EFFECTIVENESS OF STRATEGIC MATERIALS IN ADDRESSING LEARNING DIFFICULTIES IN SCIENCE 5 SUBJECT

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ABSTRACT

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This study evaluated the effectiveness of Strategic Intervention Materials (SIM) in addressing learning difficulties in the Science 5 subject. The study employed a quasi-experimental design. The respondents were the low-performing Grade 5 pupils of three selected public schools in Malita, Davao Occidental. The data were tabulated and analyzed using percentage scores, one-way ANOVA, and T-test. The teacher-made Strategic Intervention Materials (SIMs) and Self-Learning Module (SLM) were utilized to evaluate which learning materials were more effective among low-performing pupils. Results showed that all three schools got a "did not meet expectations" rating during the pretest for both experimental and control groups. However, after the experimental group was exposed to SIM and the control group to SLM, the results showed in the post-test that pupils in the experimental group from Pedro Geverola Lucero ES obtained a "very satisfactory" rating. At the same time, those at Bito ES and Tingolo IS received "satisfactory" ratings. This quantitative finding provided sufficient evidence to reject the null hypothesis. Thus, this indicates that there were significant differences between the pretest and post-test scores among the Grade 5 Science pupils.

INTRODUCTION

The COVID-19 pandemic has yet to develop a definitive vaccine, and its global impact is being felt in various sectors of society. Although it has had a significant effect on the medical transactions of hospitals and health institutions, as well as the economic setup of every country, it has not spared education from its reach.

The most common dilemma of elementary teachers nowadays is the difficulty of teaching Science lessons to the pupils. Due to this difficulty, pupils had a low academic performance. Hence, DepEd Order No. 35, series of 2016, encourages the use of Strategic Intervention Materials to foster the learning of pupils, particularly those who perform poorly. Sinco (2020) mentioned that SIM as an intervention is reasonably successful in addressing pupils' trouble learning Science topics.

SIM is an innovative teacher-made instructional material that is intentionally designed to fit the pupils' level of understanding, allowing them to learn easily. SIM offers a variety of activities that can capture the focus and eagerness of pupils. Topics are implemented through a series of exercises that are driven by self-learning guidance to prevent misconceptions. Each assessment is carefully structured to ensure that goals are consistent with its evaluation.

Despite all the teaching strategies implemented by teachers, more than 70% of the total enrollment have difficulties in learning Science, based on actual classroom experiences in previous years. To support students in their struggles with learning science, the researcher proposed this study.

Objectives of the Study

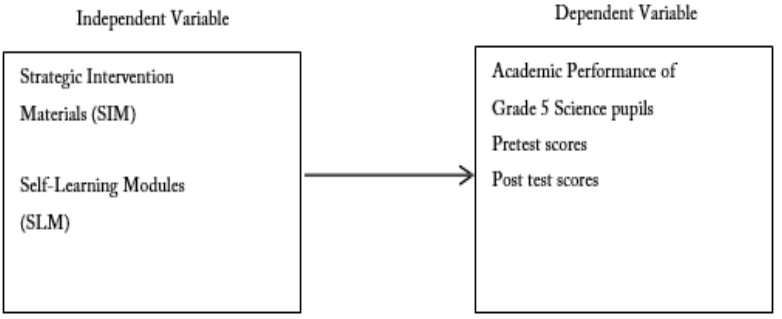
This study aimed to determine the efficacy of Strategic Intervention Materials (SIM) in Science teaching among the Grade 5 pupils in the three selected public elementary schools in Davao Occidental. Moreover, this study also sought to answer the following questions:

1. Determine the pretest scores of Grade 5 Science pupils from the identified elementary schools;
2. Determine the post-test scores of Grade 5 Science pupils from identified elementary schools;
3. Determine the effectiveness of SIM in the academic performance of Grade 5 Science pupils from the identified elementary schools;
   3.1. Determine the significant difference between the pretest and posttest scores of Grade 5 Science pupils from different elementary schools;
   3.2. Determine the significant difference between the pretest and post-test scores of the experimental and control groups from the identified elementary schools; and
   3.3. Determine the significant difference between the performance

of Grade 5 Science pupils using Strategic Intervention Materials (SIM) and Self-Learning Materials (SLM).

Conceptual Framework

Figure 1
The schematic diagram shows the relationship between the dependent and independent variables of the study.



The conceptual framework outlined the study's direction and the relationships between the variables. The independent variable was the Strategic Intervention Materials and Self-Learning Module, while the dependent variable was the academic performance of Grade 5 Science pupils. The framework explained that the utilization of SIM and SLM affected the educational performance of the Grade 5 Science pupils.

