INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY: APPLIED BUSINESS AND EDUCATION RESEARCH
2021, Vol. 2, No. 12, 1387 – 1391
http://dx.doi.org/10.11594/ijmaber.02.12.12

Research Article

Integrating Project-based Activity in Improving the Science Academic Performance of Learners in the New Normal

Jeanette Mamaril Solis

Science Faculty of Olongapo City National High School, Olongapo City, Zambales, Philippines

Article history:
Submission December 2021
Revised December 2021
Accepted December 2021

**Corresponding author:*
E-mail:
jeanette.solis@deped.gov.ph

ABSTRACT

The objective of this paper was to determine the efficacy of Project-based learning in increasing the academic performance of learners in remote learning amidst the pandemic. There were eight (8) Project-based instructional activities across six (6) most essential learning competencies in Earth Science were included in the Grade 9 Unit three Earth Science. The computed t value of 5.08 is greater than the t critical value of 2.0049 at level of significance of 0.05, the statistical decision is to reject the null hypothesis. There is a significant difference between the pre-test and post-test of the respondents who were subjected to project-based activity. Result implied that there is enough evidence to support the claim that integrating project-based activity can effectively improve the academic performance of the respondents. Based on the analysis gathered by the researcher, the use of project-based activity in on-line teaching is highly effective in improving the academic performance of students in Earth Science. Therefore, I, the researcher, recommends the use of project-based method of teaching in the on-line distance learning.

Keywords: *Project-based learning, Remote learning, Instructional activities, Academic performance*

Introduction

The Science and Technology, Engineering (STE) curriculum of Olongapo City National High School is offering On-line distance learning modality to students in Grade 9 for the school year 2020-2021. This emerging scenario is being used to facilitate the teaching-learning process. Unfortunately, the researcher observes that situation to increase the acquisition of students 21st-century skills has been marginal and becoming unimportant because of non- face to face interaction.

On the contrary, when schools went remote last year, teachers had to go outside the box in order to continue teaching without reducing student involvement. Many embraced project-based learning, a learning-by-doing instructional methodology, and found methods to incorporate it into online training (Castelo, 2020).

How to cite:
Solis, J. M. (2021). Integrating Project-based Activity in Improving the Science Academic Performance of Learners in the New Normal. *International Journal of Multidisciplinary: Applied Business and Education Research*. *2* (12), 1387 – 1391. doi: 10.11594/ijmaber.02.12.12

According to research, Project-Based Learning (PBL) can assist students in developing 21st-century abilities such as cooperation, communication, critical thinking, and creativity. It also gives students greater control over their learning and allows for a more authentic assessment of their skills and abilities. Furthermore, via well-designed projects and self-evaluation, PBL helps students to learn about and reflect on real-world situations (Castelo, 2020).

This promotes interdisciplinary viewpoints and allows learners to take on a variety of tasks and develop expertise that is useful outside a single well-defined field. Finally, rather than a single proper result acquired by the application of preset rules and procedures, it provides for a range and diversity of outcomes accessible to multiple solutions (Goodman, 2010).

This study focused on the use of Project-based Learning (PBL) in remote learning and investigated the usefulness of the instructional model that takes a learning-by-doing approach, as well as strategies to incorporate it into online education and increase student academic performance.

Methods

The quasi-experimental methodology was used in this study to establish a cause-and-effect link between an independent and dependent variable. Based on the approach and process of this study, the researcher used the non-equivalent group design, in which the researcher identified, (Thomas, 2020).

The participants were the Grade 9 coming from both Science and Technology Engineering (STE) 9-2 as Control Group (CG) with 13 boys and 15 girls and STE 9-3 as Experimental Group (EG) with 13 boys and 15 girls and a total respondent of 56 learners. The Project-based Learning approach was used once a week for the whole duration of eight (8) weeks starting March 22, 2021, and ended on May 15, 2021, or the whole 3rd grading period.

The proponent utilized a 50-point pre-test which had been given at the start of third grading period and post-test before the summative test to quantify the knowledge learned in the class. More specifically, the tests have indicated how the students learned with Project-based technique. The data targets students acquiring more concepts learned and identified that Project-based learning is a method to be fully implemented and adapted in the new normal. The study started on February 2021 and ended in June 2021.

The pretest–posttest design is based on collecting a pretest measure of the desired outcome prior to delivering treatment, followed by a post-test on the same measure once treatment is completed. Both experimental and quasi-experimental studies have used pretest–posttest designs, which can be used with or without control groups. (Salkind, 2010).

