Research Article

Effect of Strategic Intervention Materials on the Learning Competencies of Learners

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ABSTRACT

In response to the alarming performance of the learners in the core subjects, this study aimed to improve the learning outcomes using the Strategic Intervention Materials (SIM) in Grade 6 Science subject. Two intact classes with a total of forty-six (46) Grade VI learners were used as participants of the quasi-experimental study. By random approach, the control group had 20 learners, and 26 learners in the experimental group. The effect of SIM to the performance of the struggling learners in science subject was determined using the pre-test and post-test scores of the two groups of participants. Appropriate statistical tools were used to analyse the test scores of the participants by observing the assumptions of parametric test. Results showed that the pre-test scores between the two groups of participants at the start were very comparable. However, the post test scores of the participants from the experimental and control groups were statistically different with a medium effect size. Moreover, the performance of the female participants significantly exceeded the performance of their male counterparts. This was due to the diligence of the female participants in keeping and handling of the SIM for their advantage. The researcher concluded that SIM significantly helped improve the test scores of the learners. For this, it is recommended that SIM be also applied to other learning areas in schools.

Keywords: *Intervention materials, Learning competence, Performance, Strategic*

Introduction

DepEd Order No. 9, s. 2005 expressed the existence of dismal performance among the Filipino learners. This is the reason that observance of time-on-task is strengthen in all public elementary and secondary levels. Despite the efforts of the education agency across governance levels to improve learning

outcomes, the observed alarming performance among the learners continued in public elementary and secondary schools in the Philippines. As a matter of fact, the Trends in International Mathematics and Science Study (TIMSS) in 2019 revealed that Philippines scored significantly lower than any other country in Grade 4 Mathematics and Science subjects.

In the context of science as a learning discipline, 13 percent of the Filipino learners were found to have limited understanding of scientific concepts and knowledge of foundational scientific facts. The worse is that 87 percent of the Filipino learners did not reach this level (Mullis et al., 2020). This simply implies that Filipino learners have a worsening performance in science. This dismal performance in the last four years had been already noted in the study of Chua (1999), more than two decades ago. Accordingly, the annual national achievement test (NAT) results showed that most elementary pupils and high school students master less than 50 percent of what they were supposed to learn. This could have been one of the pieces of evidence being used in the policy to observe time-on-task in all grade levels of all public schools in the Philippines.

Since every school in the country is part and parcel of the overall performance of the learners in the international and local assessments, it is then important that school administrators and teachers shall employ adjustments in their teaching strategies in the classrooms. This ongoing undesirable performance of the learners calls for action. However, there were already numerous attempts to improve the performance of the learners by giving trainings and capacity buildings to teachers, but the test results did not say so. This only implies that there is more to do for all concern to help the learners improve their performance. Sison (2022) pointed out that there is a need to renew focus on improving the performance and capacity of the learners in schools. This means that teachers should engage in using teaching strategies that would really help the learners improve their learning competence in understanding the concepts and ideas of the lessons given to the learners.

On the issue of low performance in science among learners in the Philippines, this indeed calls every school head and science teachers to engage in a strategic approach to improve the performance of the learners, not only in science, but across subject areas. The researcher as a science teacher herself takes the challenge to address the low performance of the learners in the school. Hence, this action research aims to improve the performance of the learners in science using the strategic instructional materials (SIM), an approach to increase the learning competence of the learners in school (Limbago-Bastida & Bastida, 2022).. This step as well is a manifestation of observance to one of the core mandates of the teachers, the delivery of quality education to learners.

Methods

This study used all the two intact classes of Grade 6 learners in one of the schools in DepEd-Camiguin. Hence, complete enumeration was used in the selection of the participants of the study. The decision to use all the Grade 6 learners was based on the observation that both classes had comparative test results in many science examinations given to them. For this reason, the researcher randomly chose the class for the control group with 20 learners and experimental group with 26 learners in a quasi-experimental research design. After this, the participants were given a pretest on the topic vertebrates and invertebrates, one of the topics of science subject of Grade 6 learners.

