EFFECTIVENESS OF OPEN EDUCATIONAL RESOURCES (OER) IN THE PERFORMANCE OF LEARNERS IN SCIENCE 6

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Abstract. This study aimed to determine the Effectiveness of Open Educational Resources (OER) in the performance of learners in Science 6. In the pre-test administered, the control group obtained a higher mean percentage score (MPS) than the experimental group with mean percentage score (MPS) of 29.68 % and 29.00% respectively. In the post test, the learners in the control group obtained a mean percentage score of 80.18% and the experimental group had 86.33%. Both groups improved in their performances but the performance of the experimental group is much higher than the control group after Open Educational Resources (OER) was employed. Based on the results, this study concludes that Open Educational Resources (OER) in teaching Science is an effective tool in enhancing the performance of learners in Science 6.

Keywords. Open educational resources, science, traditional learning resources,

1 Introduction

The overall challenges to education in the challenging learning environment of schools with limited or no access to Information and Communications Technology (ICT) and internet connections have also a great impact in the Department of Education's vision for "digital rise" which aims to revolutionize technology and other online and web resources are implored, ICT equipment and internet connection is a great problem.

In view of the aforementioned challenges, DepEd had launched DepEd Computerization Program (DCP) that provides an E-Learning classroom or ICT room in every school with computer units, Bluetooth speakers, Interactive Promethean Board, projectors and other gadgets that aid teaching and learning process.

However, DCP packages are mere equipment and that there should be interactive teaching software and applications where learners can explore more than just traditional chalk and board teaching approach. It also helps to develop the mindset of learners towards independent learning.

Digital resources like electronic grade books, digital portfolios, learning games and other online learning resources, are powerful tool to help teachers create more engaging and interactive teaching ways of learning on teacher and learner performance. These are few ways that technology can be utilized to transform learning.

Open Educational Resources (OER) as part and parcel of e-learning has also the potential to improve educational productivity by accelerating the rate of learning taking advantage of learning time outside the school hours, reducing the cost of instructional materials and utilizing teacher's time. (UNESCO 2016).

The potential of OER is determined by the way they are used. They may simply be used as a substitute for existing propriety materials, saving some costs and improving distribution reach, but they can also lead to a full redefinition of the teaching and learning environment. This is dependent on the people using them and the policy support provided.

In the Philippines, ensuring the welfare of more than 27 million learners in basic education alone requires indomitable commitment especially amidst this crisis. However, UNESCO reiterates its stand in spite of the circumstances: "Education cannot wait. If learning stops, we will lose human capital." Meeting the needs of the most vulnerable populations during these times is essential to achieving SDG4 (UNESCO, 2017).

In view of these, the results of the LESF conducted by Palospos Elementary School showed that more than half or 65 percent of the learners from kindergarten to Grade 6 has smartphones at home. These smartphones are very essential in

learning. However, almost 90% of the parents and learners have chosen Modular Printed Learning Modality because of lack of financial capability to avail Online Distance Learning.

Furthermore, the researcher who is a Science teacher for the past five years had observed that 60% of her learners got below 75% mastery level in Science based on the results of their quarterly assessments, worksheets and quizzes. Since OER is a new trend in teaching and can be accessed on online platforms or can also be downloaded to be utilized, the researcher has determined the effectiveness of OER particularly Microsoft PowerPoint in the learners' performance in Science 6 by conducting a simple experimental research. The researcher has tried to prove that OER could enhance the performance of learners in Science after determining their learning difficulties in the said learning area.

2 Review of Related Literature

The related studies discussed in this chapter enriched the researcher's stock knowledge and helped in providing direction of the present study. The present study is different from other studies reviewed since it has different subjects, locale and research design. On the other hand, the studies mentioned above have similarities with the present study because of the use of multimedia resources.

In the study of DeVries (2013), Anup Das (2011) Juming (2013) and are focused on how OER could enhanced the teaching and learning situation in their respective countries. There is significant improvement to those learning institutions that employs OER in their education system. With its advantages such as open access and open sharing, modifying the content and low-cost distribution is at hand.

Nunez (2017) and Torio (2019) employed interactive teaching approaches in their studies. It is very evident that instruction with the aid of multimedia resources could enhance the performance of learners in different learning areas. On the other hand, Arenas (2018) combined traditional teaching resources and multimedia resources through blended learning strategy yield a good result in the performance of learners in Science 6.

