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Usability of Cooperative Learning Strategy Among Grade 9 Students in Science

Perlito A. Bais Jr.
Iloilo State College of Fisheries, College of Education - Graduate Program

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ABSTRACT

Filipino learners preferred a cooperative approach in their lessons because they become more engaged, participative, and independent in their learning. However, some had certain reservations towards working collaboratively. True to this notion, this study was conducted to specifically investigate the level of usability of the Cooperative Learning strategy among Grade 9 students in Science. A descriptive research design was used in this study with 117 randomly selected participants. It employed a researcher- made questionnaire concerning the level of usability of the Cooperative Learning strategy among participants. The validity value was 4.1, and the reliability value was .772. Data were gathered, analyzed, and interpreted using the frequency and percentage distribution and t-tests. Findings showed that the level of usability of the cooperative learning strategy as a whole and when they are grouped according to sex, age, and curricular program was useful. Further, there was no significant difference in the level of usability of the cooperative learning strategy when participants were grouped according to sex, age, and curricular program, so the null hypothesis was not rejected. The result implied that strategies involving cooperative learning were applicable to all participants regardless of sex, age, and curriculum. It is therefore recommended that science teachers provide the students with various activities that employ cooperative learning strategy as well as incorporate to their lesson preparation. Further study on cooperative learning may be conducted to explore the reasons why students prefer this type of learning strategy. Also, those students who are not comfortable with CLS may also be studied, and an experimental study on CLS taking into consideration the students' curriculum may also be explored.

Keywords: *Cooperative Learning Strategy, Usability, Science Education, Grade 9 Students, Student Perceptions, Descriptive Research*

INTRODUCTION

Science is a systematic body of knowledge and a logical approach to discover how things work (Bradford, 2017), and to establish facts, students perform experiments whether to test something new or to apply previously learned concepts. Science today should enable students to meet the demands and face the challenges ahead in the work environment (Mehta &. Kulshrestha, 2014), which gives fear and pressure to the students. This feeling effectively hindered their potential to discover things and understand problems (Gamit, Antolin & Gabriel, 2017).

To cope with the negative perception, modern-day 21st-century teachers and scholars employed innovations in terms of methodology in teaching science that will help students to overcome their fears and improve their performance on the subject (Gamit et' al., 2017). The teaching method should not only serve the academic purpose but also develop social and cooperative skills recommended by educational agencies from time to time (Mehta and Kulshrestha, 2014). That's how Collaborative learning takes place.

Cooperative learning strategy (CLS) is defined as "the instructional use of small groups where students are working together to maximize their own and one another's learning" (Johnson & Johnson, 1990 cited in Tran, 2013). In other words, cooperative learning is the pedagogy within which students are active constructors of knowledge in the learning process instead of passive receivers of any given knowledge (Liang, 2002 cited in Tran, 2013). Similarly, according to the author Halpern, 2005 cited in Dollman (2007), in cooperative learning, learners are actively involved in the process of learning and understanding while the teacher assists the students to become more independent.

The result of the study conducted by Anderson, 2005 (cited in Johnsen & Curtis, 2009) showed that 420 junior and senior students in the cooperative learning environment scored higher than their peers in standardized testing of the curriculum and were more positive about their learning experience.

In the Philippine context, Filipino learners preferred the cooperative approach in their lessons because they become more engaged, participative, and independent in their learning (Valdez et' al., 2015, cited in Gonzales & Torres, 2016). It also develops the mathematics skills and abilities of the students and improves their learning habits more than the traditional method (Gamit, et' al., 2017). However, although most of the learners had a positive outlook towards CLS, some had certain reservations towards working collaboratively (Gonzales &Torres, 2016). In my observation during our activity, students who are academic achievers perform and do the assigned task more often than those who are not, and they even rely on and become dependent on their leader, which in turn makes them more passive learners. My observation can be supported by the study of McLeish's (2009) with Jamaican students that showed 50% of the respondents were uncomfortable in CL classes and they prefer to work on their own rather than within a group due to the fear of low grades and conflicts of interest. Learners somehow disapproved of cooperative learning

regarding hitchhiking (the act of taking credit not rightfully earned), which could have resulted in their preference for working alone rather than in a group (Gonzales & Torres, 2016).

True to the notions above, the researcher is interested in finding out the usability of the cooperative learning strategy among Grade 9 students in Science. The findings of this study would be a great help to science teachers in deciding whether to employ cooperative learning in their classes or not.