MATERIALS AND METHODS

Research Locale

The study was conducted at Bito Elementary School, Pedro Geverola Lucero Elementary School (formerly New Argao Elementary School), and Tingolo Integrated School, all of which were part of the Malita East District in Malita, Davao Occidental. Pedro Geverola Lucero Elementary School was established on January 19, 1970. Currently, it has a total of 359 enrolments with 11 teaching personnel. Tingolo Integrated School was built on December 3, 1959. It had 340 enrolled pupils and 20 teaching personnel. Bito Elementary School was founded on April 23, 1905. It has a total of 237 enrolments and 10 teaching personnel. These identified elementary schools were described as remote elementary schools of the Malita East District, Division of Davao Occidental. Two of the schools were located in coastal areas, while the other was situated in an upland area inhabited by the Tagacaulo, Manobo, and Blaan tribes. Generally, transportation and communication were accessible. Moreover, the area had a sufficient power supply.

Research Design

This study used a quasi-experimental design. It was administered to two groups, the experimental (using SIM) and the control group (using SLM). Each school had only one section of Grade 5 pupils. Pupils who obtained 75-79% marks in science five were selected to participate in the study.

Sampling Design and Technique

72 Grade 5 pupils had a science grade of 75-79% based on the first grading class records of science teachers. Twenty-four pupils were from Bito Elementary School; 28 pupils were from Pedro Geverola Lucero Elementary School, and 20 pupils were from Tingolo Integrated School. Each class was divided into two groups: the experimental group and the control group.

For Pedro Geverola Lucero Elementary School, the researcher prepared 28 pieces of a quarter sheet of bond paper. Out of the 28 quarter-cut bond papers, 14 pieces were marked as "control group". The other 14 pieces were marked as "experimental group". These pieces of paper were mixed and put into a box. Each pupil was asked to determine which group they belonged to. The researcher used the same method for Tingolo Integrated School and Bito Elementary School. The selected pupils were gathered at a scheduled time since there were no face-to-face classes.

The research instrument was validated by the three master teachers who were teaching in the Malita East District. They were given validation sheets, together with samples of SIM, pretest, and post-test questionnaires. Pilot testing was conducted on the 10 randomly selected pupils. This was done to ensure the test of the face.

And the internal and external validity of the instrument.

Table 1. *Distribution of samples and respondents of the study*

School	No. of Sections (Grade 5)	Total Enrolment	Actual No. of Low-Performing Pupils (1st Quarter)	Total No. of Pupils
Bito Elem Sch	1	46	24	24
Pedro G Lucero Elem Sch	1	43	28	28
Tingolo Integrated Sch	1	30	20	20
TOTAL	3	109	72	72

Respondents of the Study

The respondents of this study were the low-performing Grade 5 Science pupils who obtained a grade of 75-79% during the first grading period. The grades were determined based on the level of progress reported in DepEd Form 138-E, as outlined in DepEd Order No. 008, series of 2015. The participants were divided into two groups: experimental and control.

Research Instrument

Before conducting the study, the researcher requested the quarter 1 class records from the Grade 5 Science teachers of each school. This was done to identify the pupils who were performing poorly.

The topics in Quarter 2, Science 5 MELC, focused on the parts of the human reproductive system and its functions. In making the SIM, the researcher identified the least mastered competency. Fortunately, elementary Science subjects had already identified the least mastered competencies in every grading period. Since the study was conducted in quarter 2, the researcher chose a topic as the basis for the Strategic Intervention Material.

To test the reliability of the research instrument, the researcher conducted a pilot test on the material on 10 selected Grade 5 pupils. The results were analyzed and interpreted with the assistance of a statistician to validate the research instrument.

Data Analysis

All data gathered were encoded, tallied, tabulated, analyzed, and interpreted accordingly.

Table 1. *To determine the academic performance of the learners, the researcher used the following rating scale*

Descriptor	Percentage Score (DepEd Order No. 8, s. 2015)	Range of Scores (20 Items)	Verbal Description
Outstanding	84.00-100.00	16.8-20.00	The academic performance of the pupils in science is exemplary.
Very Satisfactory	76.00-83.99	15.20-16.79	The academic performance of the pupils in science is very satisfactory.
Satisfactory	68.00-75.99	13.60-15.19	The academic performance of the pupils in science is satisfactory.
Fairly Satisfactory	60.00-67.99	12.00-13.59	The academic performance of the pupils in science is pretty satisfactory.
Did not meet expectations	0.00-59.99	0.0-11.99	The academic performance of the pupils in science did not meet expectations.

