

Strategic Intervention Materials: Their Effects on the Academic Performance in Science of the Grade-8 Students of Bai Saripinang National High School

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ABSTRACT

The main purpose of this study was to find out whether or not the use of Strategic Intervention Materials in Grade-8 Science would be effective in increasing the academic performance of Grade-8 students of Bai Saripinang National High School for the School Year 2017-2018. This was an experimental research using the pre-test and post-test design involving the three sections of Grade-8 Joy, Grade-8 Love and Grade-8 Charity. The respondents of the study were the students from the (3) sections who did not reach the mastery level of the learning competencies with a total of 52 students. The respondents were given a 20-item teacher-made test as their pre-test and post-test. The statistical tools employed were mean, standard deviation and t-test for independent samples. Comparing the two groups, those who have undergone the Strategic Intervention Materials (SIM) have greater number of students whose performance belonged to “*Satisfactory*” and above than those who haven’t. Generally, findings implied that the use of Strategic Intervention Materials in Grade-8 Science was effective in improving the academic performance of the Grade-8 students in Science.

INTRODUCTION

Learning science is fun for the reason that science is more than just knowledge. Science allows students to explore their world and discover new things (Millar, 2004) and teaches children necessary skills that they can use in other areas of their lives (Barredo, 2008).

As a result, science is included as a core subject in elementary, junior high school and as well as in senior high school. Another justification for the inclusion of science as a subject in school curricula is that all citizens need to achieve a degree of “scientific literacy” to gain concepts and principles linked to real life situations. Studies indicate however, that many of our Filipino learners are not attaining functional literacy though the Department of Education had exerted efforts in improving the quality of education to both public and private schools without which they find it too difficult to meet the challenges posed by our rapidly changing world.

Preliminary results from the survey done by Raymond Pingol from the VISSER project show that only around 20% of high schools have laboratories with non-traditional “modern” equipment. Unfortunately, these “modern” equipment are typically no more than the combination of a computer and an LCD projector. The lack of science education facilities is reflected on the poor quality basic science and math education seen by low achievement scores of Filipino students in various tests. The last time the Philippines participated in international surveys like the 2003 Trends in Mathematics and Science Survey (TIMSS). The Philippines ranked 34th in Math out of 38 countries and 43rd in Science out of 46 countries that were tested (Manila Times, 2014). This was a very dismal result.

Guillermo M. Luz, co-chairman of the National Competitiveness Council (NCC) presented the results of the 2010-2011 Global Competitiveness Report of the World Economic Forum as reported by de Leon (2011). The Philippines ranked 69th in educational system, 112th in science and math and 76th on internet access. In all categories, the Philippines was falling behind Singapore, Brunei, Malaysia, Indonesia, Thailand and Vietnam.

This proved that vast majority of Filipino students have performed way below the levels of most students from other countries in the international tests. Thus, education managers must focus on reforming and delivering quality instruction so that the Curriculum will not be overwhelmed by the crisis. Students must be provided with maximum opportunities to become functionally literate in science.

The problem of students’ low performance is supported by the results of National Achievement Test (NAT) for the school year 2013-2014 as reported in the Region XII SOCCSKSARGEN Regional Development Plan for 2015-2019 which reveals that Science continues to be the most difficult field of study in basic education. The mean percentage score of 45.87 in Science Year 4 is below average. Sarangani is the only division that has shown an above average performance of 52.11 while the other eight divisions including the Sultan Kudarat have scores ranging from 40.21 to 48.16. Sixty seven percent or 387 out of 579 secondary schools belong to quartile 3 in Year 4 science performances, which means that more than half of the total number of secondary schools obtained below average scores. Thus, the region needs to employ strategies that would improve the 28 or 5% secondary schools belonging to quartile 4.

Science continues to be the most difficult field of study, as a result, students have low academic performance. It is for these reasons that the researcher embarks on developing strategic intervention materials in Science for Grade-8 students that will enhance learning and remedy the least mastered skills and competencies of the students, thus attain growth in their academic performance.

