



RESEARCH PAPER

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Evaluating the effectiveness of the teacher-created science strategic intervention materials on enhancing grade 12 student performance in descent with modification

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Abstract

The study aimed to determine the effectiveness of the teacher-made science strategic intervention materials to enhance the academic performance of the Grade 12 students in intervening the least learned competency focusing on the descent with modification topic. The respondents consisting of fifteen students (15) were given an intervention on the identified lowest least-learned competency. The fifteen (15) items of a teacher-made questionnaire in pre-test and post-test were used in collecting data for the study. The study revealed a significant difference between the pre-test (45.33) and post-test (75.56) scores of the respondents in the descent with modification topic having a t-test score of -7.41 at .000 significant level of performance. This implies that the strategic intervention material (SIM) was significantly effective in intervening the least learned competency in Biology II subjects.

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Introduction

The purpose of including science in the curriculum is to attain a level of "scientific literacy" among the populace to allow them to engage as members of contemporary societies. The goal of science is to provide every Filipino student with a useful comprehension of scientific ideas and concepts applied to actual circumstances, as well as get scientific abilities, perspectives, and principles required to assess and resolve daily issues (A Framework for K-12 Science Education Practices, Crosscutting Concepts, and Core Ideas, 2012). Teachers can use assessment data to create individualized plans for struggling students, thereby personalizing a student's learning journey (Diaz, 2023). By leveraging assessment data, educators can tailor instruction to meet the specific needs of each student, fostering a more effective learning environment.

The Department of Education (DepEd) has lobbied for the modification of the laws as part of the government's efforts to address the perceived requirements of the education sector. They use the "Enhanced K to 12 Basic Education Program" to implement a basic education curriculum (Capate and Lapinid, 2015). Teachers must be sufficiently creative to meet the needs of their students considering the changes to the basic education curriculum. To raise the standard of education in the Philippines, educators must work twice as hard. DepEd also recommended a curriculum known as Strategic Intervention Material (SIM) after considering these factors. The purpose of introducing this educational material was to enhance students' performance across several subject areas. Its main goal is to support elementary and secondary students' successful learning in public schools. In addition, the teachers received training and a workshop on creating this instructional material through the DepEd Memorandum No. 117, series of 2005.

Strategic Intervention Materials (SIMs) in science are instructional materials designed to improve the academic performance of learners. These materials

are used to teach basic concepts and skills, particularly in areas where students may have difficulty mastering competencies during regular classroom activities. SIMs are created based on the learning competencies that students need to improve and are intended to increase their academic performance in science. They can be in various formats, including electronic materials, and are used to aid both traditional and online learning. Studies have shown that SIMs can be effective in improving the academic performance of learners in science (Acera, 2022).

The first quarter examination results show that the achievement rate for grade 12 students in the Magpayang National High School, School Year 2023–2024 is 10%, which is less than the 75% passing rate. This demonstrates that remedial instruction on a regular basis, more teaching resources, and instructional techniques like peer grouping are insufficient to remedy low performance in certain areas (Dy, 2011). Nevertheless, having enough and readily available instructional resources makes science instruction more effective. It is the duty of the science teacher to provide and supply the resources needed for science classes.

This study aims to find out the effectiveness of using Strategic Intervention Material (SIM) in intervening with the least learned competency in Biology II subject focusing on descent with modification. Specifically, this study sought to answer the following questions: 1. What are the least learned learning competencies in Biology II for the first quarter of the school year 2023-2024? 2. What is the level of performance of the students as measured in pre-test and post-test? 3. Is there a significant difference between the pretest and post-test of the students after using the Strategic Intervention Material (SIM)?

The purpose of this study was to determine the effectiveness of teacher-created science Strategic Intervention Material (SIM) to intervene the least-learned competency in Biology II subject focusing on descent with modification topic. This was conducted

at Magpayang National High School in the first quarter of the school year 2023-2024. Thirty (30) grade 12 students were the study's respondents. To address the research topics, a one-group pre-test-post-test research design was used. Furthermore, a 15-item test questionnaire created by the researcher was used to evaluate the student's performance.

Materials and methods

Pre-test and post-test experimental designs were used in the classroom study design. The use of strategic intervention material (SIM) to remediate learners' needs, particularly those of the least mastered skills in Biology II subject, was highlighted. It attempted to ascertain whether the teacher-made SIM is a useful tactic to improve the science performance of students in Grade 12.

The least learned competencies from the first quarter examination in Biology II for Grade 12 students were identified using test item analysis. Among the least learned competencies, the lowest least learned competency was selected as the basis of the researcher in making Strategic Intervention Material (SIM). The researcher prepared a Science SIM based on the format and requirements of the Department of Education.

A pre-test was administered to determine the level of performance of students on the identified lowest learned competency. After the pre-test scores had been gathered, the students were given remedial lessons using the researcher-made SIM. After one (1) week of remediation, the post-test was administered to determine the effectiveness of using SIM in intervening least learned competency focusing on descent with modification topic. Researcher-made questionnaire in pre-test and post-test consisting of 15 items was used.

