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ASSESSING STUDENTS' PERFORMANCE IN SCIENCE VIA PEER PAIRING STRATEGY

[1]Dirk Diestro, EdD, [2]Jenelyn L. Faelangco, MAT, [3]Mary Grace B. Gagalate, EdD
[1]Assistant Professor IV, Capiz State University – Roxas City Main Campus, Capiz, Philippines
[2]Associate Professor I, Capiz State University – Roxas City Main Campus, Capiz, Philippines
[3]Associate Professor III, Capiz State University – Roxas City Main Campus, Capiz, Philippines
[1]dmdiestro@capsu.edu.ph, [2]jenelynfaelangco1968@gmail.com, [3]mgbgalagate@capsu.edu.ph

Abstract: *Placing the pavement of learning in this academic arena where blended and self-paced learning surmounts the acquisition of knowledge among students, a specific evidence-based instructional strategy is needed. Thus, this study was made to determine the effect of the peer pairing strategy in science class, an evidence-based instructional strategy. Specifically, it sought to ascertain the science performance of the students before and after the application of the peer pairing strategy, the significant difference in the science performance of students before and after the application of the peer pairing strategy, and the effect size of the peer pairing strategy among students. In this study, it reveals that the science performance of the students before the application of the peer pairing strategy, students possess satisfactory science performance, and after the application, the science performance of the students turned out outstanding, there was a significant difference between the Science performance of the students before and after the application of the peer pairing strategy, and the effect size of the peer pairing strategy among students was a small effect. Therefore, this study recommends using the peer pairing strategy to improve students' academic performance.*

Key Words: *Confidence, Science performance, Self-efficacy.*

1. INTRODUCTION:

Education in this pandemic era has been a challenge for teachers and students. Approaches and strategies were folded far from what is conventionally done. As a result, some students were not able to cope. Placing the pavement of learning in this academic arena where blended and self-paced learning surmounts the acquisition of knowledge among students, feedbacking and learning reinforcement among students' works and performances turned out to be limited. Since students' performance is an indicator of learning gain, attaining effective transfer of learning especially in science class has been a huge concern with the type of learning modality that is dominantly used today. The teaching of Science like any other discipline turns upside-down compared to the conventional teachings before according to Dohle, Machner & Buchmann (2021). Due to this academic situation, influences like students' motivation to participate in an activity regularly have become an important concern in a science class.

With the advent of technological advancement, artificial intelligence, and the same way where rehumanizing of education era commence, science teachers have been exploring factors that may contribute effectively in addressing the aforesaid scenario. Hence, with the foregoing gap between the teaching and learning process in this pandemic, collaborative learning through peer-pairing instruction is viewed to link the gap.

Peer-pairing according to Henderson & Dancy (2009) is a specific evidence-based instructional strategy where the exchange of views among students and the discussion of one's answer with a peer takes place, and it is a very good way of serving as learning reinforcement, and additionally, it may positively affect the students' acquisition of learning and self-efficacy.

Further, this study was anchored on Lev Vygotsky's Social Constructivist Theory which highlights the role of social and cultural interactions which play in the learning process. Vygotsky's theory states that knowledge is co-constructed and that individuals learn from one another (Vygotsky, 1989).

Thus, this study was made to determine the effect of the peer pairing strategy in science class among students.

2. STATEMENT OF THE PROBLEM :

Primarily, this study aimed to determine the effect of the peer pairing strategy in science class among students. Specifically, it sought to ascertain the science performance of the students before and after the application of the peer pairing strategy, the significant difference in the science performance of students before and after the application of the peer pairing strategy, and the effect size of the peer pairing strategy among students.

3. METHODOLOGY :

This study was a quasi-experimental research employing a one-shot pretest-posttest design in determining the effect of peer pairing strategy in science class. The respondents of this study were second-year college students taking up a Bachelor of Secondary Education major in Science degree. Environmental Science was the course where this research endeavor was integrated.

In terms of Science performance, a researcher-made 50-item multiple choice test questionnaire was used encompassing the topics of Limiting Factors and Tolerance, Homeostasis in the Ecosystem, Energy Flow in an Ecosystem, Trophic Levels, and Pyramids of Energy and Biomass. This researcher-made test questionnaire underwent a validity and reliability test resulting in 0.87 Cronbach's alpha coefficient which denotes that it was reliable. More so, in ascertaining the Science performance of the respondents, the researchers used the five-point Likert scale presented as Outstanding (39.24-50.00), Very Satisfactory (29.43-39.23), Satisfactory (19.62-29.42), Fairly Satisfactory (9.81-19.61) and Did Not Meet Expectations (0.00-9.80).

This research study was conducted in three phases: pre-experimental activities, experimental activities, and post-experimental activities.

Pre-experimental activities. Primarily, the researchers prepare sets of learning tasks vis-à-vis syllabus. It was followed by the construction of the assessment tool used in the pretest to establish the baseline data for respondents' science performance. The science performance test was subjected to phase validity and reliability test. After the aforementioned step, the researcher-made test in measuring the Science performance of the participants was finalized for pretesting and post-testing provided that item placements were rearranged in the posttest.