CONCEPTUAL FRAMEWORK

Figure 1 presents the conceptual framework of the study. It depicts how the traditional method of teaching using Grade-8 Science Module and Strategic Intervention Materials (SIM) in Physics gave impact on the academic performance of Grade-8 students in Science. The arrow connecting the two boxes illustrates how the dependent variable responded or reacted to the stimulus given by the independent variables.

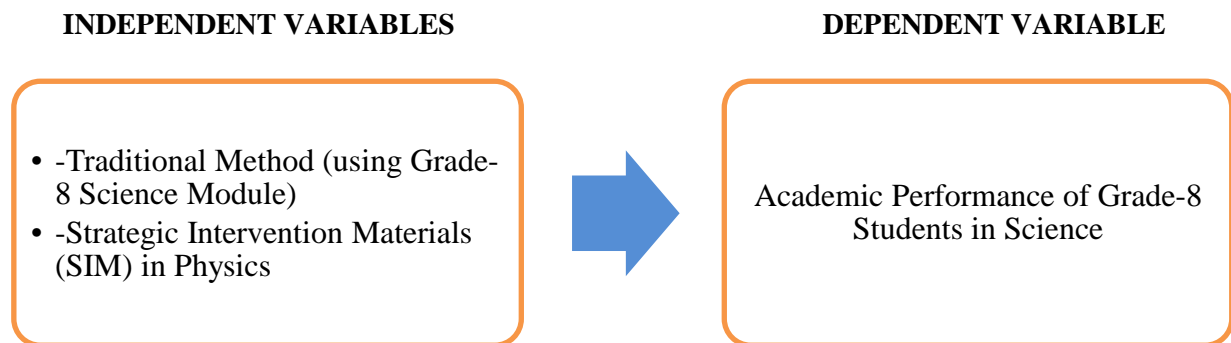


Figure 1. Research Paradigm

RESEARCH QUESTIONS

The main purpose of this study was to find out whether or not the use of strategic intervention materials in Science would be effective in improving the academic performance for the first quarter of Grade 8 students enrolled in Bai Saripinang National High School, Bagumbayan, Sultan Kudarat during the School Year 2017-2018.

Specifically, it found answers to the following questions:

1. What are the levels of academic performance in Science of the Grade 8 students before the conduct of the study?
2. What are their academic performances in Science after the conduct of the study using the two strategies?
 - 1.1 Traditional Method (using Grade-8 Science Module)
 - 1.2 Strategic Intervention Materials (SIM)
3. Is the use of strategic intervention materials effective in improving the academic performance of Grade 8 students in Science?

HYPOTHESIS

The use of strategic intervention materials is NOT EFFECTIVE in improving the academic performance of Grade-8 students in Science.

SCOPE AND DELIMITATION

This study was delimited in finding out whether or not the use of strategic intervention materials in Science was effective in improving the academic performance for the first quarter of Grade 8 students enrolled in Bai Saripinang National High School, Bagumbayan, Sultan Kudarat during the School Year 2017-2018.

Findings focused only on the results gathered from the subjects of the study where the strategic intervention materials were conducted, thus, data would only be true to this group of students and the school where it was conducted.

Further, other researchers could conduct similar studies using other grade levels in their own places to compare results. Also, the researcher will be open to suggestions to the materials other Science teachers could add to those she has already created to make the validity of this research study stronger.

LITERATURE REVIEW

This section presents the literature reviews from a variety of studies both local and foreign settings on strategic intervention materials (SIM) and academic performance of students in Science.

Strategic Intervention Materials

Strategic Intervention Materials are conceptualized and designed to aid the teacher provide the pupils the needed support to make progress in studies. These will increase and deepen the skills, knowledge and understanding of the child in various subject areas not only in science and math but also including various learning areas in the curriculum (Rodrigo, 2015).

