

Correlation in the Utilization of the Cooperative Learning Strategy to the Pupil's Attitude in Learning Mathematics and Perception in Blended Learning

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Abstract —The study aimed to determine the relationship between the perception on the utilization of cooperative learning strategy, attitude of pupils in attending Mathematics class and perception of blended learning. Utilizing the descriptive-correlational research design for an in-depth analysis of the study, the researcher used the survey on Cooperative Learning developed by Alhabeedi (2022), Modified Fennema-Sherman Mathematics Attitude Scale developed by Fennema-Sherman (1976) and Perception of Blended Learning which was developed and utilized by Alhabeedi (2022). Weighted Mean and Pearson r were the statistical tools used. Results of the study revealed a very strong significant relationship between the attitude of the pupils while attending mathematics classes and perception on the utilization of cooperative learning strategy and blended learning modality in teaching the subject. Thus, the pupils valued cooperative learning and blended learning as an effective strategy and method for learning mathematics while improving their attitude towards the subject.

Keywords — *Correlation, Utilization, Cooperative Learning Strategy, Pupil's Attitude, Learning Mathematics, Perception, Blended Learning*

I. Introduction

In the advent of the Covid-19 pandemic, many schools were subject to school closures which upended education across the globe. According to a report by UNICEF in 2021, 131 million students in pre-primary to higher secondary education in 11 countries fully missed at least three quarters of classroom instruction time in the first 18 months of the pandemic with 59 per cent (or 77 million students) missing almost all in-person classroom instruction time. With this, coupled with the rapid advancements in technology, the need for continuing education called for innovations and changes in the modalities used to deliver instruction.

With the onset restrictions placed by different countries to manage the spread of the Covid-19 virus, numerous institutions opted for learning deliveries that limit interaction between stakeholders. These learning deliveries include online learning and modular distance learning. However, purely employing these modalities resulted in ineffective learning as many studies show that activities carried out through primarily web-based instruction were found to have some deficiencies, and could not satisfy the learnings required (Yapici, 2016). This gave rise to blended learning.

By definition, blended learning is the combination of the strong advantageous sides of web-based learning and face-to-face learning (Horton, 2002; Osguthorpe & Graham, 2003). It aims to establish a balance between online based instruction and face to face learning, highlighting advantages such as decreasing the workload of faculty members, pioneering courses that have an advanced design, effective participation of students and rich learning outcomes (Moskal, Dzibuan & Hartman, 2013). However, in a study by El - Deghaidy & Nouby (2008), the authors pointed out that providing instructions and activities only in an online environment causes no difference to learning, particularly in blended learning. The authors further elaborated that the use of cooperative learning coupled with in depth research regarding blended learning environments, which include increased online and face-to-face interaction, should thus be used.

Cooperative learning accomplishing shared goals through small group interactions (Gillies, 2007). In a normal setting, cooperative learning groups are usually heterogeneous in representation, with all members aware of the shared responsibility of each individual which is imperative to the success and failure of the group. Additionally, as each individual is part of the in-class dialogues, participation is essentially observed more frequently (Yapici, 2016). Cooperative learning is considered as the foundation of many active learning strategies which highlights that students engage in dialogue, interact with other students in small groups, generate new ideas and cognitive structures within the groups, and coordinate with group mates as to the direction and speed of the work (Johnson & Johnson, 2018). This premise, in many cases, is considered effective especially in subject areas where orthodox methods seem to render students uninterested and unmotivated.

Traditional learning methods already include cooperative learning in its implementation. However, in challenging subjects such as mathematics, instruction often moves objectively regardless of the level of mastery of the students. In a similar manner, online learning provides little time for teacher and peer assistance as interaction is often very limited. These two recurring problems in both traditional and remote learning environments often leave students frustrated, resulting in incomplete learning experience and poor performance on assessments (Lin et al., 2016) and behavior problem in learning Math. On the other hand, blended learning coupled with cooperative learning facilitates active learning and interactivity between learners and the mediator in the learning environment—the teacher. Furthermore, the use of blended learning helps to diversify the instructional delivery strategies employed, particularly in mathematics curriculum,

as well as, exploring the benefits of web-based technologies in mathematics education (Awodeyi, Akpan, & Udo, 2014).

