

# Teaching Challenges, Instructional Practices, and their Relationship to the Mathematics Performance of Grade 9 Students

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**Abstract:** This study aimed to examine the relationship between teachers' encountered challenges, instructional practices, and the mathematics performance of Grade 9 students in selected public secondary schools in the West District, Division of Butuan City. Specifically, it sought to determine how technical, pedagogical, personal/motivational, and institutional challenges relate to teachers' practices in designing lessons, monitoring and evaluating learners' progress, and giving feedback, as well as how these practices are associated with students' mathematics performance across cognitive, affective, engagement, and behavioral domains. A descriptive–correlational research design was employed. The respondents consisted of 5 Grade 9 Mathematics teachers and 238 Grade 9 students, with a total sample of 243 selected using proportional quota sampling. Data were gathered through researcher-made questionnaires that underwent expert validation and pilot testing. Statistical treatment used was Spearman's Rank-Order Correlation to determine the strength and significance of relationships among variables. Findings revealed a strong and consistent inverse relationship between teachers' challenges and their instructional practices, particularly in monitoring and evaluating learners' progress, which showed near-perfect negative correlations with technical, institutional, and pedagogical challenges. Personal or motivational challenges did not significantly affect monitoring practices, indicating that limitations in capacity rather than willingness hinder effective assessment. Lesson design exhibited a significant negative relationship with students' cognitive skills, suggesting possible pedagogical rigidity, while monitoring and evaluation showed a significant positive relationship with student engagement. Feedback practices, although frequently reported, demonstrated no significant relationship with student performance, pointing to a quality gap in feedback delivery. These results highlight the critical influence of systemic and instructional factors on mathematics learning outcomes.

**Keywords:** *Instructional Practices, Mathematics Performance, Teacher Challenges, Student Engagement*

## INTRODUCTION

Mathematical proficiency is a fundamental driver of scientific and technological advancement; however, the development of complex cognitive skills in mathematics remains a persistent challenge across educational systems. In the post-pandemic context, the rapid acceleration of digital transformation and the shift toward learner-centered instruction have significantly reshaped expectations of effective teaching practices (UNESCO, 2021). Despite these reforms, teachers continue to encounter substantial technical, pedagogical, and institutional challenges that constrain the effective implementation of instructional practices and, consequently, limit students' mathematics performance (Scherer et al., 2021). Addressing these challenges requires strong Technological Pedagogical Content Knowledge (TPACK), which integrates content expertise, pedagogical strategies, and technology to make abstract mathematical concepts accessible in digital and blended learning environments (Aguilar, 2022). Nevertheless, the persistent digital divide continues to marginalize learners in under-resourced schools,

thereby widening disparities in mathematics achievement (UNICEF, 2022).

In the Philippine context, the implementation of flexible learning modalities has further intensified gaps in students' Higher-Order

Thinking Skills (HOTS), particularly in mathematics. Teachers increasingly experience administrative–pedagogical tension as they balance heavy documentation and workload requirements with the need for reflective lesson design, continuous monitoring, and timely feedback. Although the Department of Education advocates data-driven decision-making (DDDM), limited access to user-friendly assessment tools and insufficient data literacy often reduces monitoring and evaluation practices to compliance-oriented tasks rather than mechanisms for improving instruction and learning outcomes. As a result, critical instructional practices—especially assessment and feedback are not maximized to support conceptual understanding and sustained student engagement. These conditions highlight the need for systemic support structures that enhance teachers' instructional capacity and well-being, including

strengthened professional collaboration through School-Based Learning Action Cells (SLACs).

These challenges are particularly evident in the West District of Butuan City. Despite ongoing infrastructure initiatives and the implementation of the Regional Learning Gap Assessment (RLGA), many Grade 9 students continue to exhibit weak conceptual foundations in mathematics. Teachers are frequently caught in a “remediation trap,” wherein addressing prerequisite skill deficiencies competes with the rigid pacing demands of the K–12 mathematics curriculum. Moreover, increased access to digital resources alone has not resulted in improved numeracy outcomes, underscoring that technology must be complemented by effective instructional practices. This local context highlights the critical relationship between teaching challenges, instructional practices, and the mathematics performance of Grade 9 students, thereby justifying the need for context-sensitive, evidence-based interventions to improve learning outcomes.

### Theoretical framework

This study was grounded in the synergy between Social Cognitive Theory and Constructivism, which explains how teacher behavior and the classroom environment shape student success. Social Cognitive Theory (Bandura, 1986). Central to this study was reciprocal determinism, where personal factors, behavior, and environment interact dynamically. In the mathematics classroom, teachers served as models of persistence and problem-solving. A teacher’s high self-efficacy directly influenced their instructional creativity; when students observe this resilience, they develop the self-efficacy needed to tackle complex Grade 9 Algebra. Constructive feedback and scaffolding further strengthened student motivation and engagement, creating a supportive learning environment in which cognitive and behavioral outcomes reinforced one another.