This work was conceived after the researcher was able to notice the very low-test scores of the Grade 6 learners in science. This was reported formally to the school head with the intention to inform the office and get the permission to conduct action research to the existing problem among the graduating learners of the school. Upon approval, the researcher compiled a 30-itme standardized test about vertebrates and invertebrates. The test items were sorted and chosen for the final draft of the test based on the table of specification to ensure content validity and focus on the key learning areas of the topics. Then, the final draft of the test was used as the pretest instrument of the control and experimental groups of the study. The researcher then analysed the pretest scores to determine the comparability of the test scores of the two groups of learners.

When the test scores of the learners from the control and experimental groups were found comparable, the researcher proceeded the implementation of the learning intervention. The learners from the experimental group were given the SIM, while the learners of the control group received the usual teaching approach used in teaching the science lessons. The provision of the learning intervention continued until the last topic of vertebrates and invertebrates of the science subject. The learners of the control group did not receive any intervention, except the usual discussion of the lesson given to them. While the learners from the experimental group received the usual method of teaching plus the provision of SIM as a learning intervention. After all the lessons of vertebrates and invertebrates were taken, the researcher administered the post-test using the same test in the pretest.

In the implementation of this work, the researcher observed the protocols in conducting action research in the school. The researcher sought one of the fellow teachers to act as observer of the undertaking. To avoid the Hawthorne effect, the researcher assured to protect the dignity, rights, and welfare of the research participants of the study.

Results and Discussions

The analysis and interpretation of data are provided to answer the research questions of this study. Appropriate statistical tools were used based on the characteristics of the gathered data set.

The performance of the participants, the learners of the researcher, before and after the study is shown in Table 1 in terms of mean (M) and standard deviation (SD). Recall that the participants were given a 30-item test covering the topics about vertebrates and invertebrates of the science subject.

Table 1. Performance of the Participants in the Pretest and Post test

Assessment Periods	Experimental Group ($N = 20$)		Control Group ($N = 26$)	
	Mean (M)	SD	Mean (M)	SD
Pretest	5.39	1.36	3.95	1.32
Post test	23.00	2.51	12.15	3.95

It can be gleaned in the table the comparability of the performance of the participants in the pretest result. The mean between the experimental group ($M = 5.39$) and the control group ($M = 3.95$) had a difference of only 1.44, a small difference. In terms of the mean percentage score (MPS), the experimental group got 17.97 while the control group got 13.67. Using the grading scale contained in DepEd Order No. 8, s. 2015, both groups had a performance of below 75 with a description of did not meet expectations. Moreover, the standard deviation also suggested that both groups of participants had almost the same dispersion of the test scores, another indication of comparability of performance. Hence, both groups were comparable and qualified for the research design of this work.

After the treatment period, the mean of the participants in the control group ($M = 12.15$) had increased by 207.59 percent and the standard deviation ($SD = 3.95$) also increased by 199.24 percent. However, the mean of the participants in the control group suggested a mean percentage score of 40.50, which means that the control group had a performance of below 75, still, did not meet expectations (DO 8, s. 2025). While the standard deviation indicated a wider spread of the test scores compared to the pretest scores. This only indicates that the teaching approach applied to the control group did not help in improving the performance of the learners.

On the same vein, the performance of the participants in the experimental group ($M = 23$) had increased by 326.72 percent, while the standard deviation ($SD = 2.51$) moved only by 84.56 percent. This implies that the experimental group had a mean percentage score of 76.76, with a description of fairly satisfactory

(DO 8, s. 2015). The standard deviation also suggested a little increase in the spread of the test scores compared to the pretest scores. This indicates that the learning intervention through the application of SIM had helped the learners to improve their test scores (Alair, 2020). Although the performance is not too high, this implies that the SIM helps the learners to further understand the least learned competencies in the topics about vertebrates and invertebrates.

These findings corroborate to the study of Cordova (2019) and Garcia (2022) which showed the effect of SIM in the test scores of the learners in science subject. This reflects the participants acceptance of the learning intervention given to them. Hence, the needs of the learners should be always considered before deciding on the appropriate learning intervention to administer (Villar et al., 2022). Due to this, the researcher observed that the learners were happy and enjoying the learning intervention in learning the lessons about vertebrates and invertebrates in science subject.

This study also endeavoured to determine if there was a significant difference on the test scores of the participants in the control and experimental groups. Since the post-test scores were found normally distributed, t-test was used to determine the significant difference of the participants' performance after the treatment of the study. This is shown in Table 2.