It is in the rationale that the researcher who is currently a Grade 6 Math teacher in Antipolo Elementary School, Albuera South District, Leyte Division, would like to delve worthy research undertaking that will benefit the school he is currently teaching and that of the Graduate Program he is enrolled at.

This study aimed to determine the relationship between the perception on the utilization of cooperative learning strategy, attitude of pupils in Mathematics class and perception of blended learning in Antipolo Elementary School of Albuera South District, Leyte Division. The findings of the study were bases for the proposed improvement plan.

Specifically, this study sought to answer the following questions:

1. What is the perception of the teachers based on the utilization of cooperative learning strategy in teaching Mathematics in blended learning modality?
2. What is the extent of attitude of pupils while attending classes in Mathematics lessons in blended learning modality?
3. What is the extent of perception of pupils in the implementation of blended learning modality in teaching Mathematics?
4. Is there a significant relationship between the utilization of cooperative learning strategy and extent of attitude of pupils in Mathematics?
5. Is there a significant relationship between the extent of attitude of pupils in Mathematics and their perceptions on the blended learning modality?
6. What intervention plan can be proposed based on the findings of this study?

II. Methodology

Design. This study employed the descriptive-correlational research design to determine the relationship between the cooperative learning strategy of teachers, attitude of pupils in learning Math and perception of blended learning. Antipolo Elementary School, Albuera South District, Leyte Division is the main locale of the study. The 7 teachers teaching Mathematics and 75 selected pupils enrolled in the said locale for School Year 2022-2023 are the main respondents of the study and Cooperative Learning Survey developed by Alhabeedi (2022), Modified Fennema-Sherman Mathematics Attitude Scale developed by Fennema-Sherman (1976) and Perception of Blended Learning Survey which was developed and utilized by Alhabeedi (2022). This research is focused on determining the perception of teachers based on the utilization of cooperative learning strategy in teaching Mathematics. Moreover, this study is also focused in determining the extent of attitude of Grade 6 pupils while attending Math lessons and extent of perception of pupils in the implementation of blended learning and its relationship. A Proposed Intervention Plan based on the findings of the study is the output.

Sampling. There are 7 teachers teaching Mathematics and 75 selected pupils involved in this study. The research instruments were distributed personally with consent from the Local IATF and strictly following the prescribed Health Protocol.

Research Procedure. The researcher prepared the research design and tools to be utilized in the study. Approval and recommendation from the Panel of Examiner of the Graduate Studies was sought. A letter request to conduct this study was forwarded to the Office of the Schools Division Superintendent. Upon approval, permission from the District Supervisor and School Head was secured before the actual gathering of data. Orientation of the participants and administration of the survey was done through face-to-face during the SRT of the pupils in each class. After accomplishing the survey, it will be collected. Data were tallied and submitted for statistical treatment. Analysis and Interpretation of Data. Making of Proposed Intervention Plan followed.

Ethical Issues. The right to conduct the study was strictly adhered through the approval of the Schools Division Superintendent of the Division, District Supervisor, and School Head. Orientation of the respondents was done using face to face modality. In the orientation, issues and concerns were addressed and consent to be included in the study were signed. Confidentiality of the responses of the respondents in the survey was emphasized.

Treatment of Data. The Weighted Mean was employed to determine the relationship between the perception on the utilization of cooperative learning strategy in teaching Mathematics, extent of attitude of Grade 6 pupils while attending Math lessons and extent of perception of pupils in the implementation of blended learning. **Pearson r** was used to determine the significant relationship between the dependent and independent variables of the study.