The digitized instructional materials (DIMs) as focused in the study conducted by Aquino J. (2019) and Aquino V. (2019) are closely related in this study because DIMs are educational resources that can be shared "openly". On the study conducted by Forelo (2019), multimedia-based approach can improve the performance of Grade 3 learners in Science-based on their exposure to interactive animations which can also be an OER. She also administered pre-test and post test to determine the effectiveness of multimedia-based approach.

Generally speaking, all these related studies that the researcher have consolidated have bearing in the present study for most of them have tackled educational resources as focus of their study. The researcher believes that these studies could contribute greatly in the realization of the present study.
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3 Research Methodology

3.1 Research Design

This study used simple experimental research. A simple experiment is one researches often use to determine if changes in one variable might lead to changes in another variable—in other words, to establish cause-and-effect. In a simple experiment looking at the effectiveness of a new medication, for instance, study participants may be randomly assigned to one of two groups: one of these would be the control group and receive no treatment, while the other group would be the experimental group that receives the treatment being studied. Once the data from the simple experiment has been gathered, the researcher then compare the results of the experimental group to those of the control group to determine if the treatment had an effect. The researcher chose simple experimental research because it provides a systematic and logical method for answering the question. The researcher aimed
to find out the effectiveness of OER in the performance of learners in Science 6. The researcher also used purposive sampling in which every subject gets equal chance being assigned to experimental and control group. One of the factors that was considered was their general average from their previous grade level (Grade 5) to achieve balance and unbiased distribution of samples in determining the two groups of the study. Availability of learning gadgets such as smartphones, tablets and laptops of learners were also taken into account.

3.2 Sources of Data

The subjects of the study were the learners handled by the researcher in Science 6 at Palospos Elementary School during school year 2020-2021. Since there is only one section in Grade 6, the researcher divided the class of 30 learners into two groups using purposive sampling method. In forming the two groups, the researcher considered some factors like availability of smartphones, tablets, and laptops that could be used in online learning which she had assigned the group exposed to OER to be in the experimental group while the learners exposed to traditional learning resources was in the control group were given printed Self Learning Modules (SLMs)

3.3 Statistical Treatment of Data

To attain valid and reliable results from the data that were gathered, appropriate statistical tools were used by the researcher. The level of performance of the learners in Science 6 was determined using the mean and mean percentage score (MPS) and descriptive equivalent or mastery level as prescribed by DepEd. To determine the significant difference in the performance of the two groups of learners based on the pre-test and post test results, t-test for uncorrelated means was used. To determine the significant difference in the performance within each of the Control and Experimental Groups in the pre-test and the post test, t-test of
correlated means was employed. The study used Statistical Procedure for Social Science (SPSS) Program in processing, interpreting, and determining the desired statistical measures to answer the specific questions in the study.

4   Presentation, Analysis, and Interpretation of Data

4.1 Level of Performance of Learners in Science 6 Based on the Pre-Test Result

The first sub-problem posited in this study is the level of performance of the learners in Science 6 based on the pre-test results administered to the Control and Experimental groups at the beginning of the first quarter of the school year 2020-2021.

It can be gleaned from table 1 that both groups got almost the same means and mean percentage scores with the descriptive equivalent of Not Mastered. This means that learners have the same background or prior knowledge on the lessons in Science. This entails that the researcher through the use of the OER should source the learning of learners in Science 6.

Table 1. Pre-test Results of the Control and Experimental Groups in Science 6

Group	Mean	Mean Percentage Score	Descriptive Equivalent
Control Group (traditional learning resources)	11.87	29.68	Not Mastered
Experimental Group (open educational resources)	11.60	29.00	Not Mastered

4.2 Significant Difference on the Performance of the Control and Experimental Groups Based on the Pre-Test Results

The table shows that the computed t-value of 0.251 is lower than the tabular value of 2.048 at 0.05 level of significance with 28 degrees of freedom wherein it doesn't fall within the area of rejection. This implies that the null hypothesis which states that there is no significant difference in the performance of the two groups in the pre-test is accepted. The result implies that regardless of what group the learners belong, they have more or less the same background or prior knowledge in Science 6 before learning resources were utilized.

Table 2. Test of Significance of the Difference Between the Performance
of the Control and Experimental Groups in Pre-test Results

Group	Mean	Mean Difference	Computed t-value	Critical Value	Decision
Control Group	11.87	0.27	0.251	2.048	Accept H_o
Experimental Group	11.60				

Not significant, Critical t-value =2.048 at α = 0.05 with df=28

4.3 Level of Performance of the Two Groups of Learners-Based on the Post Test Results

The table confirms that learners under experimental group utilizing open educational resources performed better in their pos-test as compared to those who are under control group employed with the traditional learning resources. Though both groups have the high level or in 'mastered' as descriptive equivalent, learners under experimental group obtained a mean of 34.53 and mean percentage scores of 86.33 higher than the mean of 32.07 and mean percentage score of 80.18 of those learners under control group.

