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Development and Validation of Strategic Intervention Materials (SIM) in Mathematics

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This study explores the impact of Strategic Intervention Materials (SIM) on Grade 8 students' understanding of Triangle Congruence. Conducted during the 2015–2016 school year at a public high school, the research specifically targets this challenging mathematical concept to determine if specialized materials can effectively bridge learning gaps. The topic was chosen because it was one of the most challenging areas for students, based on the Secondary Learning Competencies for the fourth grading period. The researchers implemented a pre-test and post-test approach to measure the impact of the SIM on student achievement. This evaluation included a diverse group of participants: 40 students, 13 Mathematics teachers, and a division supervisor, ensuring a comprehensive view of the material's effectiveness. Statistical analysis revealed a significant improvement in student performance following the intervention. Statistical analysis revealed a clear improvement in performance following the use of SIM. Prior to the intervention, most students (46%) were rated at the "Fair" level, with only 10% reaching the "Very Satisfactory" level. Following the intervention, student achievement shifted significantly: 41% reached the "Satisfactory" level, while the "Very Satisfactory" and "Excellent" categories increased to 15% and 5%, respectively. Notably, the number of students in the "Poor" category decreased from five students in the pre-test to only one student in the post-test. This upward trend is statistically supported by the mean scores, which rose from 7.87 to 13.82, representing a positive mean gain of 5.95 points. Statistical analysis confirmed a significant difference between these scores, as the computed exceeds the tabular value of 1.96 at the 0.05 level of significance. Consequently, the null hypothesis is rejected. These results demonstrate that SIM effectively enhanced student understanding and academic performance in Mathematics by successfully addressing existing learning gaps. Teachers also gave positive feedback, noting that the SIM's structure guide, activity, assessment,

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enrichment, and reference cards were not only effective for this topic but could also be adapted for other lessons. Students and teachers shared helpful suggestions for improving the material. Based on what was learned, the study encourages the continued use and refinement of SIM to close learning gaps and to support different types of learners more effectively.

Keywords: Strategic Intervention Materials, Grade 8 Mathematics, triangle congruence, student improvement, teaching materials

Introduction

Mathematics education equips students with [A2.1]essential skills that help them navigate an increasingly competitive and fast-changing world. It sharpens their logical reasoning, deepens their analytical thinking, and builds their confidence in solving problems, skills that prove valuable not only in academics but in everyday decision-making. Teachers, who guide this learning journey, must remember that each student brings unique needs to the classroom. Because of this, there's a strong need for teaching materials that respond to different learning styles and levels of readiness. Apparently, many students still struggle with mathematics due to weak foundational skills. This makes it even more important for educators to use research-based, innovative strategies that help turn math into a more engaging and meaningful subject. Instead of being viewed as a subject heavy with numbers and rules, math can be experienced as a space for discovery and creative thinking. One powerful resource for this shift is Strategic Intervention Materials (SIM), which offer teachers and learners structured, user-friendly, and engaging tools to make difficult topics more accessible.[A3.1].(Dy, 2014; Rodrigo, 2015).

Mathematics is central to many fields, offering a shared language to express patterns, test ideas, and arrive at solutions. Its power extends from logical thinking to computational accuracy, and its impact can be seen in nearly every modern innovation. For example, today's digital technologies, including computers, phones, and smart systems, are built on core mathematical concepts. Employers now actively look for individuals with strong analytical and problem-solving abilities, making math education more relevant than ever. Yet despite this significance, teaching and learning mathematics continues to be a challenge across schools.

Saritas and Akdemir (2009) noted [A4.1]that well-planned instructional design plays a key role in addressing the obstacles students face in math. Tools like SIM help make abstract ideas more

understandable by presenting them in concrete, relatable ways. When designed thoughtfully, SIM can increase students' engagement and help them build mastery of topics they once found intimidating. This study focuses on how SIM can be used to support students, especially in mastering topics that have long been considered difficult.

When instruction doesn't match what students are ready to learn, learning gaps become more noticeable. Without timely support, these students risk falling further behind and may eventually need remedial help. Freigh (2009) highlighted that SIM should be created based on actual learning data, like results from quarterly exams, to directly target areas where students are struggling. This approach helps teachers design more impactful interventions that truly respond to what learners need.

In the Philippines, the K to 12 Basic Education Curriculum promotes learner-centered approaches. It encourages students to work together, think independently, and take an active role in their education. SIM complements this approach by turning students into active agents, or modulators, of their learning experience. The materials are built to help close gaps in skill and understanding, particularly where students demonstrate low mastery.

Supporting this national mission, organizations such as the Mathematical Society of the Philippines (MSP) play an important part. As the country's leading professional group in the field, MSP contributes to the promotion of mathematics education and is recognized internationally by bodies such as the Southeast Asian Mathematical Society (SEAMS, 2015). Filipino educators today are tasked with adapting not only to updated content but also to pedagogical changes introduced by the K to 12 curricula. Wilson (1996) noted that meaningful, hands-on learning activities allow students to build their own understanding of mathematical concepts. Similarly, Bloom (1976) highlighted the importance of engaging students as active participants in their