

Utilization of Strategic Intervention Material (SIM) in Teaching Biology

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Abstract

This study was conducted to describe the experiences of the Science teachers teaching Biology in utilizing the Strategic Intervention Material (SIM) and to find out if there was a significant increase in the academic performance of the students using the SIM in Kabasalan National High School, Division of Zamboanga Sibugay, within the academic year 2022–2023. SIM is a tool for remediation and a strategy to deepen the students learning. The researcher used interviews and observational procedures to gather information. For the interview, the type of interview procedure the researcher employed was an interview guide approach. There were key questions asked of the participants, though. These key questions were identified, and follow-up questions were asked to further probe the responses of the teachers. For the observational procedure, the researcher used the observer-as-participant approach. The participant-observer took on the role of observer much more than the role of participant. This study found that SIM enhances students' interest as well as their retention of the lesson. Based on the data gathered, four (4) themes emerged: SIM as supplemental learning material, SIM as an intervention, SIM as quality assurance, and SIM as academic performance enhancement. The researcher used the pretest and post-test to determine the student's academic performance enhancement and analyzed the results using the paired-sample t-test. The results showed that there was a significant increase in the student's performance from the pretest to the posttest. The SIM was deemed beneficial in upgrading students' learning of the subject's content and increasing their academic performance.

Keywords: strategic intervention material, supplementary learning material, intervention, quality assurance, academic performance enhancement



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INTRODUCTION

Education plays a significant role in improving the lives of each individual, especially the youth, by equipping them with essential knowledge and skills for lifelong learning and employment. To help students achieve their goals, educators are continuously innovating teaching methods and integrating inquiry-based approaches to make learning more meaningful and practical.

The implementation of various pedagogical methods, strategies, and approaches is particularly beneficial for students who struggle with understanding lessons, especially in science – a subject many find challenging. The Department of Education (DepEd) has noted that Zamboanga Sibugay consistently ranks among the lowest in mean percentage scores (MPS) since 2014. Furthermore, the COVID-19 pandemic exacerbated these challenges, as schools primarily relied on modular learning, distributing modules written by teachers from various regions. However, these modules often

lacked contextual relevance, making comprehension difficult for students.

To address these issues, educators have employed strategies to foster students' learning and comprehension. One of the strategies mandated by the Department of Education is the use of Strategic Intervention Material (SIM) in the classroom. These materials served as supplementary resources during the pandemic, written by local teachers who understood the specific needs and context of their students.

With the current issues of equality in education we have today, it is imperative for teachers to develop an innovative way of delivering quality instruction. The creation of SIMs is one such innovation, designed to engage students with fun and exciting lessons in alignment with the DepEd curriculum. According to Salviejo et al. (2014), SIMs are instructional materials aimed at remediation helping to boost the academic performance of students struggling in science and technology. Dacumos (2016) further explains that SIMs provide the necessary

support for learners to improve in their respective subjects.

Hence, this paper aims to explore the application of Strategic Intervention Material (SIM) by secondary science teachers at Kabasalan National High School. It seeks to analyze how science teachers integrate SIM into their classes, assess the validity of the SIM used, and evaluate whether the implementation of SIM results in a significant improvement in student performance at Kabasalan National High School.

LITERATURES

Strategic Intervention Material (SIM) as Supplementary Learning Material. Supplementary materials help motivate learners (Dodd, 2015) by creating interest in the learning and encouraging them to use the language in the class. It was utilized in the classroom to provide additional learning to the students and to help them deeply understand the lesson being taught.

Bunagan (2012; as cited in Dacumos, 2016), defined Strategic Intervention Material as material provided to students to aid learning by re-teaching least-mastered concepts and skills that were not developed during regular class sessions. It has both learning strategies and content enhancements. It is a multifaceted approach that develops students into independent learners.

SIM focuses on the skills not mastered by students during regular classes. A SIM may have six parts: a title card, a guide card, an activity card, an assessment card, an enrichment card, and a reference card. Saclao (2016) stated that SIM has many purposes. Some of them are: to make instruction individual; to give a conceptual model for learning that will lessen the need for conventional, verbalized, instructional techniques; to enable teachers to provide the analysis of the learning process; to develop instruction through improved evaluation, resulting from the formulation and measurement of learning outcomes expressed

in measurable terms; and to permit learning to occur outside the presence of the teacher.