Results and discussion

The test item analysis for the respondents' First Quarter Examination results in Biology II is displayed in Table 1. As can be seen, item 27 was marked as not mastered. Item number 27 which explains the

mechanisms (such as artificial selection, natural selection, genetic drift, mutation, and recombination) that cause population changes from generation to generation, falls into the lowest MPS percentage category with just 10% of the population having competency (STEM_BIO11/12/-IIIc-g-9).

Table 1. Test item analysis on the first quarter examination result of the respondent

Test item analysis on the first quarter examination result of the respondent	
Number of students tested	30
Total correct responses	667
Arithmetic mean	13.34
Mean percentage score	44.47%
Least learned competency	
Item number	27
Number of correct responses	3
Mean percentage score	10%
Learning competency	Explain the mechanisms that produce change in populations from generation to generation (e.g., artificial selection, natural selection, genetic drift, mutation, recombination) (STEM_BIO11/12/-IIIc-g-9)

Table 2. Proficiency level of pre-test and post-test scores of respondents

Interval	Level of performance	Pre-test		Post-test	
		f	%	f	%
11-15	Proficient	1	3.33%	20	66.67%
6-10	Nearly proficient	15	50%	10	33.33%
1-5	Not proficiency	14	46.67%	0	0%

f= Frequency, %= Percentage

Table 3. Test for significant difference

Variable	Mean	T-value	p-value	Remarks
Pre-test (45.33) and Post-test (75.56)	-4.53	-7.41	.000	Significant

Table 2 presents the level of performance of the students in pre-test and post-test. As presented, the pre-test results show that the majority (50%) of the respondents are in a "nearly proficient" level of performance on the chosen learning competency which explains the mechanisms that produce change in populations from generation to generation (e.g.,

artificial selection, natural selection, genetic drift, mutation, recombination). 46.67% are in the “not proficiency” level of performance while one of them was “proficient” level of performance got 3.33%. However, the post-test results show an increase in the performance of the students because of the intervention given using Strategic Intervention Material (SIM) which was made by the researcher. It can be observed that the majority (66.67%) of the students are in the “proficient” level of performance which means they got a mean percentage score of 75.56 means moving towards mastery. On the other hand, it can also be noted that the remaining 33.33% are at a “nearly proficient” level of performance.

The results imply that there is a significant increase in the level of performance of the respondents after the administration of SIM as intervention material. As implied, the majority (66.67%) of the respondents were able to be proficient in the learning competency after conducting remediation using SIM. The researcher found that there was a higher positive transfer of learning after the presentation of the Strategic Intervention Materials.

Table 3 shows that the students' pre-test having 45.33 mean and post-test having 75.56 mean results differ significantly from one another. The paired differences have a mean of -4.53. This shows the typical difference between the pre-test and post-test results. T-value is equal to -7.41. It suggests more solid evidence refuting the null hypothesis. There is a 0.000 p-value. Given the extremely low p-value, there is compelling evidence to refute the null hypothesis. A p-value is deemed statistically significant if it is less than a predetermined significance level, which is often 0.05. A p-value of 0.000 indicates that it is extremely unlikely that the differences that were observed were the result of pure chance. Together with an extremely low p-value, the negative t-value indicates that there is evidence to refute the null hypothesis. This implies that there is a significant difference between the pre-test and post-test measurements.

It can be pointed out that students perform better in the post-test compared to the pre-test. This implies that the use of Strategic Intervention Material (SIM) as an intervention material helps students in mastering the least learned learning competency in Biology II. In addition, using strategic intervention material, the students will have better retention of facts and concepts which will help them improve their academic performance. In addition, Bunagan (2012) defined Strategic Intervention Material (SIM) as meant to reteach the concepts and skills that were least mastered. In other words, it is material given to students to help them.

Recommendation(s)

Based on the findings of this study, the researcher hereby made the recommendations is given below. Science teachers can use the Strategic Intervention Material made by the researcher to re-teach the concepts and skills and help the students to master the learning competency. Strategic Intervention Materials for other subjects should be made to intervene in the least learned competency. Researchers may conduct a similar study covering a bigger number of respondents in another venue.

References

Acera FS. 2022. The use of strategic intervention material in science (SIM-S) in improving the academic performance of the learners. *International Journal of Arts and Social Science* 5(4), 69-77.

A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. 2012.

<http://www.nap.edu/read/13165/chapter/115>

Bunagan F. 2012. Strategic Intervention Material. Retrieved March 22, 2018.

<http://www.Slideshare.Net/Felixbunagan/Strategicinterventionhttp://84.22.166.132/Learning-And-Teaching-Guide/Deep-And-surfaceapproachesLearning.html>

Capate RN, Lapinid MR. 2015. Assessing the Mathematics Performance of Grade 8 Students as Basis for Enhancing Instruction and Aligning with K to 12 Curriculum. Retrieved March 28, 2018.

Diaz A. 2023. How to Utilize Assessment Data in the Classroom. August 14, 2023.

Dy S. 2011. Instructional Materials in Teaching Science: recent British experience, Journal of Classroom Teaching **33**, 5, 29-44.