Utilization of Strategic Intervention Material (SIM)-based Instruction of Public Elementary School Teachers and the Academic Achievement of Learners in Science

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ABSTRACT

This study examined the utilization of Strategic Intervention Materials (SIM) by public elementary Science teachers in Kitaotao I District and its impact on learners' academic performance. SIM are remedial instructional tools designed to help learners master least-developed competencies and enhance overall understanding. Anchored on social, constructivist, and cognitive learning theories, the study employed a mixed-method design integrating descriptive-correlational quantitative analysis and qualitative thematic analysis. Quantitative data were collected from forty-eight Science teachers and 235 Grades 5 and 6 learners using survey questionnaires and academic records, while qualitative data were obtained through in-depth interviews with ten teachers to explore experiences and challenges in SIM implementation. Results revealed that teachers moderately utilized SIM-based instruction, with the reference card being the most frequently implemented and the enhancement card the least. Learners demonstrated outstanding academic achievement in Science, with a mean grade of 90, which falls under the Outstanding category based on DepEd Order No. 8, s. 2015, indicating that SIM-supported instruction may have contributed to learners' mastery of competencies alongside other instructional and contextual factors. Correlation analysis showed a significant positive relationship between teachers' use of SIM and learners' performance, confirming that systematic application of structured intervention materials enhances learning outcomes. Qualitative findings highlighted challenges encountered by teachers, including lesson planning, assessment difficulties, limited time, and gaps in professional preparedness, which influenced the consistency and effectiveness of SIM implementation. Despite these obstacles, teachers employed adaptive strategies to optimize the use of SIM in the classroom. The study underscores the value of SIM as a structured instructional resource that supports competency-based learning in Science and emphasizes the need for continuous professional development, adequate planning, and institutional support to maximize its effectiveness. Findings provide empirical evidence for strengthening instructional practices and improving learner achievement through theory-driven, resource-based interventions in public elementary education.

Keywords: strategic intervention materials (sim), science education, learner academic performance, competency-based learning, and teacher instructional practices

BACKGROUND OF THE STUDY

Strategic Intervention Materials, or SIM, are identified as remedial learning tools designed to help learners master least developed competencies after regular lessons and to improve overall understanding (Lazo and De Guzman., 2021). The use of SIM is anchored on Republic Act No. 10533, which encourages the development of locally produced instructional materials to ensure accessible and quality education for all learners. Persistent low academic performance in Science, as shown in the National Achievement Test results and district-level Mean Percentage Scores, reflects gaps in instructional strategies and materials (Department of Education, 2018). Despite these challenges, teachers in Kitaotao District I have implemented SIM during instruction and remedial sessions to support struggling learners and prevent retention. Therefore, this study aims to determine the extent of teachers' utilization of SIM-based instruction and its contribution to improving learners' academic performance (Simsek & Balaban, 2010).

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This study is further grounded on established learning theories that explain the effectiveness of Strategic Intervention Materials in improving learners' academic performance. Anchored on Vygotsky's Social Development Theory, learning is viewed as a socially mediated process where interaction and guidance from more knowledgeable others enhance cognitive development (Vygotsky, 1979). Bandura's Social Learning Theory supports this view by emphasizing learning through observation, imitation, and modeling within instructional contexts. In addition, Bruner's Constructivist Theory and Piaget's concept of learners as active constructors of knowledge highlight the need for concrete experiences, clear instructions, and meaningful activities to promote understanding (Kamii and Ewing, 1996). These theoretical perspectives collectively justify the use of SIM as structured instructional materials that scaffold learning and address least mastered competencies.

Strategic Intervention Materials are further supported by socio-cultural and instructional theories which stress the role of materials and strategies in enhancing critical thinking and classroom performance (Lawson, 1985). The Department of Education formally institutionalized SIM through DepEd Order No. 9, s. 2005 as a response to persistent learning difficulties, particularly in Science and other subject areas (Togonon, 2011). Studies have shown that SIM-based activities effectively reteach concepts and skills that learners fail to master during regular instruction (Suarez and Casinillo, 2020). However, challenges remain in the Philippine education system due to shortages in instructional materials and innovative strategies, which further justify the need for SIM development and utilization (Nalupa, 2022).