SIM as an Intervention. Many science concepts, especially in biology, can be perceived as difficult to learn by secondary school students. These include water transport in plants, protein synthesis, respiration, photosynthesis, gaseous exchange, energy, cells, mitosis, and meiosis, organs, physiological processes, hormonal regulation, oxygen transport, genetics, Mendelian genetics, genetic engineering, and the central nervous system. And so, to make science concepts more interesting, strategic intervention materials are used (Cimer, 2011). According to Salviejo et al. (2014), strategic intervention material (SIM) is material for instruction in remediation. It is one of the solutions used by the Department of Education to foster and develop the academic achievements of students performing not so well in the field of science and technology.

Castaneda (2017) stated that the issue will be considered resolved if the shortcomings in science education, particularly those connected to environmental education, are addressed. One of the finest ways to help students avoid the stress that usually comes with learning science subjects is to have a remedial class.

SIM as Academic Performance Enhancement. According to Narad and Abdullah (2016), academic performance is the knowledge gained that is assessed by marks by a teacher and/or educational goals set by students and teachers to be achieved over a specific period of time.

The study of Gultiano (2012) entitled "The Effect of Strategic Intervention Material on the Student's Academic Achievement in Chemistry," which utilized the experimental design, found that the experimental group where SIM was integrated has performed significantly better in the post-test. Gultiano (2012) found that the use of strategic intervention materials is effective in mastering the competency-based skill in chemistry, based on the mean gain scores in the posttests of the experimental and control groups.

Salviejo et al. (2014) conducted a study on the Strategic Intervention Material-Based Instructional Learning Approach and students' performance in chemistry. The objective of their study is to investigate the effects of strategic intervention and material-based instruction on the performance of students in high school chemistry. They utilized the pretest-posttest experimental design. In their study, it was found that most of the students find the use of strategic intervention materials for teaching effective and that students appreciated chemistry more after they were exposed to this kind of strategy.

Saclao (2016) conducted a study on the development and impact of SIM-MOD (Strategic Intervention Material and Module Combined) on students' academic achievement in mathematics at the 8th grade level. In his study, he used a quasi-experimental design along with interviews with open-ended questions. In his study, it was revealed that there has been a pattern in the preferences of the participants with regard to the use of the strategic intervention program on rational algebraic expression and that the majority of the participants appreciate the use of the intervention program in mastering skills in Grade 8 mathematics, making it a valid learning material.

Another study was conducted by Diaz and Dio (2017) on the effectiveness of Tri-in-1 strategic intervention materials for grade 9 students through Solomon's four-group design, wherein they used a quasi-experimental design in this study. Their study aims to determine the effectiveness of Tri-in-One SIM in 9th grade mathematics. The study revealed that the use of Tri-in-One SIM is more effective than using the Mathematics Learners' Guide 9.

Based on the study of Villar et al. (2022) on the academic performance of grade V pupils using Science Strategic Intervention Material in Zambales, Philippines, it revealed that on the posttest assessment, the majority obtained scores ranging from 17 to 20, with 54 or equivalent to 81.80%. The computed mean of the assessment was 17.62, interpreted as

outstanding." The result of the analysis pointed out that the results of the post-assessment obtained a greater mean gain score than during the pretest administration. Thus, students performed better in the posttest.

In the study conducted by Dacumos (2016) on the perspective of secondary teachers in the utilization of science SIM in increasing the learning proficiency of students in science education, he employed descriptive phenomenology as his research design. His study aims to study the perspective of secondary teachers on the utilization of Strategic Intervention Material (SIM) on the learning proficiency of students in science education. In his study, it was revealed that SIM integration has played an important role in teaching, especially in increasing the proficiency level of students whose performance in science education is at lower levels, and that with the appropriate curriculum-based, strategically planned, and creatively crafted SIM integration in classroom practice, teaching science and facilitation will become effective in helping students grasp and appreciate more science concepts.

METHODS

Research Design. This study employed a qualitative research approach using a descriptive research design. It aimed to examine the experiences of teachers at Kabasalan National High School in Zamboanga Sibugay regarding the use of Strategic Intervention Material in teaching biology. Additionally, a quantitative component was integrated through the use of pretests and posttests to further investigate and reinforce the science teachers' insights into teaching biology.

Population and Sampling. Secondary science teachers in Kabasalan National High School were observed and interviewed to gather information on their utilization of the science SIM. The sample size in this study was eight (8) science teachers who were chosen through purposive sampling. For the participant to be eligible in this study, he or she should be a

junior high school teacher at Kabasalan National High School who has experience utilizing SIM in any of his science classes. The reason for setting these criteria was for the participants to provide relevant perceptions of their experiences in the utilization of the intervention material. Further, Grade 7 students were selected to be part of this study. Since all sections are heterogeneous, they were chosen via cluster random sampling. There were 159 students who took the pretest and posttest. Only students' scores in the pretest and posttest were used for statistical data and analysis, and no other information was gathered from them.

