

Enhancing Cooperative Learning in Groups in Mathematics: The Case of Akesta General Secondary and Preparatory School Grade 12 Section “A” Students

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Abstract This study was aimed to enhance students' active participation toward cooperative learning in groups in Mathematics. A case study with the involvement of Akesta General Secondary and Preparatory School Grade 12 section “A” students were considered. Questionnaires as tools for the collection of data were used. Even though students like cooperative learning, the findings reveal that their participation on the given group work are too low except the group leaders. It was analyzed that teachers need to assign roles to each and every individual group member to enhance students' commitment on cooperative learning

Key words: Cooperative learning, active participation, Member's role, Presentation

1. INTRODUCTION

A learning goal is a desired future state of demonstrating competence or mastery in the subject area being studied. Students' learning goals may be structured to promote cooperative, competitive, or individualistic efforts. In every classroom, instructional activities are aimed at accomplishing goals and are conducted under a goal structure. The goal structure specifies the ways in which students will interact with each other and the teacher during the instructional session. Each goal structure has its place. In the learning classroom, all students would learn how to work cooperatively with others. The teacher decides which goal structure to implement within each lesson. The most important goal structure,

and that should be used the majority of the time in learning situations, is cooperation (Siegel, 2005).

Cooperation is working together to accomplish shared goals. Within cooperative situations, individuals seek outcomes that are beneficial to themselves and beneficial to all other group members. Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning. It may be contrasted with competitive (students work against each other to achieve an academic goal such as a grade of “A” that only one or a few students can attain) and individualistic (students work by themselves to accomplish learning goals unrelated to those of the other students) learning. In cooperative and individualistic learning, you evaluate student efforts on a criteria-referenced basis while in competitive learning you grade students on a norm-referenced basis. While there are limitations on when and where you may use cooperative, competitive and individualistic learning styles, one may structure these learning styles in any subject area (Johnson, Johnson, & Taylor, 1993; Snyder & S., 2006).

Cooperative learning involves groups of students working to complete a common task. This is typically done with groups of 3-5 students; the smaller the group members result for the better achievements (Siegel, 2005). When working with a partner, forms of elaborated talk are more prevalent than when working alone (and talking aloud to oneself) (Krol, Janssen, Veenman, & van der Linden, 2004). Cooperative learning needs five elements: positive interdependence, face to face

interaction, individual accountability, social skills, and group processing (Forslund & Hammar, 2018). What can be deduced here is, to achieve learning objectives in cooperative learning, teachers should structure (form) groups in which all group members can face each other, interdependent and linked together so that each person has a participation on the given tasks and each member's success depends on the success of all other group members.

The term cooperative learning is also known as collaborative learning which is a body of concepts and techniques for helping to maximize the benefits of cooperation among students. A wide range of theoretical perspectives on learning - including behaviorism, socio-cultural theory, humanist psychology, cognitive psychology, social psychology and Piagetian developmental psychology - have been used to develop and justify different approaches towards cooperative learning (Jacobs & Wang, 2008).

For many years, humans have utilized the power of cooperation in a broad range of endeavors, including education. Hence, cooperation is an educational mode that promotes learning and socialization among students (Johnson, Johnson, & Taylor, 1993). The effects of learning in groups are considerably improved when students receive well-structured group work experiences or when they are instructed in group work strategies (Johnsen, 2009). One can also demonstrate the importance of social collaboration to promote learning through this style. Cooperative learning also gives students the chance to analyze and evaluate the mathematical thinking and strategies. This can be done in a non-threatening environment. The interactions with other students can help deepen the level of understanding for all students. The communication of mathematical ideas helps to develop reasoning skills and better understanding of arithmetic procedures (Martin, 2000). In this teaching style, groups of learners work collaboratively towards a goal. The goal might be an assignment, class work questions, a presentation on a specific topic, projects, etc. Also, cooperative learning enables students to work together to learn and to take

responsibility for their team-mates learning as well as their own.