The framework of the study also incorporates the five-card set model of SIM, consisting of reference, guide or monitoring, activity, assessment, and enhancement cards, which are designed to motivate learners and improve mastery of competencies (Greenstein, 2012). This approach aligns with DepEd standards that classify mastery levels using a 75 percent national benchmark for achievement (DepEd Order No. 8, s. 2015). The schematic framework illustrates the relationship between teachers' utilization of SIM-based instruction and learners' academic achievement in Science, emphasizing that systematic and theory-driven use of SIM can lead to improved learning outcomes.

Guided by this framework, the study specifically seeks to determine the extent of public elementary school teachers' utilization of SIM-based instruction using the five-card set model, the academic achievement of learners in Science, and the relationship between SIM utilization and learner performance. In addition, the study aims to identify the challenges encountered by teachers in the development and implementation of SIM-based instruction in their classes. Understanding these challenges is essential in explaining variations in utilization and effectiveness across schools. The findings are expected to provide empirical bases for strengthening instructional practices and support systems related to SIM use. Ultimately, the study intends to contribute to improved instructional planning and learner achievement in Science within the public elementary school context.

METHODS

Research Design

The study employed a mixed-method research design that integrated quantitative and qualitative approaches to provide a comprehensive analysis of the utilization of Strategic Intervention Materials and learners' academic achievement in Science. The quantitative component used a descriptive-correlational design to determine the extent of teachers' utilization of SIM-based instruction and its relationship to learners' academic performance. Survey questionnaires and learners' Science grades served as the primary quantitative data sources. The qualitative component complemented the numerical results through in-depth interviews with ten selected teacher participants. The qualitative data were analyzed using thematic analysis to identify recurring patterns, challenges, and insights related to the implementation of SIM-based instruction.

Research Instrument

The study utilized a structured survey questionnaire and learners' academic records as the primary research instruments. The survey questionnaire consisted of two parts. The first part gathered the profile of the teacher-participants, while the second part measured the extent of teachers' utilization of Strategic Intervention Material

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(SIM)-based instruction. The instrument was adapted from Garcia (2015) and patterned after DepEd Memorandum No. 117, s. 2005, which outlines the prescribed activities involved in SIM implementation. The questionnaire covered the five SIM card sets, namely the reference, guide or monitoring, activity, assessment, and enhancement cards, with indicators reflecting teachers' classroom practices.

Prior to administration, the adapted instrument was reviewed for content clarity, relevance, and alignment with the objectives of the study. Minor revisions were made to ensure that the items were appropriate to the local instructional context and understandable to the respondents. To establish instrument rigor, the adapted questionnaire underwent content validation through expert review by Science educators with experience in SIM implementation. The reviewers evaluated the clarity, relevance, and alignment of the items with the five SIM card sets. The instrument was also subjected to internal consistency analysis to assess the coherence of items measuring SIM utilization. The results supported the use of the instrument for measuring teachers' practices in the present study. The internal consistency results indicated acceptable coherence among items measuring SIM utilization, supporting the instrument's suitability for descriptive and correlational analysis.

Learners' academic achievement data were obtained from their general average grades in Science for the School Year 2021–2022, as recorded in Form 137. These official academic records were retrieved from the principals' offices of the participating schools to ensure accuracy and consistency. Academic achievement was interpreted using the performance descriptors prescribed in DepEd Order No. 8, s. 2015.

Respondents and Setting of the Study

The study was conducted in Kitaotao I District, Division of Bukidnon, which is composed of fourteen public elementary schools offering Grades 5 and 6 Science. The quantitative respondents included forty-eight public elementary Science teachers who were purposively selected, along with two hundred thirty-five Grades 5 and 6 learners identified using the Lynch formula during the School Year 2021–2022. The teachers were Bachelor of Elementary Education graduates, several of whom had earned or were pursuing master's degrees and had attended DepEd trainings related to Science instruction and instructional innovations. For the qualitative phase, ten Science teachers were selected from the same group to participate in interviews in order to gain deeper understanding of their experiences and challenges in implementing SIM-based instruction within their respective school contexts.