Instrumentation. The researcher used interview and observational procedures to gather information. For the interview, the type of interview procedure the researcher employed was an interview guide approach. Topics and issues covered were specified in advance, in outline form. There were key questions asked of the participants; however, even if these key questions were identified, follow-up questions were asked to further probe the responses of the teachers during the interview. For the observational procedure, the researcher used the observer-as-participant approach. The participant-observer took on the role of observer much more than the role of participant. The participants were fully aware that they were part of a research study (Johnson & Christensen, 2017). There were 8 science teachers that were interviewed for this study. They were chosen through purposive sampling. This was for qualitative research.

Further, during the observation, the teacher conducted a pretest and posttest for the class. For the dependent samples in the pretest and posttest, a t-test was used to compare the means of the two samples. There are 414 students in the Grade 7 curriculum, which is divided into 10 sections. The researcher utilized cluster random sampling since all sections are heterogeneous. This was for quantitative research.

Data Gathering Procedure. Initially, the researcher secured permission from both the

school head and the participants. A two-step data collection process was implemented: an invitation letter outlining the research purpose and the participants' roles was sent to the school head and science teachers. Upon receiving consent, observations and interviews were scheduled according to the participants' availability, with the option to decline participation at any time.

Following approval, the researcher conducted class observations to examine how SIM was utilized. To ensure comprehensive data capture, the researcher employed both audiotaping and videotaping, as relying solely on field notes was deemed insufficient.

Cluster random sampling was used due to the heterogeneity of the sections. The pretest and posttest, observation rubrics, and interview questions were reviewed and validated by the Master Teacher, School Head, District Supervisor, and Education Program Supervisor in Science. The validated pretest and posttest comprised 15 items as specified in the table of specifications.

In-depth interviews with the participants were conducted next, using open-ended questions to allow detailed responses about their experiences with SIM in classroom instruction. Follow-up questions were employed to delve deeper into the teachers' responses. These interviews were recorded to ensure complete information capture.

The recorded observations and interviews were transcribed individually to create detailed texts. The transcriptions were completed promptly after data collection, and field notes were reviewed and corrected immediately to maintain accuracy. Participant identities were coded to ensure anonymity, and all data was kept confidential.

Data Analysis. The pretest and posttest questionnaires were reviewed and validated by the Master Teacher, School Head, District Supervisor, and Education Program Supervisor in Science. These questionnaires were incorporated into the Strategic Intervention

Material. Additionally, the observation rubrics and interview questions were validated by the same individuals. To analyze the pretest and posttest data, a paired t-test was utilized to compare the means of the two sets of data. For the observation and interview data, the researcher employed thematic reduction, categorizing similar themes and unifying ideas to highlight significant points or statements made by participants. The emerging themes were then verified through correspondence with participants to ensure the accuracy and consistency of transcription and interpretation, as recommended by Lincoln and Guba (1985). This process aimed to ensure the accuracy, credibility, and reliability of the collected data.

RESULTS

Table 1
Students' Results in Pretest and Posttest

	N	Mean	SD	P	Mean Difference
Pretest	159	5.57	2.57	< .001	-4.61
Posttest	159	10.18	3.35		

In this study, there were 159 7th-grade students who took the pretest and posttest. Here, the researcher wanted to determine if there was a significant increase in the performance of the students at Kabasalan National High School using SIM. The paired samples T-test results showed that there was a significant increase in score from the pretest (mean = 5.57) to the posttest (mean = 10.18), $t(158) = -16.7$, $p .001$. This implied that there was a significant difference between the pretest and post-test because the p-value was less than the alpha, the Strategic Intervention Material was effective, and the students learned more than they did at the beginning of the instruction. The same study by Gultiano (2012), entitled *The Effect of Strategic Intervention Material on the Student's Academic Achievement in Chemistry*, utilized the experimental design and found that the experimental group, where SIM was integrated, performed significantly better in the post-test. Gultiano (2012) found that the use of strategic intervention material was effective in mastering

the competency-based skill in chemistry based on the mean gain scores in the posttests of the experimental group.

Further, based on the study by Villar et al. (2022) on the academic performance of Grade V pupils using Science Strategic Intervention Material in Zambales, Philippines, it was revealed that on the posttest assessment, the majority obtained scores ranging from 17 to 20 (54, or equivalent to 81.80% of the total possible). The computed mean of the assessment was 17.62, interpreted as outstanding." The result of the analysis pointed out that the results of the post-assessment obtained a greater mean gain score than during the pretest administration. Thus, students performed better on the posttest.