In this action research study, we investigated how to enhance cooperative learning in groups in mathematics: in the case of Akesta General Secondary and Preparatory School Grade 12 section "A" Students. The area of concern that we've become aware of from what we have observed when we taught our students were: students do not actively participate in group works individually that we gave to them. Students not only do not participate, but they also disturb others who wants to do that group work activities. There are one or two students who are active in the group work, those are responsible to do the given task but others have no role in the group work. To make students work hard in their group we should have aware of those students about the importance of it and give an individual task for each members of the group.

This action research project is intended to monitor students' understanding on the given group works and their scores; and observe any effect due to the enhanced cooperative learning in groups in mathematics. Teachers in all subject areas could benefit from this research.

1.1. Statement of the problem

The essence of this study focuses on enhancing cooperative learning in groups in Mathematics. In order to accomplish this, the researchers were made analysis regarding cooperative learning with some students and teachers at Akesta General Secondary and Preparatory School. During these times, many problems of the practice were encountered from the students. Hence the study was focused to improve the following encountered problems:

- Only group leaders are active in cooperative learning, other group members did not have any participation,
- Some students are not well aware of the concepts of the cooperative learning,
- There is no individual accountability and positive interdependence in cooperative learning.

1.1. Objectives of the study

1.1.1. General objective

The general objective of this action research was to enhance cooperative learning in groups in mathematics: the case of Akesta General Secondary and Preparatory School grade 12 section “A” students.

1.1.2. Specific objectives

The specific objectives of this action research were

- To create awareness towards cooperative learning
- To enhance student’s individual involvement in group works.

2. MATERIALS AND METHODS

2.1. Research Methods

To enhance cooperative learning in groups in mathematics we first observed the student’s participation in group activity and class presentation. During this observation time, we recorded that only the group leaders were responsible to do and to present the given tasks. During the presentation, except the group leaders, all other group members were not reflecting their ideas, they were not answer the questions raised by the other groups, even they were not asking a question if not clear. After we identify such kinds of problems, we have searched for different methods that could enhance individual students’ role on the given task to a group of students. To do that we’ve prepared a questionnaire that would help us to know their view on cooperative learning. In the questionnaire, out of a total population of Akesta General Secondary and Preparatory School students, 33 students of Grade 12 section “A” were considered. Among these students 17 are male and 16 are females. Thus, 17 male and 16 female students were selected using random sampling technique. We ask the questions each individual student to give their honest responses by circling once only the numbers given on the questionnaire

from 1 up to 5 with response categories of strongly disagree (1), disagree (2), undecided (3), agree (4) and strongly agree (5), and also by explaining their reason if they would not like cooperative learning. By doing this, we explored students’ views/opinions regarding cooperative learning in group in mathematics. The questions we asked them were included in the appendix. The data was used to track changes in students’ attitudes.

Generally, on this study the researchers have used the following Methods:

- Observation on student’s participation in group activity and class presentation at Akesta General Secondary and Preparatory School.
- Making an interview with students and teachers in the school.
- As a focus group, randomly selecting grade 12 section “A” students during Mathematics class was held.
- Questionnaires helps to know students’ view on cooperative learning were distributed.
- Interference to acquainted with the students group work activity through teaching at the school were held.

2.2. Proposed Actions

We have proposed different actions that enable us to create awareness and enhance students’ role in cooperative learning in groups for Akesta General Secondary and Preparatory School grade 12 section “A” students. At the first step a program in which we meet with students was arranged with principal and deputy principal of the school and we explained the purpose of the study and also arranged the necessary conditions with them.

Depending on our teaching experience, we have observed that only group leaders are active in cooperative learning, other group members do not participate on it. In order to avoid this, we decided that each individual group members should take their own roles and the given roles were designed by instructor as it is explained on Table 1 below.