Data Gathering Procedure

In gathering the data, the researcher observed the following:

First, the researcher wrote a formal letter addressed to the Schools

Division Superintendent to ask permission to conduct the study. Also, formal letters were sent to the Public Schools District Supervisor and the School Principals of Bito Elementary School, Pedro Geverola Lucero Elementary School, and Tingolo Integrated School.

Second, the Strategic Intervention Materials were validated by three experts. The researcher wrote another formal request letter to the validators. Daily Lesson Logs (DLL) were also used as a guide for the lessons, which were validated by the school heads of the three selected elementary schools.

Due to COVID-19, face-to-face meetings were not yet possible. The researcher conducted the study in accordance with the basic health protocols mandated by the Municipal Inter-Agency Task Force (MIATF). The researcher visited each identified pupil in their respective houses. The researcher conducted a brief orientation regarding the module and the SIM. After the orientation, the researcher conducted a five-minute pretest for both the experimental group and the control group, before administering the SIM to the experimental group and the module to the control group. The integration for the experiment was conducted from 8:30 to 9:30 a.m. on Mondays, Wednesdays, and Fridays. At the same time, the non-integration of Strategic Intervention Materials continued for the control group from 9:30 to 10:30 a.m. on the same days. The study was conducted over 60 minutes for both the experimental and control groups.

Lastly, at the end of the implementation of the SIM and the module, the post-test was conducted. Tabulated data were given to a statistician for interpretation.

Ethical Considerations

The following ethical guidelines were put in place during the conduct of the study:

1. The dignity and welfare of the respondents were protected at all times.
2. Consent was obtained from the respondents before the conduct of the study.
3. The privacy and anonymity of the respondents were protected.
4. Deception or exaggeration of the results of the study was avoided.

Statistical Analysis

In the data tabulation, the researcher used the following statistical tool: One-Way ANOVA. One-way Analysis of Variance was used in testing the

significant difference in the pretest and post-test scores of pupils from the three identified elementary schools. It was found significant; hence, Tukey's Honest Test of Significant Difference was used.

Paired t-test. This tool was used to find a significant difference between the pretest and post-test scores of the control and experimental groups. Analysis was done using Microsoft software, SPSS version 20.

RESULTS AND DISCUSSION

Pretest mean scores of experimental and control groups

The results indicated that before the Strategic Intervention Material (SIM) was given to the experimental group and the Self-Learning Module to the control group, pupils from both groups displayed poor performance in the intended learning competency. Likewise, both groups obtained a descriptive rating of "did not meet expectations". These findings were supported by Villonez (2018), who asserted that the effect of any strategy or material on the academic achievement of students in any written course was found to be non-significant in the pretest scores of the experimental and control groups. Furthermore, the study by Herrera and Soriano (2016) elicited similar results, finding that both the control and experimental groups performed poorly during the pretest.

Table 2. *Pretest scores of experimental and control groups*

School	Groups	Mean	Percentage Score	Standard Deviation	Descriptive Rating
Bito ES	Experimental Control	7.33 5.83	36.67 29.17	± 2.15 ± 2.12	Did not meet expectations
Pedro G Lucero ES	Experimental Control	6.93 6.69	32.64 31.07	± 2.40 ± 2.28	Did not meet expectations
Tingolo IS	Experimental Control	6.20 7.90	27.27 22.73	± 2.93 ± 2.47	Did not meet expectations

Post-test scores of experimental and control groups

The numerical figure indicated in the performance of both groups of pupils had increased in the post-test compared to the results of the pretest. However, it was evident that the experimental group performed better than the control group, with the highest percentage score of 79.64, which was described as "very satisfactory". These outcomes of the analysis align with the results revealed in Herrera and Soriano's (2016) study, which found that the utilization of SIM was effective in improving the least-learned competency of learners, as evidenced by a significant increase in the respondents' post-test scores. On the other hand, the post-test results in the study were similar to those of Gabacan and Sanchez (2021), Miguel (2012), and Soberano (2011), where the post-tests of the experimental group increased evidently after the use of SIM.

