

Short Paper

Effectiveness of Peer Assessment as Teaching Innovation: A Classroom-based Action Research

Abraham D. Cacay

San Felipe High School, San Manuel, Tarlac, Philippines

abraham.cacay@deped.gov.ph

(corresponding author)

Date received: December 6, 2021

Date received in revised form: December 8, 2021

Date accepted: March 11, 2022

Recommended citation:

Cacay, A.D. (2022). Effectiveness of Peer Assessment as Teaching Innovation: A Classroom-based Action Research. *Puissant*, 3, 465-473.

Abstract

Peer assessment has been an effective strategy to heighten the students' participation. In the 21st century of teaching and learning, the student-centered approach is the new trend making the teacher the facilitator for learning. This classroom-based action research aimed to test the effectiveness of peer assessment as an innovation with the contextualized worksheet in teaching the senior high school students in earth and life science subject. This study employed a mixed-method. The Statistical Package for Social Sciences (SPSS) was utilized to analyze the quantitative data and phenomenological methodology to interpret the qualitative data. For the school year 2018-2019, there were 130 students selected purposively as the respondents. The result showed that the peer assessment with the aid of contextualized worksheet was effective in teaching earth and life science. However, they are affected by hesitations in providing their answers, noise of the environment and not having enough time while activities are in process.

Keywords – peer assessment, action research, teaching innovation, Philippines

INTRODUCTION

Assessment has been part of the educational process to measure how much a student learns from a subject. Teachers always assess the learning of the students based on the numerical data gathered through paper and pencil evaluation and observational results during discussion. With proper assessment, teachers will know which point to focus on for the students to with difficulties cope with the lesson.



Giving feedback to the students is crucial for their development. However, with one teacher in a classroom observing numerous diverse students is difficult. In some points, a teacher can make the students cooperate and assess their peer's performance and outputs and give their feedback to the teacher who is serving as the facilitator for learning. The study of Chin, (2016) shows the potential benefit of peer assessment offering real educational, and social benefits for students. According to Topping, (2009), peer assessment is an arrangement for learners to consider and specify the level, value, or quality of their performance of other equal-status learners.

Peer assessment has been used to give the students to connect with their peers to enhance peer engagement at the same time elevate their learning capabilities. Students could empower themselves or others by motivating them to take control of their learning with responsibility. Citing Mercader et al in the study of De Brún et al., (2021) learners perceive more benefits when they provide feedback than receiving it.

Peer assessment is more of student-centered learning, and it is beneficial as they can learn by doing, they have the chance to communicate and research for themselves among other things. Student-centered approaches such as peer assessment can develop skills they need inside and outside the classroom (Brew et al., 2009).

Science as a subject requires the students to work through laboratory experiments and research. The peer assessment will increase their participation and value each other's output. Teachers during a laboratory session, are mere facilitators, observing the interaction between the students and promoting an active learning environment. Active learning methodology focuses on helping in learning and facilitating and learning (Jagtap, 2016).

Many studies focus on different learning methodologies such as peer assessment and peer assessment as an effective way to make the students engage in classroom activities. However, few focused on the effectiveness of peer assessment in science as action research. Furthermore, the researcher as a science teacher wanted to test the effectiveness of peer assessment with the contextualized worksheet as an innovation in students learning in Earth and Life Science subject.

Research Question

This study aimed to test the effectiveness of peer assessment as an innovation in teaching Earth and Life Science. Specifically, the following questions guided this study.

1. Did the performance of the respondents improve after the implementation of the innovation?
2. What are the problems encountered by the respondents during the implementation of the innovation?

METHODOLOGY

Type of Research

The one-group pretest-posttest study was used. This research employed the mixed method, with the quantitative part concerned with the numerical data gathered in the study. While the qualitative design focuses on the problems that they experienced by the learners as expressed in words.

Sampling Method

The researcher believed by sound judgment can obtain a sample representative which resulted in saving time and money. Purposive sampling is a form of non-probability sampling in which decisions concerning the individuals to be included in the sample are taken by the researcher, based upon a variety of criteria that might include knowledge of the research issue and willingness to participate in the study (Oliver, 2006).