Research Procedure

Data collection followed established ethical and administrative protocols. Permission to conduct the study was secured from the College of Education of Bukidnon State University, the Schools Division Superintendent, the District Supervisor, and the school heads. Quantitative data were collected using a survey questionnaire adapted from Garcia and DepEd guidelines on SIM implementation, and learners' Science grades were obtained from official school records. Qualitative data were gathered through semi-structured interviews with ten teachers, focusing on their practices, challenges, and perceptions regarding SIM use. Quantitative data were analyzed using descriptive statistics and Pearson product-moment correlation, which was appropriate because the variables were continuous and met the assumptions of linearity and normality. Qualitative interview data were subjected to thematic analysis to enrich and explain the quantitative findings.

RESULTS AND DISCUSSION

The Extent of Utilization of Public Elementary School Teachers in Strategic Intervention Material (SIM) –based Instruction

Strategic Intervention Materials, popularly known as SIM in Philippine Education, is an instructional material meant to reteach concepts or topics that learners consider least mastered. The essential parts are Reference Card, Guide Card, Activity Card, Assessment Card, and Enhancement Card. These are utilized by Science teachers when teaching learners in the Science subject to increase their academic achievement.

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Table 1. Extent of Utilization of Public Elementary School Teachers in Strategic Intervention Material (SIM)-based Instruction

Card Set of Activities	**Mean**	**Sd**	**Qualitative Description**
Reference (Orientation) Card	4.18	0.71	Moderate Extent
Activity Card	4.05	0.70	Moderate Extent
Guide (Monitoring) Card	4.04	0.68	Moderate Extent
Assessment Card	3.99	0.68	Moderate Extent
Enhancement Card	3.85	0.60	Moderate Extent
TOTAL	**4.02**	**0.68**	**Moderate Extent**

It can be culled from the table that the overall extent of teachers' utilization of SIM-based instruction in the five-card sets is moderate (M = 4.02), indicating that elementary Science teachers frequently implement SIM to support learners in mastering competencies in Science. Among the card sets, the reference card received the highest mean (M = 4.18), followed by the activity card (M = 4.05), while the enhancement card was the least utilized (M = 3.85). This suggests that teachers focus more on orienting learners and guiding their practice than on extending or enriching learning through enhancement activities. The relatively consistent standard deviations across the five card sets reflect that teachers generally practiced similar activities in their classrooms.

These findings imply that SIM-based instruction is recognized as a valuable tool for facilitating learning and improving academic performance, aligning with Benitez (2021), who emphasized that intervention materials aid teaching and enhance student outcomes. However, the lower use of enhancement cards may reflect challenges such as time constraints and difficulties in developing effective materials, a concern also noted by Belzile (2015), who reported that crafting interactive tutorial materials required significant time and collaborative effort. Despite these challenges, similar studies, such as Adonis (2020), confirm that contextualized intervention materials, comparable to SIM, improve learners' conceptual understanding and provide meaningful learning experiences, as observed in assessments, teacher observations, and student feedback. Overall, the findings suggest that while teachers are actively implementing SIM-based instruction, targeted support may be necessary to optimize the use of enhancement activities and fully realize the potential of SIM in improving learners' performance in Science.

The Academic Performance of the Learners in Science with the Utilization of SIM-based Instruction

The level of academic achievement of the learners in Science subject is presented in Table 2.