Research Problem

Although Cooperative Learning Strategy (CLS) has been used as an effective approach to promote active participation, collaboration, and academic achievement, its actual implementation does not always ensure that all students benefit equally from the learning process. While previous studies, such as those of Anderson (2005, as cited in Johnsen & Curtis, 2009) and Valdez et al. (2015, as cited in Gonzales & Torres, 2016), have highlighted the positive contributions of cooperative learning to students' academic performance and engagement, concerns regarding unequal participation, individual accountability, and dependence on academically capable group members remain evident. This concern is also reflected in the findings of McLeish (2009), indicating that some students were uncomfortable working in groups and preferred individual tasks because of concerns about grades and conflicts among group members. More recent research, including Lee et al. (2021), further suggests that the outcomes of cooperative learning may vary depending on how the strategy is implemented and the learning context. In the researcher's own classroom observations, academically stronger students tend to take greater responsibility for completing group activities, while some of their classmates become less involved and rely heavily on their group leaders. This situation raises questions about whether cooperative learning genuinely provides equal opportunities for participation and meaningful learning among students, particularly in science instruction.

Despite the recognized benefits of CLS, there remains a need to understand how Grade 9 students experience and perceive this strategy, the extent to which they participate in collaborative activities, and the difficulties they encounter while working with their peers. Addressing this concern is important because Science education should develop not only students' understanding of scientific concepts but also their ability to communicate, think critically, solve problems, and work collaboratively. Thus, this study seeks to examine the usability of the Cooperative Learning Strategy among Grade 9 students in science, with the intention of providing insights into its strengths, limitations, and areas for improvement. The findings may help Science teachers make informed decisions in designing and implementing collaborative activities that encourage active involvement, promote individual accountability, and provide meaningful learning opportunities for every student.

Assumptions of the Study

The study was based on the following assumptions:

1. Participant Competency: The Grade 9 students had enough experience with the Cooperative Learning Strategy (CLS) to provide meaningful feedback on its usability in Science.
2. Respondent Honesty: The participants answered the survey questionnaire honestly and objectively.
3. Instrument Validity: The researcher-made questionnaire was an appropriate tool for measuring the perceived usability of CLS.
4. Data Representation: The students' responses accurately reflected their actual perceptions regarding collaboration, engagement, independence, and challenges.
5. Sample Representativeness: The randomly selected participants adequately represented the Grade 9 population, allowing for accurate data analysis across sex, age, and curricular programs.

Objectives of the Study

The main objective of this study was to determine the usability of the Cooperative Learning Strategy among Grade 9 Science students. Specifically, the study aimed to achieve the following objectives:

1. To describe the profile of the participants in terms of Sex, Age, and Curriculum Program.
2. To assess the level of usability of the Cooperative Learning Strategy as perceived by the participants as a whole and when grouped according to their profile variables (Sex, Age, and Curriculum Program).
3. To determine if there is a significant difference in the perceived level of usability of the Cooperative Learning Strategy when the participants are grouped according to Sex, Age, and Curriculum Program

Conceptual or Theoretical Framework

The study was anchored on Wittrock's Generative Learning Theory, Social Interdependence Theory, and Vygotsky's notion of the Zone of Proximal Development, stating that learning and development are collaborative activities and that children are cognitively developed in the context of socialization and education, which is generally termed cooperative learning. It requires students to work together and help each other in achieving specific and attainable learning goals.

To build on existing research, this study first gathered the participants' profile data, including their sex, age, and academic program. The participants were chosen using stratified random sampling and completed a researcher-developed questionnaire to evaluate the usability of the Cooperative Learning Strategy.

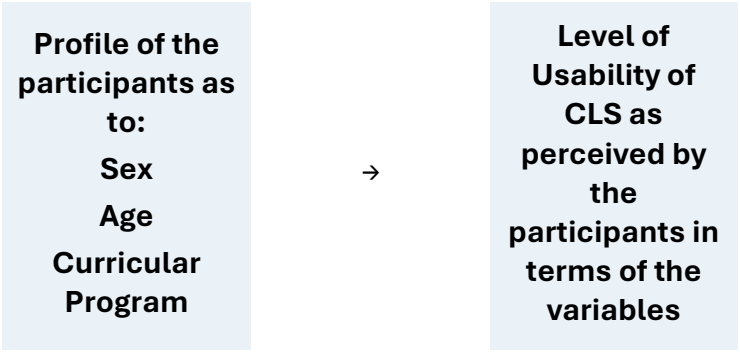


Figure 1. Conceptual framework of the study

METHODOLOGY

Research Design

The study was action research that utilized a descriptive survey employing a researcher-made questionnaire. The goal of it is to describe a phenomenon and characteristic, and it is more concerned with what rather than how or why something has happened (Nassaji, 2015). Therefore, observation and survey tools are often used to gather data. Data can be analyzed quantitatively using frequencies, percentages, averages, or other statistical analyses to determine relationships (Nassaji, 2015).