Table 3. *Post-test scores of experimental and control groups*

School	Groups	Mean	Percentage Score	Standard Deviation	Descriptive Rating
Bito ES	Experimental Control	14.42 08.92	72.08 44.60	± 2.15 ± 3.63	Satisfactory Did not meet expectations
Pedro G Lucero ES	Experimental Control	15.93 10.31	79.65 51.55	± 1.38 ± 1.97	Very Satisfactory Did not meet expectations

Comparison between the pretest and post-test scores of the experimental group (SIM) and control group (SLM) among the Grade 5 Science pupils

These quantitative findings provided sufficient evidence to reject the null hypothesis. This indicated a significant difference between the pretest and post-test mean scores in Grade 5 Science pupils who were exposed to and not exposed to SIM. The experimental group in each school had a higher mean score in the post-test than the control group. There was a significant increase in the mean scores between the classes. This means that pupils exposed to SIM performed better. Furthermore, these results were in coherence with the study by Sinco (2020), which found an improvement in pupils' performance after the introduction of SIM. This study has yielded similar results to those of Kempar (2016) and Suarez (2020), and it also demonstrates the same findings.

These findings were similar to those of Soberano (2011) and Togonon (2011), who found that students exposed to SIMs performed better on the post-test than on the pretest. In addition, the study by Sinco (2020) found a significant difference between the students' pretest and post-test performance, indicating that the utilization of SIM was an effective intervention that enabled students to achieve better scores.

Table 4. *Comparison of pretest and posttest scores of experimental and control groups*

School	Groups	Mean	T-value	P-value	Decision
Bito Elem Sch	Experimental Control	64.17 48.58	4.78	0.000	Reject Ho3
Pedro G Lucero Elem Sch	Experimental Control	68.07 44.92	3.49	0.002	Reject Ho3
Tingolo Integrated Sch	Experimental Control	68.40 42.70	5.14	0.000	Reject Ho3
Over All	Experimental Control	66.86 45.54	6.98	0.000	Reject Ho3

Analysis of the performance of pupils using Strategic Intervention Materials (SIM) and Self-Learning Module (SLM)

The result of the analysis of pupils' performance using SIM and SLM is presented in Table 5. The table shows that pupils from Pedro Geverola Lucero Elementary School who used SIM attained a "very satisfactory" rating, while the other schools achieved a "satisfactory" rating. However, pupils using SLM got "did not meet expectation" rating results. These results were in coherence with the study of Sinco (2020) and Suarez (2020). Likewise, Kempar (2016) found that using SIM escalates the academic performance of pupils compared to traditional learning methods.

Table 5. *Analysis of Pupils' Performance using Strategic Intervention Materials* (SIM) and Self-Learning Modules (SLM)

School	Groups	Mean	Standard Deviation	Percentage Score	Descriptive Rating
Bito ES	SIM SLM	64.17 48.58	8.22 7.75	72.08 44.58	Satisfactory. Did not meet expectations.
Pedro G Lucero ES	SIM SLM	68.07 44.92	7.82 23.51	79.64 47.86	Very Satisfactory. Did not meet expectations
Tingolo IS	SIM SLM	68.40 42.70	4.33 15.21	72.73 35.91	Satisfactory. Did not meet expectations.
Over All	SIM SLM	66.86 45.54	7.25 16.78	74.82 42.78	Satisfactory. Did not meet expectations.

Conclusion

Based on the findings collected, the researcher formulated the following conclusions:

1. The effect of any strategy or material on the academic achievement of students in any written course was found to be non-significant in the pretest scores of the experimental and control groups.
2. SIM increases the academic performance of a pupil compared to traditional learning methods.
3. Utilization of SIM is an effective intervention that has enabled students to obtain better scores. Therefore, SIM is an effective intervention material to address the learning difficulties of Grade 5 Science pupils.
4. The results manifest that pupils perform better using SIM as an intervention.

RECOMMENDATIONS AND IMPLICATIONS

Recommendations

Based on the findings and conclusions drawn from the study, the following are recommended:

1. Use SIM on the least learned concepts in the Science subject.
2. Utilize SIM as remedial materials to enhance and improve academic performance, particularly among low-performing pupils.
3. Future researchers could conduct a similar study with a broader focus on the use of SIM in other disciplines to confirm the findings and conclusions presented in this study.

Implications

Strategic Intervention Material is an effective aid in improving academic performance, particularly for low-performing students in science or other subject areas within the curriculum. Its efficacy has already been proven by several studies conducted worldwide. This implies that SIM may be used in Science subjects to help pupils cope with the least mastered competency. Hence, SIM assists pupils in developing fundamental knowledge, skills, and understanding of challenging topics in Science.

It is highly recommended that, with the implementation of SIM, the school administration and teachers continually upgrade their teaching strategies to meet the evolving needs of learners. Teachers may learn to innovate, revise, or invent new teaching approaches so that learners find learning an exciting experience. Indeed, this study suggests that educational institutions may continually challenge teachers to refine their pedagogical approaches by periodically updating their lesson plans, syllabi, and modules.

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