SIM can give the opportunity to explore various ideas and concepts that would enrich their understanding of varied subject matters that sharpen their competencies. Furthermore, the strategic instructional materials tend to re-teach the lessons which are not so much clear to the learners and to help them gain mastery of the skills. Each intervention material contains five parts such as the guide card, activity card, assessment card, enrichment card and reference card. The guide card stimulates the pupil's interest on the topic discussed and gave a preview of what they would learn (Dy, 2013). The activity card translates the focus skills in at least three activities. The assessment card provides exercises, drills or activities that allow pupils to assess their understanding of what they have learned correct errors when appropriate and monitor their learning and use feedback about their progress. The enrichment card provides activities that reinforces the content of the lesson and provides opportunities for the pupils to apply what they have learned to other subject areas or in new contexts. Finally, the reference card provides further reading to the pupils. In its continuing effort to raise the quality of education in the country, the Department of Education (DepEd) continuously implements innovations particularly in Science. The focus of the Science Education Program of the Basic Education Curriculum is to make learning meaningful for students, in order to improve their achievement. In fact, most of the seminars, trainings and scholarships sponsored by the DepEd and Department of Science and Technology (DOST) for teachers teaching science subjects have the objectives of furthering the enhancement of their knowledge and skills in delivering goods to the students. An example of this is the National Training on Strategic Intervention Materials (SIM) Development in Summer 2005. The training workshop aimed to enhance teachers' skill in test analysis and interpretation and capacitate them in developing various intervention materials for remediation and enrichment of learning (DepED Memorandum No.117 s. 2005). Moreover, the strategic intervention materials guarantee alignment of activities with the tasks/objectives, keep the activities short and simple, provide a variety of activities to cater to the diverse learners; provide number of activities so that the learner can have enough practice in developing the skill and focus on the least mastered skills.

In addition, the designs of the strategic intervention materials are attractive and eye-catching that is why a lot of teachers are encouraged to use them in the teaching-learning process. The benefit of the strategic intervention materials is not only for the teacher's convenience and system in teacher but also for the easy grasp of the learners.

Academic Performance

It is currently understood that, in order for students to be considered “fully proficient in science” (Duschl et al., 2007), they must be able to (1) know, use, and interpret scientific explanations; (2) generate and evaluate scientific evidence and explanations; (3) understand the nature and development of scientific knowledge; and (4) participate productively in scientific practices and discourse. There is a growing understanding of the role that early childhood education can play in building science literacy. Infinitely curious about the world around them, children constantly observe and explore, take in new information, and generate their own ideas about how the world works. It is now widely known that cognitive stimulation in the early years is critical for brain development and that young children have cognitive capacities far beyond what was previously believed (Shonkoff & Phillips, 2000).

The lack of science education facilities is reflected on the poor quality of basic science and math education seen by the low achievement scores of Filipino students in various tests. Teaching preparation of public school teachers in science is also a factor in learning. There is only a small fraction of teachers in high school that qualified and capable to teach physics, chemistry, biology and mathematics. Although these numbers have increased for public schools due to scholarships efforts of DOST-SEI, there is still a need to have programs for the continuing professional development such as training programs and conferences (Manila Times, 2014).

Filipino students are still weak in math and science, according to results of the Trends in International Mathematics and Science Study. The study revealed unsatisfactory results, the Philippines ranked 34th in Math out of 38 countries and 43rd in Science out of 46 countries that were tested (Manila Times, 2014). Educators in the Philippines must strive harder to help students enhance their learning and make remedy for the least mastered skills of the students, thus attain growth in their academic performance.

METHODOLOGY

This section presents the research design, locale of the study, respondents, data gathering instrument, data gathering procedure and statistical tools used in this study.

Research Design

The experimental method (pretest-posttest) of research was employed in this study using two groups of subjects as the control and experimental group, respectively. Experimental method of research is a method or procedure involving the manipulation of conditions for the purpose of studying the relative effects of various treatments applied to members of a sample.

Locale of the Study

The study was conducted at Bai Saripinang National High School located at Purok Magsaysay, Bai Saripinang, Bagumbayan, Sultan Kudarat, Region XII, Philippines.

Respondents

Bai Saripinang National High School has currently three (3) sections of Grade-8 students for the School Year 2017-2018. The respondents of the study were the students from the (3) sections who did not reach the mastery level of the learning competencies. A simple random sampling (fish bowl technique) was employed and Group 1 became the experimental group and Group 2 turned out to be control group.

Data Gathering Instruments

The following were the research instruments used in the study.