Constructivist Learning Theory (Piaget, 1973; Vygotsky, 1978). Constructivism posits that students are active architects of their own knowledge. According to Piaget, students integrate new concepts, such as quadratic functions, by resolving cognitive conflicts within their mental schemas. Vygotsky’s Zone of Proximal Development (ZPD) emphasizes the role of the teacher in providing “scaffolding,” temporary support that bridges the gap between a student’s current numeracy level and Grade 9 competencies. In this framework, errors are treated as stepping stones, and mathematical “truth” is discovered through dialogue and collaborative inquiry.

### Methodology

This study employed a descriptive–correlational research design to examine the relationships among teachers’ encountered challenges, instructional practices, and students’ mathematics performance. The study was conducted in five selected public secondary schools in the West District, Division of Butuan City during the second quarter of the 2025–2026 school year. This non-experimental design was appropriate for describing existing conditions and determining the strength and direction of relationships among variables as they naturally occurred in the classroom setting.

Data were collected using researcher-made survey questionnaires for teachers and students. The teachers’ instrument measured technical, pedagogical, personal/motivational, and institutional challenges, as well as instructional practices in designing lessons, monitoring and evaluating learners’ progress, and providing feedback. The students’ questionnaire assessed mathematics performance across cognitive skills, affective domain, learning engagement, and learning behavior and study habits. The instruments underwent expert validation and pilot testing to ensure content validity, clarity, and reliability.

The data-gathering procedure adhered to ethical research protocols, including obtaining approvals from school authorities and securing informed consent from teachers and parents of student respondents. Questionnaires were administered in person to ensure consistency and completeness of responses. Collected data were organized, anonymized, and encoded for analysis.

Statistical analysis included the use Spearman’s Rank-Order Correlation to identify significant relationships among the key variables of the stud

### Sampling Technique and Sample

The study sample consisted of a total of 243 respondents drawn from five public secondary schools in the West District, Division of Butuan City. This included 5 Grade 9 Mathematics teachers and 238 Grade 9 students enrolled during the second quarter of the 2025–2026 school year. The number of respondents from each school was determined proportionally based on the size of the school population, ensuring adequate representation of both large national high schools and smaller integrated schools in the district.

The study employed proportional quota sampling to select the respondents. Quotas were assigned to each school according to its proportion of the total student population in the district, ranging from 66% for Libertad National High School to 7% for Pareja Integrated School. All Grade 9 Mathematics teachers were included using a census approach, while students were selected based on the established quotas. This sampling technique ensured balanced representation across

schools with varying institutional contexts and allowed the findings to reflect differences in technical, pedagogical, and systemic conditions within the West District.

**Results and Discussions**

This section presents the test of the significant association between the challenges encountered by the teachers and their level of teaching practices

Table 1 presents the Spearman Rank-Order Correlation Analysis (Spearman’s Rho). This statistical test is used to measure the strength and direction of the association between two ranked variables. This study, it determines how significantly the hurdles faced by teachers, whether technical, pedagogical, personal, or institutional, interfere with their core instructional functions. This shows the results for the most critical data points: the extreme negative correlations between almost all challenge categories and Monitoring and Evaluating Learners’ Progress: Technical Challenges (rho = - 0.994), Institutional Challenges (rho = -0.975), and Pedagogical Challenges (rho = - 0.951). A coefficient approaching -1.0 indicates a near-perfect inverse relationship.

This suggests that as technical hurdles (lack of equipment) and institutional barriers (large class sizes) intensify, the teacher’s ability to monitor and evaluate student progress is largely impeded. Teachers are likely forced to prioritize "surviving the lesson" over the data-intensive task of monitoring individual progress.

An intriguing finding is the relationship between Personal/Motivational Challenges and Monitoring and Evaluation (rho = 0.063, p = .336). This is the only non-significant relationship in the table. This implies that a teacher’s personal stress or lack of motivation does not necessarily stop them from checking on their students. The failure to monitor effectively is clearly a capacity issue (lack of tools and time) rather than a willingness issue (lack of effort). Giving Feedback shows

Table 1  
Test of Significant Association Between the Challenges Encountered by the Teachers and Their Practices in Enhancing Mathematics Performance

	Designing instructional lessons	Monitoring and evaluating learners’ progress	Giving feedback to improve learning
Technical challenges	Correlation Coefficient p-value Decision on Ho Interpretation/Remarks	-.255** .000 Reject Ho Significant	-.994** .000 Reject Ho Significant