Research Locale

The study was conducted at Eusebio Lopez Memorial Integrated School in Sagay City, Negros Occidental, Philippines, during School Year 2018-2019. The setting included only Grade 9 learners of the school for whom the researcher taught the science subject.

Participants

The population of this study was the eight sections of Grade 9 students of an integrated school in the division of Sagay City, Negros Occidental of school year 2018-2019. These eight sections were divided into SSC and STVEP, two sections comprising the former and six sections comprising the latter. The sample of this study was randomly selected from two SSC sections and two STVEP sections. Two STVEP sections were selected from the population of six sections through simple random sampling. Further, the 117 participants of this study were determined using Slovin's formula through stratified random sampling after the two STVEP sections were identified.

Research Instruments

The study used a researcher-made questionnaire that is composed of two parts. Part I contained information about the profile of the Grade 9 students of school year 2018-2019, which was categorized into sex, age, and curricular program. Part II of the questionnaire consisted of twenty (20) items that measured the level of usability of the cooperative learning strategy. The scale used to determine the level of usability was the following: strongly agree (5), agree (4), moderately agree (3), disagree (2), strongly disagree (1).

Data Gathering Procedure

Upon approval of the letter of permission from the school principal, the study will then be conducted with the participants of the said school. The instrument will be administered personally by the researcher during the participants' vacant time so that their classes will not be hampered, and the data can be gathered, tabulated, and analyzed easily.

Data Analysis

The survey data was being encoded, processed and analyzed using SPSS software. For problem no. 1, frequency and percentage were used in determining the profile of the participants. For problem no. 2, mean was utilized to identify the level of usability of Cooperative learning. For problem no. 3, in determining the significant difference in the level of usability of Cooperative learning according to sex, age and curriculum program, t-test for independent means was used.

Ethical Considerations

Before the conduct of the study, permission from the school principal was sought through a formal letter with an attached questionnaire. It stated the purpose and objectives of the study. A participant’s consent and parent’s consent were also obtained prior to the administration of the instrument. To ensure the cooperation of the participants, the researcher assured that the information provided would be treated with high confidentiality and would only be used for research purposes. To avoid plagiarism, names of authors, journals, and other cited sources in the study were all acknowledged in the references following the seventh edition American Psychological Association (APA) format.

RESULTS AND DISCUSSION

Profile of the Participants

Table 1 shows that in terms of sex, the participants are dominated by females (70.9%). Further, majority of the participants belong to the younger age group (14-15 years old). Also, 53.8% of the participants are from STVEP; while, 46.2% are from SSC.

Distribution According to Sex	Frequency	Percent
Male	34	29.1
Female	83	70.9
Total	117	100
Distribution According to Age		
Younger	88	75.2
Older	29	24.8
Total	117	100
Distribution According to Curricular Program		
SSC	54	46.2
STVEP	63	53.8
Total	117	100

Table 1. Participants' profiles in terms of sex, age, and curricular program

The majority of the Grade 9 participants are female. This is in consonance to the data of Philippine Statistics Authority (PSA) from Department of Education where 79.9% secondary enrolment rate are females with a ratio of 1.2 while 96.2% of primary enrolment rate are males (Buenaventura, 2019). In terms of age, there are 24.8% of Grade 9 participants who are not at the grade level they are expected to. This can be attributed to the results of the 2016 Annual Poverty Indicators Survey (APIS) that less than 2 % of children aged 6 to 11 year are out-of-school youth; which is twice lower than 3.5% of the total children aged 12 to 15 years who are not attending school. Most of the Grade 9 participants are coming from the STVEP curriculum. This can be attributed to data from the Department of Education and the Technical Education and Skills Development Authority as of 2016, where TVE enrollees have reached 2.27 million (Buenaventura, 2019). Another underlying reason why there are only a few in the Special Science Curriculum (SSC) is the "Retention Policy," as stated in DepEd Order no. 55 s. 2010.

Level of Usability of Cooperative Learning in terms of variables in the study

Table 2 reveals that participants perceived cooperative learning as useful (M = 4.06; SD = 0.5002). In terms of sex, both groups obtained a mean score of 4.06 with 0.6414 and 0.4340 standard deviations, respectively. Further, in terms of age, the younger age group

participants obtained a higher mean score (M = 4.07; SD = 0.5009) compared to the older age group (M = 4.02; SD = 0.5043). Lastly, in terms of curricular program, participants coming from SSC obtained a mean score of 4.11 (SD = 0.5424), which is higher than the obtained mean score of STVEP participants (M = 4.02; SD = 0.6412).