1. Strategic Intervention Materials

These are intervention materials which designed to help teachers provide the students a needed support to make progress, to increase and deepen student’s skills, knowledge and understanding from concrete science to

what is more abstract. Furthermore, these are instructional materials meant to re-teach the concept (s) and skill (s) to help the learners master a competency-based skill which they were not able to develop during classroom teaching. Each intervention material has five parts such as the guide card, activity card, assessment card, enrichment card and reference card.

The guide card stimulates the students' interest on the topic to be discussed and give a preview of what they would learn. The activity card follows the guide card where it translates the focus skills in at least three activities. It provides activities that are organized based on the sequence of the focus skills written in the guide card and includes examples to concretize the concepts, particularly those drawn from real life experience.

The assessment card provides exercises, drills or activities that allow students to assess their understanding of what they have learned correct errors when appropriate and monitor their learning and use feedback about their progress. The enrichment card provides activities that will reinforce the content of the lesson and provides opportunities for students to apply what they have learned to other subject areas or in new contexts. The reference card provides reading to students. It relates the content with the students' life experiences. It includes a carefully and well-researched list of resources that helped students reinforce concepts and skills that they learned. It also includes additional useful content not found in the books.

2. Pre-test/Post-test

It was a 20-item teacher-made test which was designed to measure the mastery level of the students on the lessons chosen by the researcher and focused on the first module of the Grade-8 science which was Forces and Motion. The items in the test were analyzed and validated before the actual conduct of the study.

Data Gathering Procedure

A pilot pre-test was done before the experiments using the validated test items. The experimental group was exposed to the use of Strategic Intervention Materials while the control group was exposed to the traditional way of teaching using the Grade-8 Module in Science.

A pre-test was given to both groups before the introduction of the lesson and a post-test after the end of the lessons. Both pre-tests and post-tests given to the experimental and control group were the same.

The lessons in the intervention was read and studied by the students and the researcher directed the students to learn in the context of their own personal experiences. Furthermore, the control group was given the same lesson, same number of contact time and rules with the experimental group. They were given the same pre-tests and post-test after the treatment. And their scores in every treatment were tallied and interpreted by the researcher to determine whether there were significant differences on their mean scores in the pre-tests and post-tests.

Statistical Tools

The following were the statistical tools used in the study: (1) Mean and Mean Percentage; (2) Standard Deviation; and (3) t-test formula for independent samples.,

RESULTS, DISCUSSION AND REFLECTION

This section presents, analyzes and interprets data based on the order of the research questions.

Academic Performance in Science of the Experimental Group after the Conduct of the Study

Table 1 presents the data about the academic performance in Science of the experimental group after the conduct of the study. Frequency counts and percentage were used to treat the data gathered.

Table 1. Academic Performance Level in Science before and after the Conduct of the Study among the Experimental Group (n = 26)

Academic Performance Level	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Percentage
Above Satisfactory	0	0%	5	19%
Satisfactory	11	42%	13	50%
Below Satisfactory	15	58%	8	31%
Total	26	100%	26	100%

It could be seen on the table that there are increase in the academic performance after the conduct of the study. 5 or 19 percent who were found to be on above satisfactory level on their academic performance level. They were students whose proficiency level was found between 86 and above.

Further, data reveal that there are 13 or 50 percent of the experimental group obtain Satisfactory level of academic performance in Science. It shows that these students learned at average level of the Science skills required of them to master. They just learned the skills taught to them as per required.

Also, there are 8 or 31 percent of the experimental group who had academic performance in Science found on Below Satisfactory. They are students who were unable to reach the required skills to learn in Science as expected of them.

Academic Performance in Science after the Conduct of the Study among the Control Group

Table 2 presents the data about the academic performance in science after the conduct of the study among the control group. Frequency counts and percentage were employed to treat the data gathered.

Table 2. Academic Performance Level in Science before and after the Conduct of the Study among the Control Group (n = 26)

Academic Performance Level	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Percentage
Above Satisfactory	0	0%	1	4%
Satisfactory	14	54%	10	38%
Below Satisfactory	12	46%	15	58%
Total	26	100%	26	100%

It was revealed in the data that only 1 or 4 percent belonged to above Satisfactory level. This academic performance in Science reflects that these students are above average in their achievement. They learned the skills in Science greater than what was expected of them.

