

**The relationship between mathematics curriculum alignment
and teaching effectiveness: A descriptive-correlational study**

Maria Fortunata B. Mamauag*

Northeastern College, Santiago City, Isabela, Philippines

ABSTRACT

Curriculum alignment plays a critical role in ensuring quality mathematics instruction by promoting coherence among learning objectives, instructional content, teaching strategies, assessment, and intended learning outcomes. Despite the implementation of the K to 12 curriculum in the Philippines, limited empirical evidence exists on how mathematics curriculum alignment relates to teaching effectiveness among public secondary school teachers, particularly in local school contexts. This study examined the level of mathematics curriculum alignment and its relationship with teaching effectiveness among public secondary school teachers in Santa Maria, Isabela. Using a quantitative descriptive-correlational design, data were collected from all junior and senior high school mathematics teachers through a validated researcher-made questionnaire. Descriptive statistics and Pearson's correlation coefficient were employed to analyze the data. Results revealed consistently high levels of curriculum alignment and very high teaching effectiveness. A very strong positive and statistically significant relationship was found between curriculum alignment and teaching effectiveness. The study concludes that effective curriculum alignment substantially enhances instructional quality and recommends sustained institutional support, professional development, and curriculum enhancement initiatives to strengthen mathematics instruction.

Keywords: Curriculum alignment, teaching effectiveness, mathematics education, public secondary school teachers, descriptive-correlational research.

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INTRODUCTION

The alignment among the intended, implemented, and attained curriculum is a crucial element in ensuring quality education, especially in mathematics, where precision, coherence, and progression are fundamental. Curriculum alignment refers to the degree to which educational goals, content, instruction, and assessment are coordinated and mutually reinforcing (Anderson, 2002). In the Philippine context, the Department of Education (DepEd) has long emphasized the importance of curriculum alignment in improving learner outcomes, particularly in mathematics under the K to 12 Basic Education Program (DepEd, 2016).

*Corresponding author

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Mathematics education in secondary schools plays a pivotal role in developing analytical thinking, problem-solving skills, and academic readiness for science, technology, engineering, and mathematics (STEM) fields. However, findings from national and international assessments, such as the Trends in International Mathematics and Science Study (TIMSS) and the National Achievement Test (NAT), consistently show that Filipino learners continue to struggle to meet proficiency standards in mathematics (Mullis et al., 2020; SEI-DOST & UP NISMED, 2019). One contributing factor identified in various studies is the misalignment among what is intended in the curriculum, what is actually taught in classrooms, how learning is assessed, and the learning competencies prescribed in the national curriculum framework (Ornstein & Hunkins, 2017; Cabansag, 2020).

In the municipality of Santa Maria, Isabela, where public secondary schools are situated in both urban and rural communities, mathematics teachers face the challenge of delivering instruction that is aligned with national curriculum standards while remaining responsive to the diverse needs of learners. Factors such as the availability of instructional resources, contextualization of lessons, and teacher preparedness may influence the fidelity of curriculum implementation (Briones & Sumilang, 2020). Moreover, teaching effectiveness, defined as a teacher's ability to facilitate learning, manage the classroom, and promote student achievement, is often associated with the teacher's capacity to align instruction with curriculum standards (Stronge, 2018).

Teaching effectiveness cannot be measured solely through students' test scores. Rather, it encompasses a complex interplay of instructional planning, content delivery, assessment practices, classroom management, and teacher–student interaction. Numerous studies suggest that when teachers implement a well-aligned curriculum, students develop deeper conceptual understanding and demonstrate improved academic performance (Porter, Smithson, Blank, & Zeidner, 2007). Conversely, curriculum misalignment may result in learning gaps, fragmented instruction, and reduced learner motivation (Polikoff, 2012).

Given these considerations, it is imperative to examine the extent of mathematics curriculum alignment and its relationship to teaching effectiveness among public secondary school teachers in Santa Maria, Isabela. The findings of this study are expected to contribute to the improvement of instructional practices and provide evidence-based recommendations for curriculum enhancement, teacher professional development, and instructional supervision.