Table 2. Learners' Academic Achievement in Science

Mean Grade (for both Grades 5 & 6)	**Percentage**	**Level of Academic Performance**
90	98%	Outstanding

Note: 90–100% Outstanding, 85–89% Very Satisfactory, 80–84% Satisfactory, 75–79% Fairly Satisfactory, and 74% and below Did Not Meet Expectations

The learners in Grades 5 and 6 achieved an Outstanding level of academic performance in Science, with a mean grade of 90. Learners' academic achievement is based on DepEd Order No. 8, s. 2015, which classifies performance into qualitative descriptors ranging from Outstanding to Did Not Meet Expectations. A mean grade of 90 falls within the Outstanding category, indicating that learners, on average, met or exceeded the expected grade-level competencies in knowledge, skills, and understanding. For consistency, this study reports

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achievement primarily using mean grade values, while the percentage serves as a school-based reference for mastery. These results reflect strong overall achievement across the cohort, though they may also be influenced by factors such as assessment practices, classroom conditions, and teaching strategies.

These results align with Owizy (2020), who emphasized that student performance is strongly influenced by the quality of teaching and the facilitation of complex learning tasks. Similarly, Eakman et al. (2019) and Colmar et al. (2019) highlight that academic achievement depends on multiple factors, and that underachievement reflects a failure to meet expected educational standards across all ability levels. Despite potential challenges such as overcrowded classrooms, which can limit individualized attention and innovative instructional approaches, the study demonstrates that integrating SIM-based instruction effectively enhances learners' engagement and maximizes their academic performance in Science.

Table 3. Correlation Analysis Between Academic Achievement of Learners in Science and Teachers' Practice of SIM-based Activities

Variables	**Academic Achievement in Science**			
	(rs)	t-value	Interpretation on Correlation	Decision on Ho1
Extent of Utilization of SIM-based Instruction	Sig. (2-tailed) .204	.004	Considerable relationship	Rejected

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

The correlation analysis presented in Table 3 shows a statistically significant positive relationship between teachers' utilization of SIM-based instruction and learners' academic achievement in Science, with an rs value of .204 and a significance level of .004. The magnitude of the correlation indicates a weak relationship, meaning that SIM utilization accounts for only a small proportion of the variation in learners' Science achievement. While increased use of SIM-based activities is associated with higher academic performance, SIM utilization alone does not strongly predict learners' achievement outcomes.

Given the significant p-value, the null hypothesis (Ho1) is rejected. The previous textual mention of "accepted" was an inconsistency; the calculations correctly indicate rejection. The weak strength of the association suggests that other factors, such as teacher assessment practices, learner characteristics, and school-level conditions, also influence Science achievement. Therefore, the result should be interpreted as evidence of an associative rather than causal relationship between SIM utilization and academic performance.

These findings align with Hiloma (2021), who reported that Strategic Intervention Materials contribute positively to learners' performance, though the impact depends on the implementation context. Gracia (2015) emphasized that SIM card-set activities function as supportive instructional interventions rather than stand-alone determinants of achievement. Dahar (2011) noted that instructional materials enhance learning when combined with effective teaching strategies, sufficient time, and appropriate assessment practices. In this study, the weak correlation suggests that SIM serves as a complementary remediation tool that supports learning rather than a primary driver of outstanding performance. This interpretation reflects classroom realities, where SIM is often used selectively and under time constraints. SIM-based instruction should therefore be viewed as one of several contributing factors to learners' Science achievement rather than the sole explanatory variable.

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Challenges Encountered by Teachers in Implementing SIM-Based Instruction

The findings revealed that elementary Science teachers face several challenges in implementing SIM-based instruction, which help explain why overall utilization may be moderate even when learners achieve outstanding grades. One major difficulty is lesson planning and aligning activities with the curriculum. Teachers reported challenges in breaking down competencies, sequencing lessons, and ensuring learners possess prior knowledge necessary for understanding new concepts. As one teacher explained, "Minsan po yung mga learning competencies kailangan pa syang e-break down… hindi talaga naiituro iyon sa mga non-education graduates katulad ko" (T9). Compressed lessons and limited instructional time further hinder implementation, with another teacher noting, "May lesson na compressed… prior knowledge na dapat ituro… hindi mo na sya maituro… minsan ung mga bata nahihirapan silang magsagot" (T4). Even during the pandemic, time constraints persisted: "Naka-set lang sa akin 1hr per subject… halos di na kami makapag-activity" (T4). These challenges highlight that while teachers recognize the importance of competency-aligned instruction, structural and time limitations make it difficult to execute SIM-based activities fully.