III. Results and Discussion

Table 1
Perception of Pupils on the Utilization of Cooperative Learning Strategy
Used by Teachers

No	Cooperative Learning Strategy	Weighted Mean	Description	Interpretation
1	Cooperative learning facilitates greater student participation in class activities.	4.52	Strongly Agree	Very High
2	Cooperative learning enhances class participation.	4.44	Strongly Agree	Very High
3	Cooperative learning improves my attitude towards participation.	4.43	Strongly Agree	Very High
4	Cooperative learning makes learning easier.	4.38	Strongly Agree	Very High
5	Cooperative learning makes students who work together achieve more than when they work alone	4.62	Strongly Agree	Very High
6	Cooperative learning makes me express opinions, argue, debate, negotiate, and ask questions.	4.71	Strongly Agree	Very High
7	Groups activities make the learning experience easier.	4.77	Strongly Agree	Very High
8	Cooperative learning enhances good working relationships among students.	4.73	Strongly Agree	Very High
9	Cooperative learning encourages interaction between students.	4.46	Strongly Agree	Very High
10	Cooperative learning has helped me to raise my hand to answer and discuss.	4.51	Strongly Agree	Very High
11	Cooperative learning has a positive impact on the students about learning	4.28	Strongly Agree	Very High
12	Cooperative learning is a good example for active learning strategies in the educational process	4.44	Strongly Agree	Very High
13	Teachers use a lot of cooperative learning strategies in the classroom.	4.43	Strongly Agree	Very High
14	Cooperative learning contributes in development of a real collaborative skills among students.	4.34	Strongly Agree	Very High
15	Cooperative learning strategy increases students' motivation to learn.	4.76	Strongly Agree	Very High

16	Cooperative learning strategy motivates students to use more of the mental processes of thinking.	4.48	Strongly Agree	Very High
17	Cooperative learning strategy promotes self-management skills for students.	4.49	Strongly Agree	Very High
18	Cooperative learning strategy promotes self-confidence.	4.52	Strongly Agree	Very High
19	Cooperative learning strategy increases the incidence of positive behavior and decreases negative behavior.	3.72	Agree	Agree
20	Cooperative learning strategy helps students to solve problems, make decisions, plan and organize their work	3.80	Agree	Agree
AVERAGE		4.44	Strongly Agree	Very High

Table 1 presents the perception in the utilization of cooperative learning strategy of teachers in teaching Mathematics. It was revealed on the table that the perception in the utilization of cooperative learning strategy of teachers in teaching Math has an average of 4.44 which is interpreted as strongly agree. This means that the perception in the utilization of cooperative learning strategy of teachers in teaching Mathematics is very high. This implies that when teachers utilize cooperative learning activities in the classroom, it helps improve interaction in groups, promotes individual responsibility for learning and impacts metacognitive awareness. The benefits of cooperative learning also include increased cooperation and more well-developed social skills, motivation and retention of knowledge. Furthermore, cooperative learning enables pupils to have a broader understanding of the subjects since they are able to collaborate the learning process.

Table 2
Extent of Attitude of Pupils in Attending Math Class

No	Statements	Weighted Mean	Description	Interpretation
1	I am sure that I can learn math.	4.45	Strongly Agree	Very High
2	My teachers have been interested in my progress in math	4.00	Agree	High
3	Knowing mathematics will help me earn a living.	4.52	Strongly Agree	Very High
4	I don't think I could do advanced math.	3.90	Agree	High
5	Math will not be important to me in my life's work.	3.87	Agree	High
6	Males are not naturally better than females in math.	3.78	Agree	High
7	Getting a teacher to take me seriously in math is a problem.	2.80	Undecided	<i>Moderately High</i>
8	Math is hard for me.	3.89	Agree	High
9	It's hard to believe a female could be a genius in mathematics.	4.34	Strongly Agree	Very High
10	I'll need mathematics for my future work	3.67	Agree	High
11	When a woman has to solve a math problem, she should ask a man for help.	3.76	Agree	High
12	I am sure of myself when I do math.	3.66	Agree	High
13	I don't expect to use much math when I get out of school.	2.54	Disagree	Low
14	I would talk to my math teachers about a career that uses math.	4.41	Strongly Agree	Very High
15	Women can do just as well as men in math.	3.77	Agree	High
16	It's hard to get math teachers to respect me.	2.46	Disagree	Low
17	Math is a worthwhile, necessary subject.	4.51	Strongly Agree	Very High
18	I would have more faith in the answer for a math problem solved by a man than a woman.	3.66	Agree	High
19	I'm not the type to do well in math.	2.13	Disagree	Low