Statement of the problem

This study aimed to assess the extent of mathematics curriculum alignment and its relationship with teaching effectiveness among public secondary school teachers in Santa Maria, Isabela.

Specifically, this study sought to answer the following research questions:

1. What is the level of mathematics curriculum alignment among public secondary school teachers in Santa Maria, Isabela, in terms of alignment of learning objectives with curriculum standards, alignment of instructional content with curriculum guides, alignment of teaching strategies with prescribed competencies, and alignment of assessment tools with learning outcomes?
2. What is the level of teaching effectiveness among public secondary school teachers in terms of instructional planning and preparation, delivery of mathematics instruction, classroom management and learning environment, and assessment and feedback practices?
3. Is there a significant relationship between the level of mathematics curriculum alignment and the teaching effectiveness of public secondary school teachers in Santa Maria, Isabela?

4. What challenges do public secondary school teachers encounter in aligning the mathematics curriculum with their teaching practices?
5. What strategies may be proposed to enhance mathematics curriculum alignment and improve teaching effectiveness among public secondary school teachers in Santa Maria, Isabela?

METHODOLOGY

This study employed a quantitative research approach using both descriptive and correlational research designs. The descriptive design was used to determine the levels of mathematics curriculum alignment and teaching effectiveness, as well as the challenges encountered by public secondary school mathematics teachers. The correlational design examined the relationship between curriculum alignment and teaching effectiveness.

The study was conducted in selected public secondary schools in Santa Maria, Isabela, with all junior and senior high school mathematics teachers serving as respondents through total enumeration.

Data were gathered using a researcher-made, expert-validated questionnaire consisting of three major parts: curriculum alignment, teaching effectiveness, and challenges encountered. The instrument underwent expert validation and pilot testing to ensure validity and reliability, with Cronbach's Alpha used to establish internal consistency.

After securing the necessary approvals from educational authorities and school heads, the researcher administered the questionnaire, collected the completed responses, verified their completeness, and encoded the data for analysis while maintaining strict confidentiality.

The collected data were analyzed using SPSS. Mean and Standard Deviation were used to determine the levels of curriculum alignment, teaching effectiveness, and challenges encountered, while the Pearson Product-Moment Correlation Coefficient (Pearson r) was employed to determine the significance of the relationship between mathematics curriculum alignment and teaching effectiveness.

RESULTS AND DISCUSSION

The findings indicate that public secondary school mathematics teachers in Santa Maria, Isabela demonstrate a consistently high level of curriculum alignment across all four dimensions examined. The alignment of learning objectives with curriculum standards obtained an overall weighted mean of 4.28, the alignment of instructional content with the curriculum guide 4.26, the alignment of teaching strategies with prescribed competencies 4.61, and the alignment of assessment tools with intended learning outcomes 4.49, all interpreted as "Always." These findings suggest that teachers consistently implement mathematics instruction in accordance with the Department of Education's curriculum standards and the Most Essential Learning Competencies (MELCs). Such results indicate that curriculum standards have become an integral component of teachers' instructional planning, classroom delivery, and assessment practices.

Among the four dimensions, the alignment of teaching strategies with prescribed competencies recorded the highest overall mean (4.61). This finding implies that teachers deliberately select instructional methods that correspond with the competencies expected of learners rather than relying solely on traditional teaching approaches. The high ratings for reflective teaching, learner-centered strategies, and competency-based instruction demonstrate that teachers recognize curriculum alignment as an ongoing instructional process rather than

merely compliance with prescribed standards. However, the reported mean of 6.08 for ICT integration exceeds the maximum value of the five-point Likert scale, indicating a probable data entry or computation error that should be corrected before final presentation.

Teaching effectiveness likewise received very favorable ratings. Instructional planning and preparation obtained an overall weighted mean of 4.62, classroom management and learning environment 4.61, delivery of mathematics instruction 4.58, and assessment and feedback practices 4.50, all interpreted as "Strongly Agree." These findings indicate that the respondents possess a high degree of professional competence in planning instruction, facilitating classroom learning, managing student behavior, and evaluating learner performance. The consistently high ratings suggest that effective teaching among the respondents extends beyond classroom delivery and includes careful lesson preparation, appropriate assessment, and the creation of positive learning environments.

