with one another, is a neglected aspect of instruction.

Correspondingly, the knowledge of biology in achieving success in the learning process in accordance with the curriculum, the performance of teachers and students is required to manage their creativity by linking real situations to the classroom. Still, often students get bored with the same learning model every day. In learning activities teachers play a full role in teaching and learning process because without teachers the students will not succeed (Listiadi & Ak, 2019). The role of teachers in the learning process of teachers as a facilitators, teachers as managers, and teachers as evaluators in learning (Ariffin, Bush, & Nordin, 2018). This effective role encourages teachers to consider what methods are used in delivering the subject matter. Various learning methods ranging from lectures, demonstrations, and cooperative learning teachers can use in delivering the material, but in this study chose cooperative learning because cooperative learning involves students more in the learning process (Gillies, 2014).

In Malaysia, numerous studies done by researchers have encouraged the use of cooperative learning in order to increase student achievement and social skills' development (Mahbib et al., 2017; Kuo & Huang, 2015; Ning, 2013; Ning 2011). Thus, research done by Hassan et al., (2020), Awang et al., (2017) and Ngasiman (2014) stated that students' academic achievement through technical subjects showing poor results and the contributing factors to this decline involved learning approach. This situation indirectly makes learning objectives difficult to achieve while not meeting the demands of the actual learning process (Schneider, M., & Preckel, 2017). Besides, some students and teachers experience less effective and practical learning methods which contributed to the decrease in students' performance and academic achievement (Kim et al, 2018; Suryawati & Osman, 2017). Therefore, this study should be conducted as an attempt to study (i) to identify the items influence of cooperative learning on students' achievement and, (ii) the relationship between the cooperative learning methods towards students' achievement.

Literature Review

The Elements of Cooperative Learning

Previous studies indicate several elements are needed for successful implementation of cooperative learning, most of which are inter-related (Johnson & Johnson, 2011). For that reason, the researcher has isolated three essential components needed for cooperative learning: (a) Positive social interdependence, (b) Accountability, and (c) Participation (Johnson & Johnson, 2018). Positive social interdependence is based on the notion that the success of each group member is essential for the group as a whole (Channon et al., 2017). In an effort to build positive interdependence within a group, the teacher should assign grades based on the groups' assessment or product as a whole. This should not be confused with combining individual grades of each group member

to assign a grade to the group. The use of a reward system can also contribute to positive interdependence. This reward could be a good grade (Jaquett et al., 2020). For self-regulating students, the reward of a good grade would be more than enough to foster appropriate levels of positive interdependence (Kim, 2017).

When left to their own devices in a group setting, students would not garner the academic achievement expected from cooperative learning. Both group and individual accountability will affect the learning outcomes of the group (Astuti & Barratt, 2018).

One way for a teacher to increase accountability is to develop group-oriented contingencies, in which the groups' access to a reward is directly related to meeting a specific academic performance criterion. As each student will be motivated differently by different rewards, more than one type of reward should be available, and, in some respects, rewards could be combined to encourage students and increase levels of accountability (Day et al., 2018; Ahmad & Ibrahim, 2015). Participation in the cooperative learning process can be linked to high levels of accountability. Therefore, an equal level of participation amongst students is another key element to cooperative learning (Fernandez-Rio et al., 2017). In order to facilitate the participation of all group members, teachers must explicitly explain that each group member is required to be an active participant in their learning, and students will be assessed by the quality of input they provide to the group as a whole (Strom & Strom, 1998).

Method

This study was conducted using the quantitative approach of survey design. The data was collected through distributing the questionnaire to sixty technical students of Faculty of Civil and Environmental Engineering, Universiti Tun Hussein Onn Malaysia. All the participants enrolled in the Hydraulics & Mechanics of Material Laboratory subject and Transportation & Environmental Engineering Laboratory subject. Then, the data were analysed using the Statistical Packages for Social Science (SPSS) software to obtain mean score and standard deviation. The Pearson correlation test was conducted to identify the relationship between cooperative learning method and students' academic achievement. In contrast, the multiple regression test was conducted to determine the influence of cooperative learning method on the academic achievement.

Results

Results Related to The First Question of Study

The data of this study were analysed and the findings were shown in the form of standard deviation and mean. The data obtained from this study were analysed descriptively using mean of SPSS 22.0. The mean score obtained was translate using a table from Moidunny source for reference.

Table 1: Score Mean Table (Moidunny (2009))

Mean Score	Interpretation
1.00 - 1.89	Very Low
1.90 -2.69	Low
2.70 - 3.49	Moderate
3.50 - 4.29	High
4.30 -5.00	Very High

The results of descriptive analysis which was conducted to identify the factors influenc cooperative learning on students' achievement between genders were given in Table 2.