Respondents

The total number of the senior high school population of San Felipe High School, San Manuel, Tarlac was considered since this research is not only to seek out answers to the problems that are considered in this study, but all the subject respondents participated in the assessment strategy believed to be widely accepted to be engaging. The senior high school is composed of four (4) sections namely: Grade 11- Agri-Fishery (Red Tomato), Grade 11-Information Communication Technology (Cyber) Grade 11- Shield Metal Arch Welding (Spark), and Grade 11- General Academic Strand (Enthusiasm). The table below shows the number of students considered as a subject of this study.

Table 1. Respondents of the Study

Grade and Section	Population
Grade 11 – Red Tomato	51
Grade 11 – Cyber	23
Grade 11- Spark	17
Grade 11- Enthusiasm	39
Total	130

Data Collection Procedure

Before the students underwent the proposed innovation, a pretest was introduced to analyze their initial knowledge on the topic "the Earth subsystem: biosphere, lithosphere, hydrosphere, and atmosphere". Peer assessment of group work participation was initialized. Through peer assessment, students can learn from each other while having no difficulties understanding the comments given by their peers. Conway et al., (as cited in Forsell et al., 2019), concluded that peer assessment is perceived as fair by the students.

In each section, the population is divided into 5 groups, and they are tasked to draw each of the Earth subsystems and presented it to the class. The researcher provided a scoring rubric to each group to get their participation score and overall comments as a group to the work of others. The said rubrics were eventually used by the teacher to evaluate the students' participation. Teachers are given at least 60 minutes to deliver their lessons and there are four Earth subsystems (one subsystem per week) that were discussed thoroughly by the teacher-researcher. For one month, every Monday was discussion, every Tuesday they were tasked to draw the lesson discussed as a group with the scoring rubric s their guide. Every Wednesday was presentation day and students are free to assess each group's activity after the given criteria and every Thursday was quiz day, when the 15-point quiz was administered. After a month of process, an open-ended survey about the problem they encountered during peer assessment was administered right after the posttest. Furthermore, the content of the pretest, the 15-point quizzes, and the posttest was all related to the topic given.

Data Analysis

The mixed-method that involves the 15-point content-based quizzes and the perceptions of the respondents were utilized as the data gathering instrument. To determine the significant differences between the students' performance denoted by their scores in 15-point content quizzes. The quizzes were validated by three Master Teachers of different schools in San Manuel, District. The average computed mean of the validators was 4.10 or valid as described in the table below.

Table 2. validation means range and description (Adopted from Meimban, cited in Cacay, 2019)

Mean range	Description
4.21-5.00	Highly Valid
3.41-4.20	Valid
2.61-3.40	Moderately Valid
1.81-2.60	Fairly Valid
1.00-1.80	Not Valid

Moreover, the quantitative results particularly the series of tests were analyzed using frequencies, rank, means and percentages, and other descriptive statistics as necessary.

Finally, the qualitative data gathered were interpreted to determine the problems encountered by the students through an open-ended survey.

RESULTS AND DISCUSSION

The quantitative and qualitative results analyses, and interpretations are presented in this section. Salient findings in other studies and suggestions of other authors are also integrated for synthesis.

Improvement of the Respondents' Performance through Peer Assessment

The researcher expected that the peer assessment improved the respondents' performance in the subject Earth and Life Science, particularly the Earth Subsystems as the main topic. The series of the 15-point based quizzes scores were assessed.

Table 5. Scores of the Learners in the series of Quizzes

Quiz/Test	Lowest Score Obtained	Highest Score Obtained	Mean	Standard Deviation	Coefficient of Variation
Pre	5	13	8.13	2.18	0.26 or 26%
1 (Lithosphere)	5	10	7.79	1.36	0.17 or 17%
2 (Hydrosphere)	6	13	9.48	2.21	0.15 or 15%
3 (Biosphere)	7	13	9.27	1.32	0.15 or 15%
4 (Atmosphere)	7	14	10.20	2.46	0.14 or 14%
Post	10	15	13.16	1.51	0.11 or 11%

Table 5 perceptibly shows the respondents' highest and lowest scores obtained that despite the different content of their quizzes, the scores are dramatically increased, and the highest score obtained are all above the average score of 8. It can also be noticed that the mean scores are improved (7.79, 9.48, 9.27, and 10.20) from the first to the last quiz administered by the researcher. This expresses that the learning performance of the students who are made to undergo the innovation of peer assessment is improved and also the improvement of their performance can be compared statistically in the difference of the mean scores of the pretest and the posttest.