Experimental Activities. In this phase, the administration of pretest was conducted, and after the pretest, the actual utilization of the peer pairing strategy commenced.

Post-Experimental Activities. At the end of the experimentation, students were subjected to post-testing to determine the effect of the peer pairing strategy.

This study used mean to analyze the descriptive data and paired t-Test and Cohen's d analysis to inferentially analyze the collected data set at 5% level of significance.

4. RESULTS AND DISCUSSIONS :

On the Science Performance of the Students Before and After the Application of the Peer Pairing Strategy

The result of the science performance of the students before and after the application of the peer pairing strategy reveals that before the application of the peer pairing strategy, students possess "satisfactory" science performance, and after the application of the aforesaid strategy, the science performance of the students turned out "outstanding." Thus, this entails that the use of the peer pairing strategy in learning science was an effective strategy among students since it enhances the student's creativity in expressing ideas and grasping new concepts, and most of all, students may not feel hesitant to clear queries since there is a less intimidating factor between the pair hence, the feeling of belongingness allows the student to concentrate better on the tasks which are translated to higher achievements. More so, it was observed that this strategy uplifts one's knowledge limit and paves the way for a greater level of understanding which promotes active learning along with interpersonal skills. The result of this study affirms the findings of Kovel (2021) which reveals that peer tutoring increases students' self-efficacy and confidence in their skills and knowledge, and this significantly improved their academic standing in class.

Table 1a: Science Performance of the Students Before and After the Application of the Peer Pairing Strategy

Test	Mean	Std. Deviation	Verbal Interpretation
Pretest	27.08	4.57	Satisfactory
Posttest	39.92	4.37	Outstanding

On the Science Performance of the Students During the Application of the Peer Pairing Strategy per Topic

The result shows that there was a favorable effect on the Science performance of the students as it reveals that students' performance ranges from very satisfactory to outstanding performances both in written tasks and performance tasks in Environmental Science. This implies that using peer pairing as a teaching-learning strategy enables students to improve their comprehension, confidence, and skills since it is being taught by peers that eliminates the usual barrier between and among the class, instead, they see each other as equals and are free to ask more questions and make small talk. The presented result validates the findings of Ali, Anwer & Abbas, (2015) revealing that peer tutoring is a highly effective way for students to learn since the strategy is more open and comfortable to deal with, thus, students learn without any sort of hesitation.

Table 1b: Students' progress vis-à-vis Topics in the Course

Topics	Mean	Interpretation
Limiting Factors and Tolerance	32.87	Very Satisfactory
Homeostasis in the Ecosystem	35.56	Very Satisfactory
Energy Flow in an Ecosystem	35.37	Very Satisfactory
Trophic Levels	36.94	Very Satisfactory
Pyramids of Energy and Biomass	39.63	Outstanding

On the Significant Difference in the Science Performance of Students Before and After the Application of the Peer Pairing Strategy

The result reveals that there is a significant difference between the Science performance of the students before and after the application of the peer pairing strategy. This implies that the use of the peer pairing strategy provides a positive significant change with respect to the base point which was the Science performance before the application of the strategy as compared to the performance after the application, this may be due to the sense of belongingness in learning among students which were translated to a high level of learning readiness. The result of this study conforms with the result presented by Flores, Ibarra & Triveno, (2018) which reveals significant differences in the group that was tutored compared to the low-performing students who did not receive the peer tutoring intervention and the increase among the grouped who received that was due the confidence that was generated between tutor-tutee since there was no fear of raising doubts or making mistakes, the high expectation was attributed to motivation to fulfill their role, and demonstrate its execution through a high commitment to the task.

Table 2: Significant Difference in the Science Performance of Students Before and After the Application of the Peer Pairing Strategy

Pair	Mean	Std. Deviation	t	df	Sig. (2-tailed)	Remarks
Pretest - Posttest	-12.83	1.699	-45.328	35	.000	Significant

On the Effect Size of the Peer Pairing Strategy

The effect size of the peer pairing strategy among students reveals a "small effect." This implies that the peer pairing strategy was an effective strategy in driving the students to max their science class. The result of this study conforms with the result presented by Flores, Ibarra & Triveno, (2018) after finding that the use of peer support on students positively improves school performance.

Table 3: Effect Size of the Peer Pairing Strategy among Students.

Paired	Mean	Std. Deviation	Cohen's d
Pretest	27.08	4.57	2.87
Posttest	39.92	4.37	

5. CONCLUSIONS AND RECOMMENDATIONS :

Conclusions

With the aforementioned results, the researchers concluded that the science performance of the students before the application of the peer pairing strategy, students possess satisfactory science performance, and after the application,

the science performance of the students turned out outstanding, there was a significant difference between the Science performance of the students before and after the application of the peer pairing strategy, and the effect size of the peer pairing strategy among students was a small effect.

Recommendations

This study recommends the use of the peer pairing strategy to improve students' academic performance. Also, it is highly encouraged among other researchers to take another research endeavor using other quasi-experimental research designs in ascertaining the effect of the peer pairing strategy.

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