Table 2: Mean Score, Standard Deviation and Interpretation of Items Influence of Cooperative Learning on Students' Achievement

No.	Item	Mean Score	S.D	Interpretation
1	My team members and I help each other	4.75	.571	Very High
2	My teammates and I instilled a sense of teamwork in our work.	4.48	.676	Very High
3	The members of the team and I perform the tasks within a set time.	4.43	.647	Very High
4	My team members and I use the materials provided optimally.	4.60	.588	Very High
5	My team members and I share the work fairly.	4.73	.516	Very High
6	My team members and I perform our tasks systematically.	4.52	.725	Very High
7	The members of the group and I had a harmonious discussion.	4.40	.588	Very High
8	The team members and I analyse the problem to solve the problem.	4.75	.474	Very High
9	My teammates and I work together to get things done.	4.38	.490	Very High
10	My team members and I encourage each other.	4.60	.494	Very High

11	The rest of the group and I are free to comment,	4.43	.647	Very High
12	The members of the group and I can follow the instructions given in obedience.	4.47	.596	Very High
13	My team members and I perform work / tasks in a positive and conducive environment.	4.68	.651	Very High
Total		4.56		

Table 2 shows a mean score for items influencing cooperative learning on students' achievement. The highest mean score reading with the result of 4.75 is on the statement No 1; "My team members and I help each other". The lowest mean score with 4.38 mean scores is for the statement No 9; "My teammates and I work together to get things done". Although in statement No 9 score is lower, but still this item contributes a very high effect of cooperative learning on students' achievement. Overall, most of the items' mean scores were at a very high level.

Results Related To the Second Question of Study

The second objective of this study was to identify the relationship between group learning and student achievement. The results of the correlation analysis are shown in Table 3.

Table 3: Correlations between Cooperative and Students' Achievement

		Cooperative Learning	Students' Achievement
Cooperative Learning	Pearson Correlation	1	.860*
	Sig. (2-tailed)		.001
	N	60	60
Students' Achievement	Pearson Correlation	.860*	1
	Sig. (2-tailed)	.001	
	N	60	60
*p<0.05			

The result showed that the relationship between cooperative learning method and students' achievement was high (r: 0.860), which also showed positive correlations between the two related variables as shown in Table 3 above.

While there was a difference in the relationship between cooperative learning and achievement in boys and girls, where higher correlations were seen among female students (r: 0.881) than male students (r: 0.826). The findings are as shown in Table 4.

Table 4: Correlation between Cooperative Learning and Students' Achievement among Male and Female Technical Students

Genre	Correlation (r)
Male	0.826
Female	0.881

To sum up, there was a significant correlation between the cooperative learning method toward students' achievement. In addition, the relationships among female students are more reliable than male students toward cooperative learning method.

Discussion and Conclusion

The findings of this study suggest that cooperative learning has positive effects on students' academic achievement. Based on the technical student's response, it is known that students are happy to follow the lesson with the cooperative learning method across the Hydraulics & Mechanics of Material Laboratory subject and

Transportation & Environmental Engineering Laboratory subject. The findings of this study are in line with previous studies where through the ethics of learning from an Islamic perspective, cooperative learning will result in blessings and even better effects of learning individually (Panhwar, 2016). This is because through group discussion, students will be able to share a comprehensive knowledge and understanding of the subject being studied or the project they are working on, as well as train the members of the group involved using maximum speaking, listening, thinking and interpersonal communication skills (Gillies, 2019; Sun et al., 2017).

The results' analysis shows that there is a strong and significant relationship between cooperative learning towards the achievement of technical students where there is a relatively high degree of correlation and values. The findings of this study are similar to other studies done on cooperative learning. According to Altun (2017), when cooperative learning is carried out responsibly, it can increase students' academic achievement. Additionally, the research of Abramczyk and Jurkowski (2020) indicated a positive correlation between the use of cooperative learning and student achievement. These results suggest that student achievement can be increased with the implementation of cooperative learning methods. The results are consistent with the research of Loes et al., (2017), which indicates when students work together in a cooperative fashion, they experience higher rates of learning gains.

Besides, the results also shows that the correlation values between the cooperative learning method and male technical students' achievement were less than that of female technical students. This finding is supported by previous studies, where Olabiyi and Awofala (2019) found that female students achieved better academic performance than male students. Male and female students with disproportionate achievement have long been an issue (Schnell, C., & Loerwald, 2019; Van Es & Weaver, 2018; Sosa,



2017). Academic achievement for female students was found to be more encouraging than male students (Udu, 2018).

Against the backdrop, the findings from this study suggest that there is a positive relationship between the use of cooperative learning towards student achievement. As a result, in enriching the cooperative learning method, as teachers, they must be creative and flexible with their lesson planning and instruction. Teachers must be willing to think critically about the needs of their students and develop lessons that are creative, fun, and exciting, so the students are being challenged to use higher-order thinking skills and inference, not just the memorisation of key points. The implementation of cooperative learning can be expanded not only to other technical subjects but also to other disciplines such as social studies and others.

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