20	My teachers have encouraged me to study more math.	3.78	Agree	High
21	Taking math is a waste of time.	2.19	Disagree	Low
22	I have a hard time getting teachers to talk seriously with me about math.	2.44	Disagree	Low
23	Math has been my worst subject.	2.48	Disagree	Low
24	Women who enjoy studying math are a little strange.	3.66	Agree	High
25	I think I could handle more difficult math.	3.71	Agree	High
26	My teachers think advanced math will be a waste of time for me.	1.94	Disagree	Low
27	I will use mathematics in many ways as an adult.	3.77	Agree	High
28	Females are as good as males in geometry	3.65	Agree	High
29	I see mathematics as something I won't use very often when I get out of high school.	2.10	Disagree	Low
30	I feel that math teachers ignore me when I try to talk about something serious.	2.08	Disagree	Low
31	Women certainly are smart enough to do well in math.	3.89	Agree	High
32	Most subjects I can handle OK, but I just can't do a good job with math.	3.84	Agree	High
33	I can get good grades in math.	3.67	Agree	High
34	I'll need a good understanding of math for my future work.	3.72	Agree	High
35	My teachers want me to take all the math I can.	3.82	Agree	High
36	I would expect a woman mathematician to be a forceful type of person.	3.90	Agree	High
37	I know I can do well in math.	4.45	Strongly Agree	Very High
38	Studying math is just as good for women as for men.	3.67	Agree	High
39	Doing well in math is not important for my future.	2.02	Disagree	Low
40	My teachers would not take me seriously if I told them I was interested in a career in science and mathematics.	3.90	Agree	High

41	I am sure I could do advanced work in math.	4.10	Agree	High
42	Math is not important for my life.	3.00	Undecided	<i>Moderately High</i>
43	I'm no good in math.	3.10	Undecided	<i>Moderately High</i>
44	I study math because I know how useful it is.	4.00	Agree	High
45	Math teachers have made me feel I have the ability to go on in mathematics.	3.87	Agree	High
46	I would trust a female just as much as I would trust a male to solve important math problems.	3.90	Agree	High
47	My teachers think I'm the kind of person who could do well in math.	3.76	Agree	High
AVERAGE		3.51	Agree	High

Table 2 presents the extent of attitude of Grade 6 pupils in attending Math class. It was revealed on the table that the extent of attitude of Grade 6 pupils in attending Math class has an average mean of 3.51 which is interpreted as high. This means that pupils agree that their extent of attitude in attending Math class is high. This implies that attitudes can change and develop with time and once a positive attitude is formed, it can improve students' learning. On the other hand, a negative attitude hinders effective learning and consequently affects the learning outcome henceforth performance. This implies further that pupils agree that they are confident that they will math and at the same time it is very useful in their day-to-day activities which proves that math is useful in everyone's life and their attitude towards the subject depends upon the kind of teachers teaching the subject, the environment and the activities given to them.

Table 3
Perceptions of Pupils in Blended Learning

No	Statements	Weighted Mean	Description	Interpretation
1	Compared to traditional, face-to-face instruction, blended learning helps me better understand mathematics.	4.00	Agree	High
2	Blended learning enables me to become more involved in the learning process.	3.90	Agree	High
3	With blended learning I can control how fast or slow I move through lessons.	3.89	Agree	High
4	I am satisfied with my interactions with my teacher during blended learning.	3.87	Agree	High
5	I am satisfied with my interactions with my classmates during blended learning.	3.78	Agree	High
6	Compared to traditional, face-to-face instruction, blended learning is a more effective instructional strategy.	3.88	Agree	High
7	I would recommend that other students take blended learning course	3.65	Agree	High
8	Blended learning is an effective way to learn mathematics	3.92	Agree	High
9	Compared to traditional, face-to-face instruction, generally, I am more engaged during blended learning.	4.00	Agree	High
10	Given a choice, I would take another blended learning course	3.90	Agree	High
11	In general, I am satisfied with blended learning instructional strategy.	3.80	Agree	High
AVERAGE		3.87	Agree	High