Table 1: Group members roles and their functions

| Individual Group members roles | Functions |
|--------------------------------|---|
| Coordinator | Coordinating and keeping a group on the task and verifying that all members contribute |
| Recorder | Taking notes on important thoughts expressed in the group and writing final summary |
| Materials Manager | Picks up, distributes, collects, turns in, or puts away materials needed for the tasks given |
| Helper | gives help in reading, demonstrating, problem solving, or using materials for the successful achievement of group work. |
| Checker | Checks for accuracy and clarity of thinking during discussions. Checks written work and tracks point |

In addition to the roles described on

Table 1, to consolidate students' understanding and participations on their roles, we propose that all students should present what the group have done for the whole class, that is, students should have to present what they have done in their group to the rest of the class so that all group member will take a presenter role as the presenter is to be assigned by the instructor randomly during the presentation time. Here, randomly selecting the presenter helps to finish the tasks on the allotted time, since if one group member present, the teacher can leave the others though all the rest of the members are prepared and expected to present. Moreover, in order to initiate students' participation, we have proposed to reward them (the reward might be pen, pencil, exercise book, etc.), and used questionnaire and interview analysis

to acquire sufficient data for the purpose of the study.

3. RESULTS AND DISCUSSION

3.1. Implementation of the Actions

After deciding the appropriate time and conditions the questionnaire that helps us to analyze students' awareness and understandings towards cooperative learning in groups on mathematics was distributed to 33 students. During the first class we have taught them, we group them with 5 members and gave them an assignment by telling them to submit the next day. When we check the individual member's participation on the given assignments by asking questions from the given assignment, only group leader students respond correct answer with explanation, other group members do not respond and even they do not know about the given questions. Next day we

gave another assignment by assigning roles, explained on Table 1 above, for each individual group members. In addition to this, we also told them that they should have to present what they have done in their individual group to the rest of the class so that all group member would take a presenter role as the presenter is to be assigned by the instructor randomly during the presentation time.

In addition to giving assignments for the students as it were implemented above, on another session, we made a group discussion in the class by giving them a mathematical problem and we were facilitated their group discussion as it were described on the following flow chart.