Further results show that there are 10 or 38 percent found to belong in Satisfactory level related to their Science skills. They did not exceed the expectations of what are required to them to master. Moreover, there are 15 or 58 percent of the students without intervention found to be below satisfactory. It means they are students who are fall short of the capabilities to learn the skills expected of them.

Comparing the two groups, those who have undergone the Strategic Intervention Materials have greater number of students whose performance belonged to Satisfactory and above than those who did not. Eighteen (18)

or 59 percent are for those who were taught with Strategic Intervention materials while those who were not had 11 or 42 percent satisfactory and above.

Generally, these results implied that those students who were taught with supplementary instructional materials performed better than without.

Data Showing Whether or Not the Use of Strategic Intervention Materials is Effective

To arrive to an answer whether or not the use of strategic intervention materials (SIM) is effective in improving the academic performance, t-test for independent sample was employed.

Table 3. Means (\bar{x}) of both Experimental and Control Group

Groups	n	Mean	Std. Deviation	Std. Error Mean
Experimental Group	26	11.7692	2.98406	.58522
Control Group	26	7.3462	1.87494	.36771

Table 3 shows that the mean (\bar{x}) value obtained by the experimental group was 11.77, while the control group was 7.35, giving a difference of 4.42 in favor of the experimental group.

Table 4. Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	7.426	.009	6.400	50	.000	4.42308	.69115	3.0348	5.81130
Equal variances not assumed			6.400	42.07	.000	4.42308	.69115	3.0283	5.81780

Data further reveal in Table 4 that the computed obtained t-test value was 6.400. Tested at .05 level with df equals 50, the required tabular value for significance is 1.676. The obtained computed “t” value of 6.400 is greater than 1.676, thus, this leads to reject the null hypothesis formulated. It means that the use of strategic intervention materials in teaching Science is effective in improving the academic performance of the students in the said learning area.

The results indicated that the academic performance in Science of the two groups differ in favor of the experimental group. It meant that those students who had undergone learning with the use of strategic intervention materials (SIM) performed better that those without. The use of SIM as an intervention material was effective in improving the academic performance of the students. These results confirmed further that the use of instructional materials to supplement the books as used in teaching by the teachers, were effective to help school children continue to make progress on a particular standard.

These findings were similar to the results of the study conducted by Soriano (2014) which showed that the use of SIM-BI is effective in terms of improving students' performance and learning approach. The surface learners performed equally well as the deep learners when SIM-BI was used. The positive result of the survey suggested that the SIM was appreciated and appealed to both types of learners.

CONCLUSION AND RECOMMENDATION

The use of Strategic Intervention Materials (SIM) is more effective than traditional teaching approach using Grade-9 Science Module in improving the academic performance of students. It is hereby recommended that Science teachers should devise an instructional material suited to the learning interests of the students. The use of the developed Strategic Intervention Materials (SIM) in this study should be adopted by the Grade-8 Science teachers to increase the performance level of the students particularly in the least mastered competencies.

ACKNOWLEDGMENT

I would like to pay special appreciation to the following persons who made my research successful and assisted me at every point to accomplish this study. A big thanks to my principal, **Nelly Beliran**, for her vital support and enthusiasm throughout the completion of this research. To my co-teachers, **Carmen Guilaran** and **Maybelle Manaraog**, whose persistent encouragement and sympathetic attitude at every point during the research process, helped me to work in time. To my bestfriend, **Novie Joy Aujero**, for her valuable ideas and untiring support in the preparation and conduct of this study. I am sincerely motivated by your words of wisdom and to Sir **Michael Aprong**, for his services and expertise in computer which turned my strategic interventions materials successful and effective.

This work would not have been possible without the financial support of the **Basic Education Research Fund (BERF)**, DepEd-Region XII, Carpenter Hill, Koronadal City. I am grateful for the assistance given. Above all, I am whole-heartedly expresses my sincere gratitude to the living God who faithfully gave me an encouraging support through her family and friends. Finally, thank you so much my dear husband, **Ronnie Alair**, for your love, patience and unwavering moral support to complete my research study.

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