This performance in the post test comparing both groups point out that the competencies and proficiencies acquired during the try-out were established and retained. It could be deduced that the OER as learning resources is an effective measure to improve the performance of the learners in Science 6.

Table 3. Post test Results of the Control and Experimental Groups

Group	Mean	Mean Percentage Score	Descriptive Equivalent
Control Group (traditional learning resources)	32.07	80.18	Mastered
Experimental Group (open educational resources)	34.53	86.33	Mastered

4.4 Test of Significance of the Difference in the Performance Within Groups Based on the Pre-Test and Post-Test Results

It is reflected on Table 4 that within the Control Group there is a mean difference of 20.2 and the absolute value of the computed t-value of 64.811. Based on the critical value of 2.114, it is evident that the computed t-value is higher than the critical value, therefore the null hypothesis is hereby rejected. The rejection of the null hypothesis which states that there is no significant difference in the performance of the learners in the Control Group is based on the computed t-value which is greater than the critical value.

Table 4. Test of Significance of the Difference in the Level of Performance of the
Control Group Based on the Pre-Test and Post-Test Results

Control Group	Mean Difference	Computed t-value	Critical Value	Decision
Pre-test Mean = 11.87 Post Test Mean=32.07	20.2	64.811	2.114	Reject H_o

Significant, Critical t-value=2.114 at α=0.05 with df=14

The table 5 shows that based on the pre-test and post-test means of the Experimental Group wherein the learners were exposed to OER, there is a mean difference of 22.93 and an absolute value of computed t-value of 56.229. Looking intently at the same table, the critical value is pegged at 2.114 and it could be gleaned that the critical value is lower than the computed t-value. Therefore, the null hypothesis which states that there is no significant difference in the performance of the learners based on the pre-test and post test results is hereby rejected.

Table 5. Test of Significance of the Difference in the Level of Performance of the
Control Group Based on the Pre-Test and Post-Test Results

Experimental Group	Mean Difference	Computed t-value	Critical Value	Decision
Pre-test Mean = 11.60 Post Test Mean=34.53	22.93	56.229	2.114	Reject H_o

Significant, Critical t-value=2.114 at α=0.05 with df=14

4.5 Test of Significance of the Difference Between the Post-Test Results of the Control Group and the Experimental Group

It can be conjectured from table 6 that the computed t-value of -2.141 is higher than the tabular value of 2.048 at 0.05 level of significance with 28 degrees of freedom wherein it falls within the area of rejection. The result implies that the null hypothesis that there is no significant difference in the level of performance of the two groups in the post test is rejected. It means that the experimental group performed significantly higher in the post test. Thus, it substantiates that employing open educational resources as learning resources is effective in learning Science 6.

Table 6. Test of Significance of the Difference in the Level of Performance of the
Control Group Based on the Pre-Test and Post-Test Results

Group	Mean	Mean Difference	Computed t-value	Critical value	Decision
Control Group	32.07	2.46	2.141	2.048	Reject H_o
Experimental Group	34.53				

Significant, Critical t-Value =.2.048 at α =0.05 with df=28

5 Conclusion and Recommendation

The level of performance of the learners exposed to traditional learning resources is higher than to those exposed in OER as revealed by the pre-test results. However, the corresponding mean percentage scores are way below the 75% mastery level prescribed by DepEd. There no significant difference in the level of performance of the two groups in the pre-test. The level of performance of the Experimental Group is higher than the Control group based on the post test results. There is a significant difference in the level of the performance of the two groups with the experimental group having an edge over the control group. There is a significant difference in the performance of each group in the pre-test and post test results. OER is more effective than the traditional learning resources for it can outsource more leaning resources in less time because of its technological advantage. Furthermore, OER is not delimited to merely printed SLMs because through internet connectivity, there is a vast source of learning resources.

Science 6 teachers should be resourceful in finding out effective learning resources or instructional materials for the learners. Laptops, tablets and smartphones should be utilized as instructional devices in this time of pandemic where distance learning is the learning modality prescribed by DepEd to facilitate the use of OER. Teachers in other learning areas should use OER to further enhance the learning process. School administrators should design training programs focused on the use of OER as learning resources that can cater a wide and up-to-date knowledge and information to learners to purposely facilitate distance learning modalities. Findings of the study should be used by future researchers as bases in the conduct of similar investigations.

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