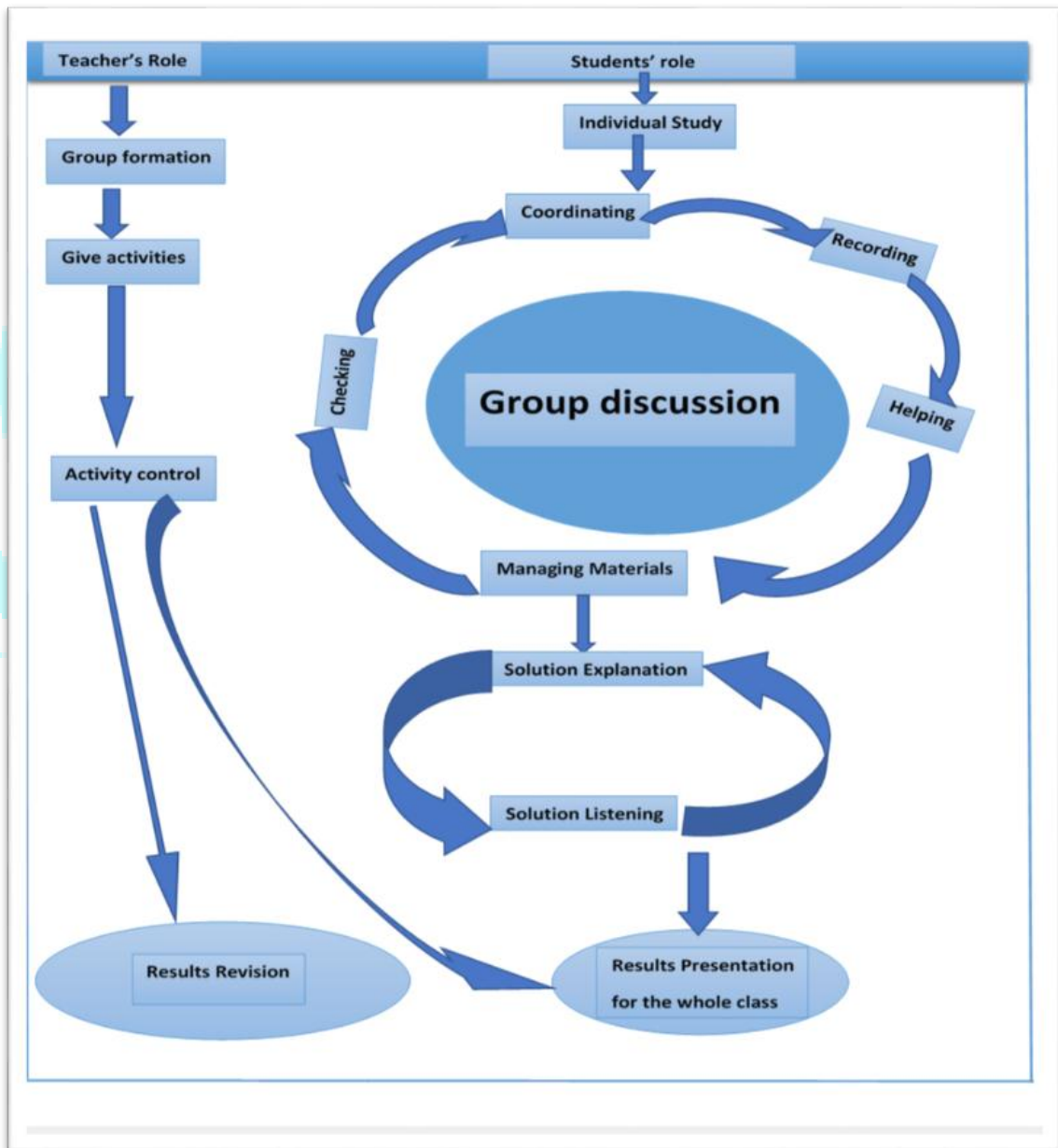


Figure 1: A flow chart that shows what different actors do at a given times

As it was shown on Figure 1, in problem solving, students first study problem individually in the class. Then they were grouped and assigned specific roles and perform their duty and later share together. When they share their ideas in the group, one member become the problem solver and the rest listener, and vice versa. That is, the problem solver explains her/his solution to the listener and the listener follows the explanation and catches any errors that occur. Then after, they present results for class-room discussion. Finally, the teacher gives revision on what they have discussed in their group.

3.2. Evaluation of the Actions

Depending on the responses of the students on the questionnaire, we deduce that many students enjoyed the opportunity to work within a group, that is, as we have seen from the questionnaire 74.5% of students like to participate in cooperative learning (The number, 74.5%, was calculated by taking the average value of students' responses on the questionnaire). On the other hand, there are some students who would rather prefer to work alone. The benefits outweigh the demands. Overall, students like the cooperative learning in groups. Also, we have analyzed students' involvement from the given assignment during the pre-implementation and post implementation observations. When we compare the students' participation on the first and second assignment there is big difference on their understanding and active participations. Students who were not have any role in the first assignment didn't actively participate. After we gave roles according to the preceding Table 1 and enforce them to present the given tasks randomly, they actively contribute for the group by: correcting and clarifying questions to the group members as what the question says, organizing group discussion, bringing resources, asking questions when they did not understand the questions to get clue, arranging main point of what the group discussed and demonstrating and presenting it in class.

Generally, in our post-implementation-observation we were pleasantly surprised with the

difference in students' behavior that we observed. After assigning students to take roles, initiating them to present for the whole class by randomly selecting the presenter during the presentation time, asking questions from the group members and rewarding them depending on their responses, almost all students were actively participated on the given tasks.