Grouping Variables	Standard Deviation	Mean	Interpretation
Sex			
Male	0.6414	4.06	Useful
Female	0.4340	4.06	Useful
Age			
Younger	0.5009	4.07	Useful
Older	0.5043	4.02	Useful
Curricular Program			
SSC	0.5424	4.11	Useful
STVEP	0.6412	4.02	Useful
Grand Mean	**0.5002**	**4.06**	**Useful**

Table 2. Level of Usability of CLS based on variables

The result of this study that cooperative learning is useful as perceived by the students as a whole is strongly supported by the findings that Filipino learners preferred the cooperative approach in their lessons because they become more engaged, participative, and independent in their learning (Valdez et' al., 2015 cited in Gonzales & Torres, 2016). Further, the result that the participants viewed cooperative learning as useful regardless of their sex, age, and curriculum is an indication that students tend to prefer cooperative learning because, in a cooperative class, they never felt bored, maintained in- class communication, learned the lessons happily (Gocer, 2010 cited in Amedu & Gudi, 2017), and achieving a common goal produces higher achievement and greater productivity than working alone (Gillies,2016).

Significant difference in the level of usability of cooperative learning as perceived by the participants

Table 3 reveals that there is no significant difference in the level of usability of cooperative learning as perceived by the participants when they are grouped according to sex, age, and curriculum, as shown on the obtained p-values of 0.979, 0.588, and 0.327, respectively, at the 0.05 level of significance. The result implies that strategies involving cooperative learning are applicable to all participants regardless of sex, age, and curriculum.

Grouping Variables	t	df	Sig. (2- tailed)	Interpretation
Sex	0.026	115	0.979	Not Significant
Age	0.543	115	0.588	Not Significant
Curricular Program	0.985	115	0.327	Not Significant

Table 3. Significant difference in the level of usability of CLS

The result that there is no significant difference in the level of usability of cooperative learning when the participants are grouped according to curriculum is supported by a meta-analysis indicating that students involved in a cooperative learning environment, regardless of their curricular programs, had significantly higher grade point averages and had more self-confidence, were better able to manage emotions, and were more emotionally independent from parents (Gillies, 2016). Further, a significant result showed that students in any structured curriculum are more willing to listen, ask for elaborations, share ideas, and aid (Gillies, 2004 cited in Yeung, 2015).

General Discussion

The result that the participants viewed cooperative learning as useful regardless of their sex, age, and curriculum is an indication that students tend to prefer cooperative learning, which is supported by the Social Interdependence theory that students help each other learn because they care about the group and its members, and come to derive self-identity benefits from group membership (Slavin, 2011 cited in Tran, 2013). Positive interdependence may result in positive interaction in which individuals encourage and facilitate each other's efforts to complete tasks and accomplish the group's goals (Johnson & Johnson, 2008).

On the contrary, this result negates the findings that some learners had certain reservations towards working collaboratively (Gonzales &Torres, 2016) and learners somehow disapproved of cooperative learning concerning hitch-hiking (the act of taking credit not rightfully earned) and resulted in their preference for working alone more than in a group (Gonzales et' al., 2016). Further, this result opposes the findings of the study of McLeish's (2009) with Jamaican students that showed that 50% of the respondents were uncomfortable in CL classes and they prefer to work on their own rather than within a group due to the fear of low grades and conflicts of interest.

CONCLUSION

Based on the findings, Cooperative Learning Strategy (CLS) was found to be useful among Grade 9 students regardless of sex, age, and curricular program. This suggests that providing students with learning activities that encourage cooperation and group participation can be beneficial across different student groups. Since no significant differences were found in the perceived usability of CLS when participants were grouped according to these variables, the null hypothesis was not rejected. Although SSC students obtained a higher mean score than STVEP students, this difference does not necessarily indicate that they are more academically inclined or more suited to collaborative learning. Rather, it may reflect differences in their curricular experiences and learning activities. Overall, CLS can be considered a useful teaching approach in Grade 9 Science if activities are designed to encourage active participation and meaningful contributions from all students.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proposed:

1. Since Cooperative Learning Strategy (CLS) was found to be useful among Grade 9 students regardless of sex, age, and curricular program, Science teachers are encouraged to incorporate this strategy into their lesson preparation and provide varied activities that promote collaboration and active participation.
2. Future researchers may conduct further studies to explore the reasons students prefer Cooperative Learning Strategy and identify the factors that influence their learning experiences.
3. Further studies may also focus on students who are uncomfortable with CLS to better understand their concerns and the challenges they encounter during group activities.
4. Experimental studies may be conducted to examine the effectiveness of CLS among students from different curricular programs and determine whether the strategy produces different learning outcomes.

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