The data that was gathered through the teacher-made test were tallied and analysed with the aid of the following statistical tools:

1. Frequency and percentage distribution and mean score for the numerical variable.
2. For the significant difference between the academic performance of students subjected to Project-based Learning method and the significant difference on the pre-test and post test results of the traditional method and Project-based learning method, two-tailed t-test was employed.

Results and Discussion

This part of the research contains the results of the study which consisted of the performance of the students exposed to Project-based Learning (PBL) in terms of the pre-test and post-test. Furthermore, it described the difference on the pre-test and post test result of the students subjected to the traditional method and Project-based learning (PBL) method.

Table 1. Mean Score of Experimental Group in their pre-test and post-test result

Parameters	N	$\bar{x}$	Delta (Δ)	$\sum D$	$\sum D^2$
Pre-Test	28	25.79	9.5	266	4596
Post-test	28	35.29			

It can be gleaned on the table 1 the pre-test mean score of 25.79 and post-test mean score of 35.29 has significantly increased the mean score of Experimental Group by 9.5.

Table 2. Paired T-test value @ 0.05 level of significance on the Pre-test and Post-test of the Experimental Group

						t-value		
Parameters	N	$\bar{x}$	Df	$\sum D$	$\sum D^2$	comp	Tab	Remarks
Pre-test	28	25.79	54	266	4596	5.08	2.0049	Ho Rejected

Table 2 displays the computed t value of 5.08 is greater than the t critical value of 2.0049 at level of significance of 0.05, the statistical decision is to reject the null hypothesis. There is a significant difference between the pre-test and post-test of the respondents who were subjected to project-based activity. Result implied that there is enough evidence to support the claim that integrating project-based activity can effectively improve the academic performance of the respondents.

Table 3. Mean Score Control Group in their pre-test and post-test result

Parameters	N	$\bar{x}$	Delta(Δ)	$\sum D$	$\sum D^2$
Pre-Test	28	34.82	2.25	106	1942
Post-test	28	37.07			

It can be observed on the table the pre-test mean score of 34.82 and post-test mean score of 37.07 has increased the mean score of Control Group by 2.25.

Table 4. T-test value @ 0.05 level of significance on the Pre-test and Post-test of the Control Group

						t-value		
Parameters	N	$\bar{x}$	Df	$\sum D$	$\sum D^2$	comp	Tab	Remarks
Pre-test	28	34.82	54	106	1942	1.09	2.0049	Ho Accepted
Post-test	28	37.07						

Table 4 exhibits the computed t value of 1.09 is less than the t critical value of at 2.0049 at level of significance of 0.05, the statistical decision is to accept the null hypothesis. There is no significant difference on the pre-test and post-test results of the Control group. Result implied that there is enough evidence to support the claim that traditional method of teaching has not improved the academic performance of the Control group.

Table 5. Mean Score of Experimental Group and Control Group in their pre-test result

Parameters	N	$\bar{x}$	Delta(Δ)	$\sum D$	$\sum D^2$
Control	28	34.82	9.73	253	4605
Experimental	28	25.79			

It can be noted on the table the pre-test mean score of Control Group is 34.82 while Experimental Group has a mean score of 25.79. The Experimental Group has greater mean score; therefore, they have more stock knowledge compared with the Control Group with a difference of 9.73 more correct answers.

Table 6. T-test value @ 0.05 level of significance on the Post-test of the Experimental Group and Control Group

						t-value		
Parameters	N	$\bar{x}$	Df	$\sum D$	$\sum D^2$	comp	Tab	Remarks
Control	28	34.821	54	253	4605	4.83	2.0049	Ho Rejected
Experimental	28	25.786						

Table 6 exposes the computed t-test value of 4.83 is greater than the t critical value of 2.0049 at level of significance of 0.05. Thus, the null hypothesis is rejected. There is a significant difference between the pre-test score of the Experimental group and Control Group. The Control Group had a greater difference and stock knowledge in Earth Science with a difference of 9.73 correct responses.

Table 7. Mean score of Control Group versus Experimental Group in their post-test result

Parameters	N	$\bar{x}$	Delta (Δ)	$\sum D$	$\sum D^2$
Control	28	37.07	1.48	242	3032
Experimental	28	35.59			

It can be seen on the table the post-test mean score Control Group of 37.07 and Experimental Group post-test mean score of 35.59. The Control Group has an edge of mean score of 1.48.