A second challenge involves assessing and monitoring learners' mastery of competencies. Teachers reported difficulty in interpreting and applying assessment tools such as the Table of Specifications. One participant shared, "TOS! opo yun po yung pagcategorized ng remembering, knowledge ba yan, nahihirapan din po kami dyan" (T1), reflecting the complexity of competency-based assessment. Large class sizes and variability in learner progress further complicate monitoring: "Mahirap i-monitor ang progress ng bawat bata lalo na kapag masyado silang marami sa klase" (T5). Teachers also noted challenges in determining the reliability of assessment results: "Ung pag-determine nung reliability nung result… challenging at the same time" (T4). These observations suggest that even though SIM is designed to scaffold learning, practical barriers in assessment may limit its comprehensive effectiveness.

A third set of challenges relates to limited time and insufficient teacher preparedness. Implementing SIM activities requires additional effort on top of regular workloads. One teacher explained, "Ako talaga isesearch ko talaga kasi nangangapa kasi first time mo makaranas… pero so far naman nakagawa naman ng paraan" (T2). Others highlighted gaps in professional training: "Ngayong pandemic na maraming oras, saka ko nare-realize na hindi pa rin pala ko prepared as a teacher… kulang pa talaga ako sa training at knowledge" (T10). Even when training was provided, workload and personal responsibilities constrained teachers' capacity to fully engage: "…basta ang gawa ko, tatapusin ko lahat ng kaya ko sa school at pag-umuwi na ako, fofocus na lang ako sa family ko… or sa movie kami ng mga anak ko" (T20). These insights demonstrate that while teachers recognize the value of SIM-based instruction, practical and professional limitations affect consistent implementation.

These qualitative findings help explain the quantitative results showing a weak positive correlation between SIM utilization and learners' Science achievement. Although overall SIM use is moderate, targeted components—such as reference and activity cards—still provide structured support that helps learners master least-developed competencies. This indicates that SIM functions as a remedial and scaffolding tool rather than a sole driver of high achievement.

Recent studies reinforce these observations. Porat, Shamir-Inbal, and Blau (2023) emphasized that teachers' planning, management of learning activities, and assessment capacity are critical for effective implementation of technology-integrated instructional tools, including SIM-based modules. Similarly, Andaya (2024) found that SIM-based learning enhances learner engagement and comprehension, particularly when teachers integrate the materials systematically into classroom instruction. Collectively, these studies underscore that while SIM-based instruction has significant potential to improve learning outcomes, lesson planning, assessment literacy, and teacher preparedness are key factors in maximizing its effectiveness.

CONCLUSION

Based on the findings of the study, it can be concluded that elementary Science teachers in Kitaotao I District moderately utilize Strategic Intervention Materials (SIM)-based instruction, implementing activities in the five-card sets most of the time. Learners achieved an Outstanding level of performance in Science, indicating high competency in knowledge, skills, understanding, and grade-level requirements. The correlation analysis showed

a weak but statistically significant relationship between teachers' SIM utilization and learners' academic achievement, suggesting that SIM supports learning—particularly for low-performing learners—but does not solely determine academic outcomes.

Qualitative findings highlighted challenges that affect SIM implementation, including lesson planning, assessment practices, and limited teacher preparedness. Despite these constraints, teachers demonstrated resourcefulness and employed coping strategies to integrate SIM effectively into instruction. These insights reinforce that SIM functions as a targeted remedial and scaffolding tool rather than a standalone factor driving achievement.

Overall, the study indicates that SIM-based instruction is a valuable resource for enhancing learners' competencies in Science. To maximize its effectiveness, schools should provide continuous professional development, structured guidance, and instructional support, including training on enhancement-card use, assessment literacy, and time management. Addressing these factors can strengthen teachers' capacity to implement SIM comprehensively and ensure that learners continue to achieve high levels of competency.

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