3.3. Reflection

3.3.1. Effectiveness of the Action

After we conducted this action research, we were pleasantly surprised with the difference in student behavior that we observed. Giving students some roles to contribute to the group has enhanced individual role in-group activity and ensured that the students were actively involved in the activity. Before using student roles during the group activity time, only few students of each group were participating in the activity; while the others were not participated. However, once we arranged the students that they all had a job to do during the group discussion and class presentation, we found no students to be off task and, for the most part, almost all were actively participated in the activity. Moreover, the class presentation and participation became very warm and so reflective. Students' motivation/interest to ask and answer questions has boosted.

3.3.2. Difficulties Encountered

There are many challenges that the we faced while conducting this research. Among these, the followings are the main encountered problems.

- ✓ Low academic background of the students.
- ✓ Students' absenteeism from the class.
- ✓ The allotted time per session is 42 minutes in the school which is insufficient when evaluating the level of understanding of each group members through presentation.
- ✓ Due to Covid-19, students were not interested in group works.

3.3.3. Learned Lesson

After successful accomplishment of the study, the researchers learnt a lot of things from this action research. The most important learned

lessons from using the cooperative learning teaching method are listed below.

- ✓ It increases learners' creativity, confidence, critical thinking ability, engagement, responsibility and decision-making capacity.
- ✓ It improves experience sharing processes among learners; team learning, togetherness, Leadership ability, Decision-making, Trust-building, Communication and Conflict-management skills.
- ✓ It makes learners to have a marked degree of freedom and control over the organization of learning activities.
- ✓ It makes learners active, creative and knowledge constructors.
- ✓ It makes learners responsible for their learning.
- ✓ It creates two and more ways of communication; between teacher and learners.
- ✓ It strengthens the individual learner's problem-solving capacities.

CONCLUSION

Even though we can enhance cooperative learning in group by assigning roles for the group members randomly, a few students still have a low active participation; thus, we need to motivate them through strong participation and observation at every teaching-learning process. Also due to the shortage of the time it is difficult to impose the action on all students so that one can able to develop better strategies in which s/he can enhance cooperative learning in groups on the allotted times.

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Appendix
Questionary to be filled by students

The purpose of this questionnaire was to collect valid information which assists the researcher to know students’ attitude on cooperative learning in a group. The researcher believes that, the students’ responses were vital in determining the success of the study. Hence, they were kindly requested to fill the questionnaire completely and honestly. The questionnaire filled by the students were prepared as follows.

I. Direction: Below are items to assess your opinion about cooperative learning. Read each statement carefully and indicate your choice by circling once only the numbers given from 1 up to 5 by using the following keys as the meaning of the numbers given.

Strongly agree (5), agree (4), Undecided (3), Disagree (2), and strongly disagree (1)

Please give your honest response to each statement and do not write your name on any page of the questionnaire. Thank you for your kind cooperation!

Sex: Male Female (tick one box)

Table 2: Items to Asses Students Opinion

| No | Statements | Strongly disagree | disagree | Undecided | Agree | Strongly agree |
|----|--|-------------------|----------|-----------|-------|----------------|
| 1 | I always like to work in groups in mathematics class. | 1 | 2 | 3 | 4 | 5 |
| 2 | I ask my group members if the given problem is not clear to me and get further understanding | 1 | 2 | 3 | 4 | 5 |
| 3 | When I work in group, I prepare questions by myself and ask my group members to know their level of understanding. | 1 | 2 | 3 | 4 | 5 |
| 4 | I understand the mathematics concepts when I work in a group. | 1 | 2 | 3 | 4 | 5 |
| 5 | My group members ask me questions when we work in groups. | 1 | 2 | 3 | 4 | 5 |
| 6 | Working in a group helps me to understand the concepts better. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|--|---|---|---|---|---|
| 7 | Working in a group helps me to get the work completed on time. | 1 | 2 | 3 | 4 | 5 |
|---|--|---|---|---|---|---|

II. Direction: For the following statements please give your honest responses as you are required to do.

1. Do you think cooperative learning has disadvantage?

Yes No (tick one box)

2. If your answer for question 1 above is Yes give your detail explanation, that is why you dislike cooperative learning.