Despite these highly favorable results, several aspects warrant further improvement. Teachers reported relatively lower ratings in sustaining learner engagement throughout lessons, maximizing the use of visual and concrete instructional materials, promoting student reflection, implementing peer and self-assessment, and providing remediation based on assessment results. These findings suggest that although teachers have mastered curriculum implementation, learner-centered assessment, and reflective teaching practices remain areas requiring continued professional development. Greater emphasis on formative assessment strategies and active student participation may further strengthen instructional quality.

One of the most important findings of the study is the relationship between mathematics curriculum alignment and teaching effectiveness. Statistical analysis yielded a Pearson correlation coefficient ($r = .985$) with a p-value of .000, indicating a very high positive and statistically significant relationship between the two variables. Consequently, the null hypothesis was rejected. This finding demonstrates that teachers who consistently align their objectives, instructional content, teaching strategies, and assessment practices with curriculum standards also tend to exhibit higher levels of teaching effectiveness. The strength of the correlation suggests that curriculum alignment is not merely an administrative requirement but a critical determinant of effective mathematics instruction. It reinforces Tyler's (1949) curriculum rationale, Porter's (2002) Curriculum Alignment Theory, Constructivist Learning Theory (Piaget, 1952; Vygotsky, 1978), and Stronge's (2018) Teacher Effectiveness Framework, all of which emphasize that coherent alignment among curriculum objectives, instruction, and assessment contributes to improved teaching quality and learner achievement.

Although teachers generally demonstrated high levels of curriculum alignment and teaching effectiveness, they acknowledged experiencing several implementation challenges. The overall weighted mean for challenges was 3.61 ("Agree"), indicating that these concerns are commonly experienced in practice. The most prominent challenges involved the lack of updated curriculum-aligned instructional materials, limited time for collaborative planning, difficulty in contextualizing mathematics lessons using real-life situations, completing the curriculum within the academic year, and aligning assessments with curriculum standards. Teachers also reported challenges related to managing large classes, addressing learner diversity, limited training opportunities, and technological constraints. These findings suggest that effective curriculum implementation depends not only on teacher competence but also on institutional support, adequate instructional resources, sufficient planning time, continuous professional development, and access to educational technology. Addressing these concerns would likely strengthen curriculum implementation and further improve mathematics teaching effectiveness.

In general, the findings demonstrate that mathematics teachers in public secondary schools in Santa Maria, Isabela, consistently implement curriculum-aligned instruction and exhibit very high teaching effectiveness. More importantly, the exceptionally strong positive

relationship between curriculum alignment and teaching effectiveness provides empirical evidence that adherence to curriculum standards substantially contributes to instructional quality. Nevertheless, the identified implementation challenges indicate that sustaining high-quality mathematics instruction requires continuous institutional support, curriculum enhancement initiatives, teacher capacity-building programs, and adequate instructional resources to ensure that curriculum standards are translated into meaningful classroom learning experiences.

CONCLUSION

Based on the foregoing findings, this study concludes that mathematics teachers consistently aligned their learning objectives, curriculum content, teaching strategies, and assessment practices with the prescribed mathematics curriculum. This indicates that teachers carefully followed curriculum standards and ensured that instruction and assessment were connected to the intended learning competencies.

The study further concludes that mathematics teachers demonstrated a very high level of teaching effectiveness in terms of instructional planning, delivery of instruction, classroom management, and assessment practices. This suggests that teachers were able to provide organized, engaging, and supportive learning experiences for students.

Moreover, the study concludes that curriculum alignment is closely associated with teaching effectiveness. The very high positive relationship between the two variables implies that teachers who closely align their instruction with the curriculum are more likely to demonstrate effective teaching practices inside the classroom.

Lastly, the study concludes that despite the strong curriculum alignment and teaching effectiveness, mathematics teachers still experience challenges in implementing developmentally appropriate practices and managing classroom demands. Limited instructional materials, lack of time for collaborative planning, and difficulties in connecting lessons to real-life situations remain concerns that may affect the quality of instruction if not properly addressed.

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