Moreover, the standard deviation also considered by the researcher and the table above signifies that the scores of most of the respondents tend to group with mean. According to IDRE, (2016) that the coefficient variation which is the ratio between the standard deviation and the mean should be less than one to indicate less variance. Therefore, through peer assessment, the impact was practically equal between the respondents as the mean of their scores for each of the quizzes exceeded the average which is 8.

The improvement of the learning performance of the students as measured by their scores in quizzes is an indication that the peer assessment as the teaching innovation was indeed helpful in effective learning. Positively, this is because the students participated actively through the entire topic and they learned from their peers and explicitly understood the explanations of their classmates using their own words to express their ideas and with the help also of the teacher as the facilitator of learning which is aligned to the findings of Aquino (2015) that students are not just mere receivers of knowledge on the other side of the teaching-learning process but an active part of it; and such was achieved through peer assessment.

Problems Considered by the Senior High School Students through Peer Assessment

This section provides the analyzed answers from the open-ended survey of the respondents concerning the problems they considered and experienced in peer assessment. Most of them considered the following:

Reluctant in Providing Answers. The respondents on this study finished the concerning activities with their peers and they need to finish their activity collaboratively. But some students sometimes do not feel to provide answers based on their understanding of the questions in their activity. Based on their words, *“aking kaklase ay nag-aatubili sa pag bigay ng sagot patungkol sa ibang kaklase...”* this statement could be accentuated that students sometimes are not motivated enough to perform their activities, however, the teacher noticed and addressed the problem instantly as their peers report their unruly peers. For some reason, students who are hesitant in giving their answers are the one who is discriminated against during the teaching innovation, or the students who are not confident enough to speak in English fail to finish the activity. The students’ main reason was they are nervous to communicate in English to their peers since the language of the subject is English. Research conducted by Ahmad (2021) generalized the causes of students' reluctance to participate in classroom discussions. These are being tense when forced by teachers to answer a question, getting tensed and nervous to speak in front of the whole class, and having faulty pronunciation in English. Participation of each student is important for the success of the class making the researcher consider their answers in Taglish (Tagalog and English) form if they could explain their thoughts very well. Codeswitching provides both teachers and students some benefits in the teaching and learning process (Metila, 2009). Allowing the other students to code-switch contributed to the fast pace of the discussion within each group since the activity was a time constraint.

Time Constraint. Students have perceived that the time given is not enough to accomplish the activity provided by the teacher that involved peer assessment as teaching innovation. *“sa dami ng target (objective) sa binigay mo sir.... ay hindi namin maharap lahat na tapusin...”* teaching them to budget their time in doing their activities is very important to address as time management is the key to effective learning. Even with the use of codeswitching, not all the students in each section could think fast to meet the targets of the activities. Students must have proper time utilization skills because this could affect their learning seriously (Ahmad et al., 2019). This could mean that students spend most of their time researching, brainstorming, and argumentation within their groups before sharing their corroborate ideas with the class. Moreover, students found difficulty in analyzing some questions and for them, it is time-consuming their words, *“hindi sapat ang oras... kailangan pa ng mahabang oras...”* this means that in dealing with the activities with a peer-to-peer discussion and especially with their peers asking for some help, the budgeted time is not enough for them. Taken that they must understand the objective of the activity when analyzing the questions plus sharing that answer to their peers and eventually, leads to argumentation. However, a healthy augmentation within and between groups was highlighted to the findings on the study of Phua & Tan

(2018) that asking hypothetical questions could construct a quality argument. Nonetheless, the students must be aware of the limited time given in finalizing their answers.

Noisy Environment. Classroom, noise is rampant and unexpected sometimes. The noise that disturbs the operation of the class is either coming from the inside or the outside of the four walls of the room can fail in accomplishing their activities with their peers. According to the respondents, "*members of the group are noisy and not listening while having an activity...*" inside the classroom, this is normal amongst them but can be addressed immediately by the teacher. The study of Shield & Dockrell (2008) suggested that students are affected by the noise of individual external events that also affected the test scores of their respondents. This could accentuate that unwanted noise could affect the concentration of the students in accomplishing their activities. According to their words, "*ang ingay sa labas... lalo na yung mga estudyanteng dumadaan...*" Teachers should always not tolerate unwanted noise especially when it comes from the students who are not involved in the class to avoid miscommunication during peer assessment. The consequence of noise disturbance impacts the declination of students' performance (Buchari & Matondang, 2017).

CONCLUSIONS

Based on the garnered data and analyses of the students' answers in the open-ended survey, the peer assessment was overall effective in improving the students' knowledge and understanding of the topics in the subject Earth and Life Science based on the quantitative results of the study.