SIM Serves as Intervention. Intervention is identified as a formal process for helping students who are struggling where research-based instructional approaches are implemented around very specific skill deficits and where progress is regularly tracked.

"More than a learning material, SIM is one of the interventions I am employing especially to those who cannot go to school regularly due to distance..."s- P1

"SIM is one of the interventions I am using..." - P2

Here, the teachers utilized SIM as an intervention for remediation. Remedial education is assigned to assist students in order in achieving expected competencies in core academic skills such as literacy and numeracy. As a teacher recognizes misconceptions or errors in understanding, he or she may quickly redirect students through explicit remediation of that concept. Teachers were able to determine how to bridge the gap for those students who are having a hard time understanding the lesson, those who cannot attend class regularly, and those who are living in far-flung areas. Based on the respondents' narratives, SIM bridged the gap between those concepts that were not understood and even misunderstood through remediation.

SIM Undergoes Quality Assurance. Based on the statements of these well-versed teachers, quality assurance played a vital role in ensuring that the SIM has met the established standards set by the Department of Education.

"I can say that the SIM is legit and valid because it goes through a thorough review to assure that its quality is good..." – P4

"Because it was quality assured, the SIM is really valid in a way that the students are learning the concept without any misconceptions or erratum..." – P3

According to Gillis (2019), the standards and procedures defined by a quality assurance program help prevent defects before they arise. Thus, SIM has to undergo quality assurance before it is utilized by the teacher so that students will not encounter any misconceptions and will better understand the lesson.

SIM as Academic Performance Enhancement. According to Narad and Abdullah (2016), academic performance is the knowledge gained that is assessed by marks by a teacher and/or educational goals set by students and teachers to be achieved over a specific period of time.

"...They can be of help because, if they will not be able to answer to modules especially this pandemic, it is a follow-up and it is of big help..." – P6

"SIM is of big help in the academic performance of the student because the activities are easy and can easily be understood..." – P7 (Translated from Cebuano by the author)

Based on the statements of the teachers, Strategic Intervention Material was really helpful to the learning of the students because there was a significant increase in their academic performance. Teachers were able to bridge the learning gap and were able to teach and reteach the least-learned competencies for students to master. This was also evident from the results of the pretest and posttest of the

students; there was really a huge difference in terms of their scores.

Moreover, the scores of the students for the pretest and posttest have undergone statistical treatment and analysis. Using the paired samples t-test, results were analyzed and interpreted.

DISCUSSION

The research aimed to describe the experiences of teachers at Kabasalan National High School in using Strategic Intervention Material (SIM) for teaching biology. The analysis revealed several key findings: Firstly, science teachers utilize SIM as supplementary material to facilitate learning, provide interventions, and enhance student performance. SIM is integrated into instruction to address remediation needs, particularly for challenging topics, and to enrich students' understanding of the subject matter.

Secondly, the validity of SIM is ensured through rigorous quality assurance processes, including checks and reviews by the master teacher, school head, district supervisor, and education program supervisor in science. The validity and reliability of SIM have been confirmed through these reviews, and the test questionnaire's non-normality justified the use of the Spearman Rank correlation coefficient for reliability testing.

Lastly, the paired samples T-test demonstrated a significant improvement in student scores from the pretest (mean = 5.57) to the posttest (mean = 10.18), with a $t(158) = -16.7$, $p < .001$. This significant increase indicates the effectiveness of SIM in enhancing student learning and academic performance at Kabasalan National High School.

SIM proves to be an effective tool for addressing students' needs, improving memory retention, and making the teaching and learning process more engaging. Based on the experiences of teachers who have used SIM, it is a valuable resource for remediation and boosting academic achievement. The improved test

results from pretest to posttest underscore SIM's impact on student learning.

To further support this, it is recommended that the school principal organize in-service training focused on SIM and its benefits for student learning. Developing a matrix and session guide for SIM writing, along with obtaining approval from the division headquarters, could enhance teachers' awareness and skills. Additionally, teachers should prioritize addressing least-learned competencies and participate in training sessions on creating effective SIMs to promote autonomous learning among students.

Future researchers could build on this study by exploring the effectiveness of SIM in various teaching and learning contexts, gathering student perspectives on SIM, and examining its impact on academic performance. This could provide valuable insights and serve as a benchmark for further research.

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