Table 8. T-test value @ 0.05 level of significance on the Post-test of the Experimental Group and Control Group

						t-value		
Parameters	N	$\bar{x}$	Df	$\sum D$	$\sum D^2$	comp	Tab	Remarks
Control	28	37.07	54	242	3032	1.60	2.0029	Ho Accepted
Experimental	28	35.59						

Table 8 reveals the computed t-test value of 1.60 is less than the t critical value of 2.0049 at level of significance of 0.05. Thus, the null hypothesis is accepted. There is no

significant difference between the post test score of the Experimental group and Control Group. The Experimental Group who was subjected to project-based activity method has the same achievement with the control group in the post-test result.

Conclusions

1. The experimental group mean score in the pre-test and post-test results is lower than the control group.
2. There is no significant difference between the pre-test and post-test of the Control group who were not subjected to project-based activity. Results implied that there is enough evidence to support the claim that without integrating project-based activity had not significantly increased the academic performance of the control group.
3. There is a significant difference on the mean score of between the pre-test post test results of the Experimental group. The Experimental group, who were subjected to project-based activity, achieved higher pre-test/post-test difference.
4. There is a significant increase in the mean score of the Experimental group in terms of the pre-test/post test results. This implies that project-based learning is one of the alternative learning models for the students in achieving higher academic performance in distance learning during the Covid-19 pandemic.

Acknowledgement

The researcher would like to acknowledge and extend her sincere appreciation to all those who had contributed to the realization of this research:

To her parents, Geronimo and Leonarda Mamaril, for their bestowing unconditional love support and, sacrifices especially in taking care of her son. It was a great comfort and relief that her parents are there every time she needed them. The countless times they have taken care of their children and grandchildren will never be forgotten. No valuable words to express her gratitude.

Her husband, Danielo B. Solis, for invaluable love, understanding, prayers, and continuing support to complete my research work. Your encouragement when the times get rough is much appreciated and noted. To her one and only son, Daniel James Solis for being an inspiration, her pride and biggest blessing from God.

Thanks to her brothers, Jessie and Edmund Mamaril for their prayers and support.

To my cousin, Carina G. Prendon, and all my friends, colleagues who have been helping and encouraging me throughout the year of my study. No words can describe her gratitude and favors received from them.

Above all, God Almighty, the ultimate source of wisdom and courage to undertake the tedious task, giving insight, guidance and for the unconditional love and endless blessings.

References

Article in a Journal:

Castelo, M. (2020) How to Facilitate Project-Based Learning Online-Integrating PBL into remote learning can help students stay connected and engaged Retrieved https://edtechmagazine.com/k12/article/2020/08/how-facilitate-project-based-learning-online?fbclid=IwAR2_l0025sfs8q2AcBTv_zFpW1BDTNpfKKGUyjHK6SDAKB_sPB8PRto1n4

Gonser, S. (2020) Using Project-Based Learning to Prepare Students for Cutting-Edge Careers Hoping to prepare high school graduates to solve complex, real-world problems, an Ohio STEM school found answers in project-based learning Retrieved https://www.edutopia.org/article/using-project-based-learning-prepare-students-cutting-edge-careers

Harkema, R. (2020) Project Based Learning: Definition and Ideas Retrieved https://study.com/academy/lesson/project-based-learning-definition-and-ideas.html

Lumen (2020) Project-based learning Retrieved https://courses.lumenlearning.com/educationx92x1/chapter/project-based-learning/

Lynch, M (2020) 14 PROJECT-BASED LEARNING ACTIVITIES FOR THE SCIENCE CLASSROOM Retrieved https://www.thetechedvocate.org/14-project-based-learning-activities-science-classroom/

PBL Works (2020) Retrieved https://www.pblworks.org/what-is-pbl#:~:text=Project%20Based%20Learning%20is%20a,question%2C%20problem%2C%20or%20challenge.

Thomas, L (2020) An introduction to quasi-experimental designs Retrieved https://www.scribbr.com/methodology/quasi-experimental-design/

Wyson, J.D. (2020) Designing Performance Task in the New Normal: Reinventing Project-Based Learning: A webinar Retrieved https://cavite.lpu.edu.ph/index.php/en/cas-news-events/719-designing-performance-task-in-the-new-normal-reinventing-project-based-learning-a-webinar-facilitated-by-mr-john-daryl-wyson#:~:text=Here%20are%20important%20reasons%20why,problem%20solving%20skills%20in%20students.&text=The%20teacher%20changes%20his%20role,the%20student%20to%20understand%20it