The students are, however, affected by hesitations in providing their answers, the noise of the environment while having an activity, and not having enough time while activities are in process. The identified problems encountered by the students would result in stress and failure to accomplish the task within the given time, obtaining the objectives of the activities, and not properly understanding the concept of the topic.

RECOMMENDATIONS

In line with the conclusion above, it is recommended that peer assessment should be institutionalized in all fields of science. To perform this assessment effectively, the teachers should be focused to solve the problems being encountered by the respondents during the process like, time management should be taught amongst the students, keeping the students busy while teaching and learning are on the process inside of the classroom to avoid unnecessary noises and for the outside noise, teachers should be more mindful of the students passing by the corridor and instruct them not to make loud noises. Lastly, teachers who want to use peer assessment as teaching innovation should

always encourage the students to participate and be confident in expressing their thoughts.

ACKNOWLEDGEMENT

The researcher would like to extend his gratitude to the Department of Education, the leadership of the Schools Division of Tarlac Province, and all the faculty and staff of San Felipe High School, especially to Sir Joemel P. Calderon, PhD.

REFERENCES

- Ahmad, C. (2021). Causes of Students' Reluctance to Participate in Classroom Discussions. *ASEAN Journal Of Science And Engineering Education*, 1(1), 47-62. Retrieved 4 January 2022, from <https://ejournal.upi.edu/index.php/AJSEE/>.
- Ahmad, S., Batool, A., & Hussain Ch, A. (2019). Path Relationship of Time Management and Academic Achievement of Students in Distance Learning Institutions. *Pakistan Journal Of Distance & Online Learning*, 5(2), 191-208. Retrieved 5 January 2022.
- Aquino, J.B. (2015). *The Effectiveness of Payne-Rathmell triangle model with journal writing in teaching geometry*. International Conference on Science and Mathematics Education. SEAMEO RECSAM, Penang, Malaysia.
- Brew, C., Riley, P., & Walta, C. (2009). Education students and their teachers: comparing views on participative assessment practices. *Assessment & Evaluation In Higher Education*, 34(6), 641-657. <https://doi.org/10.1080/02602930802468567>
- Buchari, & Matondang, N. (2017). The impact of noise level on students' learning performance at state elementary school in Medan. *AIP Conference Proceedings*. <https://doi.org/10.1063/1.4985498>
- Cacay, A. (2021). *Formative Assessment in Junior and Senior High School Science Instruction* (Master of Arts in Education Major in Science). Urdaneta City University.
- Chin, P. (2016). Peer assessment. *New Directions In The Teaching Of Physical Sciences*, (3), 13-18. <https://doi.org/10.29311/ndtps.voi3.410>
- De Brún, A., Rogers, L., Drury, A., & Gilmore, B. (2021). Evaluation of a formative peer assessment in research methods teaching using an online platform: A mixed methods pre-post study. *Nurse Education Today*, 108, 105166. <https://doi.org/10.1016/j.nedt.2021.105166>
- Forsell, J., Forslund Frykedal, K., & Hammar Chiriac, E. (2019). Group Work Assessment: Assessing Social Skills at Group Level. *Small Group Research*, 51(1), 87-124. <https://doi.org/10.1177/1046496419878269>
- Introduction to SAS. UCLA: Statistical Consulting Group. from <https://stats.idre.ucla.edu/sas/modules/sas-learning-module-introduction-to-the-features-of-sas/> (accessed August 22, 2016).
- Jagtap, P. (2016). Teachers Role as Facilitator in Learning. *Scholarly Research Journal For Humanity Science And English Language*, 3, 17. Retrieved 27 November 2021.

- Metila, R.A. (2009). *Decoding the Switch: The Functions of Codeswitching in the Classroom*.
- Phua, M., & Tan, A. (2018). Promoting productive argumentation through students' questions. *Asia-Pacific Science Education*, 4(1). <https://doi.org/10.1186/s41029-018-0020-9>
- Shield, B., & Dockrell, J. (2008). The effects of environmental and classroom noise on the academic attainments of primary school children. *The Journal Of The Acoustical Society Of America*, 123(1), 133-144. <https://doi.org/10.1121/1.2812596>
- Topping, K. (2009). Peer Assessment. *Theory Into Practice*, 48(1), 20-27. <https://doi.org/10.1080/0040584080257>