Table 3 presents the perception of pupils on blended learning. It was revealed on the table that the extent of perception of pupils in the implementation of blended learning has an average mean of 3.87 which is interpreted as high. This means that the pupils agree that blended learning is an effective way of learning mathematics. This implies that blended learning provides authentic and meaning for activities that foster and support learning by enabling pupils to ascertain goals and to access appropriate information resources and tools. Further, the results implies that blended learning creates a powerful interaction among learners in the classroom and pupils learn more

when they are with the teachers and at the same provides better understanding of the lessons convey.

Table 4
Test of Relationship

Variables Correlated	r	Computed value or t	Table Value @.05	Decision on Ho	Interpretation
Utilization of Cooperative Learning Strategy and Attitude of pupils in Mathematics	0.80	3.663	0.854	Reject Ho	Significant Relationship (Very Strong)
Attitude of pupils in Mathematics and Perceptions on Blended Learning Modality	0.88	3.662	0.521	Reject Ho	Significant Relationship (Very Strong)

Table 4 presents the test of relationship between the utilization of cooperative learning strategy, perceptions on blended learning modality and extent of attitude of pupils in Mathematics. It was revealed on the table that the extent of perception on the utilization of cooperative learning strategy and attitude of pupils in Mathematics has a computed value or t of 3.663 which is bigger than the tabular value of 0.854 at 0.05 level of significance, so null hypothesis is rejected. This means that there is a significant relationship between the extent of perception on the utilization of cooperative learning strategy and attitude of pupils in Mathematics. The r value of 0.80 revealed a very strong significant relationship. This implies that the utilization of cooperative learning strategy in teaching mathematics contributes to the attitude of the pupils in the subject. The positive and negative attitude of the pupils towards learning math will depend on the cooperative learning strategy used by teacher which stimulates or motivates them to love and understand the subject.

Moreover, this table also presents the test of relationship between the attitude of pupils in Mathematics and extent of perceptions on blended learning modality. It was revealed on the table that extent of attitude of pupils while attending classes in Mathematics and perceptions on blended learning modality has a computed value or t of 3.662 which is greater than the tabular value of 0.521 at 0.05 level of significance, so null hypothesis is rejected. This means that there is a significant relationship between the attitude of pupils in Mathematics and extent of perceptions on blended learning modality. The r value of 0.88 revealed a very strong significant relationship. This implies that by implementing blended learning modality where pupils have access to the teachers and the activities provided to them help predict positive or negative attitude towards learning the subject. Meaning, when pupils were given more activities using modules, negative attitude towards learning the subject is expected but if pupils are exposed to blended learning where pupils are engaged in activities on a face-to-face and modular or online teaching-learning, positive attitude is attained.

IV. Conclusion

The study revealed a very strong significant relationship between the attitude of the pupils while attending mathematics classes and perception on the utilization of cooperative learning strategy and blended learning modality in teaching the subject. Hence, the attitude of the pupils while attending Mathematics lesson depends upon the cooperative learning strategy utilized by teachers in blended learning modality. Thus, the pupils valued cooperative learning and blended learning as an effective strategy and method for learning mathematics while improving their attitude towards the subject.

V. Recommendations

1. The proposed intervention plan formulated should be utilized;
2. Teachers should prepare cooperative learning strategy in teaching Mathematics;
3. Teachers should motivate the pupils through the provision and integration of cooperative learning activities in the classroom to develop positive attitude towards the subject;
4. Teachers should attend trainings, LAC sessions and other capability building activities for the improvement of teaching-learning process in Math;
5. School Heads should prepare activities and trainings which will help the teachers improve their teaching performance in Math;
6. Teachers should encourage parents to provide feedback regarding the implementation of blended learning modality and be able to use these for planning activities for the teachers to improve their teaching-learning strategies and methods; and
7. Future researchers should replicate this study to include different locale and include different variables aside from the mentioned in this study.

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