Table 2. Test of Significant Difference on the Post test Scores Between the Participants of the Experimental and Control Groups

Groups	df	t-stat	t-crit	p-value	Decision
Control vs Experimental	34	9.67	2.03	0.000*	Significant

* Difference is statistically significant at a t-test p-value of 0.01
With a medium effect size of 0.54

It has been shown that the participants from the experimental group ($M = 23, SD = 2.51$) performed better than the participants of the control group ($M = 12.15, SD = 3.95$). While the table above shows that there was a statistically significant difference on the post-test scores between the participants of the experimental and control groups, $t(34) = 9.67, p < .01$. The effect size was medium, with a Cohen's d value of 0.54. This means that 54 percent of the difference was due to the intervention, or the intervention had medium effect in improving the test scores of the participants from the experimental group. This implies that the use of SIM had significantly influenced the test scores of the participants from the experimental group. Furthermore, this result suggested that learning intervention is indeed required if the performance of the learners in the class does not meet the expectations, or the proficiency is too far from the acceptable value or level.

This finding is consistent to the study of Reiser et al. (2016) which confirmed the contribution of SIM in improving the performance of the learners in science subject. Moreover, this finding is also supported in the study of Lazo (2021) which found out the significant increase or improvements in the test scores of the learners who were given the SIM as a learning intervention in science subject. It is suggested that whenever there are learners whose performance is below the expected proficiency, learning intervention is an approach to help learners improve performance in a learning area.

Knowing the significant difference of the post-test scores of the participants from the experimental group in terms of sex is indeed necessary for future reference. Since the post-test scores were normally distributed, t-test was used to analyse the data. This is shown in Table 3.

Table 3. Test of Significant Difference Between the Posttest Scores of Males (N=12) and Females (N=14) from the Experimental Group

Sex	Mean	SD	t-stat	t-crit	p-value	Decision
Males	21.17	2.44	2.09	2.06	0.047*	Significant
Females	23.43	4.84				

* Difference is statistically significant at a t-test p-value of 0.05
With a negligible effect size of 0.10

The table shows that the performance of the females ($M = 23.43, SD = 4.48$) is higher than the males ($M = 21.17, SD = 2.44$). With respect to the performance of the participants using the MPS (DO 8, s. 2015), the females achieved fairly satisfactory performance level (78.10), while the males failed to meet the expectations (70.57), or the least proficiency level at an MPS of 75. Hence, only the females from the experimental group were able to reach the fairly satisfactory performance level among the participants of the study. T-test also confirmed that there was a significant difference on the post-test scores of the male and female participants from the experimental group, $t(24) = 2.09, p < 0.05$. The effect size was negligible, with a Cohen's d of 0.10. This means that the intervention had insignificant effect on the test scores between the male and female participants. In this situation, the male participants from the experimental group also are in need of more learning intervention to achieve the required proficiency level in learning the lessons of science subject.

This result is connected to the study of Ullah et al. (2019) which observed the dominance of females in numbers among schools in a country. Likewise, the study of Cominghud (2020) also confirmed that, generally, the educational performance of females across the globe is higher than that of the males. According to observations, females are known to persevere than the males. This is an attitude so required from learners who are catching up to improve their performance level.

Conclusions and Recommendations

The findings revealed that the participants of the experimental and control groups were comparable since the means of the test scores of both groups were below the proficiency level of 75 at the start of the study. However, the performance of the participants in the control group did increase but still below the required proficiency level at 75. While the participants of the experimental group increased to fairly satisfactory level. Analysis also showed that there was a statistically significant difference in the post-test scores of the participants of the experimental and control groups. This work further noted that, in terms of sex among the participants from the experimental group, females performed better than males. In fact, the performance of the females reached the fairly satisfactory level, while the performance of the males was below the required proficiency level at 75 mean percentage score. This shows that females appreciated and enjoyed the learning intervention than the males.

Based on the observations of this study, the researcher recommended that before deciding the learning intervention to use in addressing the low performance of learners in the class, it is their needs that must be the basis of selecting the appropriate approach to improve learning. On the effect of SIM as manifested in this work, the researcher recommended the use of this learning intervention to learners in other learning areas. The school heads are advised to provide more support to the teachers in producing SIM for learners in need of this kind of learning intervention. If the school has a variety of SIM, the school heads are also encouraged to strengthen the utilization of the existing learning materials to further increase the performance of the learners across subject areas.

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