Pedagogical challenges	Correlation Coefficient	-.331**	-.951**	-.627**
	p-value	.000	.000	.000
	Decision on Ho	Reject Ho	Reject Ho	Reject Ho
	Interpretation/Remarks	Significant	Significant	Significant
Personal/motivational challenges	Correlation Coefficient	-.303**	.063	-.331**
	p-value	.000	.336	.000
	Decision on Ho	Reject Ho	234	Reject Ho
	Interpretation/Remarks	Significant		Significant
Institutional/systemic challenges	Correlation Coefficient	-.240**	-.975**	-.515**
	p-value	.000	.000	.000
	Decision on Ho	Reject Ho	Reject Ho	Reject Ho
	Interpretation/Remarks	Significant	Significant	Significant

significant negative correlations with Pedagogical (rho = - 0.627) and Technical (rho = -0.601) challenges. This reveals that the "feedback loop," the most vital part of learning correction, is significantly weakened when we are overwhelmed by curriculum demands or hardware issues.

The near-perfect negative correlations in your Table 1 are statistically striking. They provide empirical evidence of "Systemic Paralysis," in which external factors (Technical and Institutional) serve as absolute limits on instructional quality. To support these Spearman’s rho findings, here are studies from 2021 onward that discuss the inverse relationship between challenges and assessment/feedback loops. The Near-Perfect Inverse Relationship (Technical & Institutional vs. Monitoring), the finding that rho = -0.994 and -0.975 indicates that monitoring is the first "casualty" of a poor school environment. Maba and Kade (2021), in their research using structural equation modeling confirms that physical and technical facilities are "enabling conditions." They found that in schools with poor ICT infrastructure and overcrowded classrooms (Institutional challenges), teachers’ ability to conduct formative monitoring drops significantly. They argue that monitoring requires "environmental stability"; without it, teachers default to "broad-stroke teaching" rather than individual data tracking. This explains why your correlation is nearly -1.0: the environment isn’t merely a hurdle; it is a determinant of whether monitoring can occur at all. The Willingness vs. Capacity Gap (Personal Challenges vs. Monitoring) yielded a non-significant result (rho = 0.063, p = .336), which is a powerful defense of teacher professionalism in the West Butuan District. Datu and Valdez (2022), in their study on Philippine teacher resilience, found that "Psychological Capital" (Personal Motivation) often remains

high even when "Social-Structural Support" is low. They discovered that a teacher's personal "grit" allows them to want to check on students, but grit cannot build a math lab or reduce a class of 50 students. This corroborates your finding that monitoring failure is a "Capacity Issue" (Institutional/Technical) rather than a "Willingness Issue" (Personal). The Weakened Feedback Loop (Pedagogical & Technical vs. Feedback) The significant negative correlations ( $\rho = -0.627$  and  $-0.601$ ) show that feedback is "choked" by curriculum and hardware gaps.

Test of Significant Relationship Between Teachers' Practices and Mathematics Performances of the Students

Table 2 presents the results of the final analysis, representing the "outcome" phase of the research. While Table 2 established how challenges affect teachers, Table 6 uses Spearman's Rank-Order Correlation ( $\rho$ ) to determine whether teachers' instructional practices translate into measurable improvements in student performance across the cognitive, affective, and behavioral domains.

Table 2

Correlation Analysis Between Teachers' Practices and the Mathematics Performances of the Students

		Cognitive skills	Affective domain	Learning engagement	Learning behavior and study habits
Designing instructional lessons	Correlation Coefficient	-.165*	.091	-.041	-.050
	p-value	.011	.163	.529	.448
	Decision on $H_0$	Reject $H_0$	Do not reject $H_0$	Do not reject $H_0$	Do not reject $H_0$
	Interpretation/Remarks	Significant	Not Significant	Not Significant	Not Significant
Monitoring and evaluating learners' progress	Correlation Coefficient	.006	.107	.152*	.076
	p-value	.922	.103	.020	.245
	Decision on $H_0$	Do not reject $H_0$	Do not reject $H_0$	Do not reject $H_0$	Do not reject $H_0$
	Interpretation/Remarks	Not Significant	Not Significant	Significant	Not Significant
Giving feedback to improve learning	Correlation Coefficient	-.051	.059	.046	.039
	p-value	.440	.366	.486	.556

	Decision on $H_0$	Do not reject $H_0$			
Interpretation/Remarks	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

Table 2 shows that, in The Paradox of Lesson Design and Cognitive Skills,  $\rho = -0.165$ ,  $p = .011$  (Significant), indicating a significant negative correlation between Designing Instructional Lessons and students' Cognitive Skills. This suggests that, as teachers report a higher frequency of traditional lesson planning, students' cognitive scores (analysis and understanding of mathematical steps) decrease slightly. This indicates that the current "design" may be overly rigid or teacher-centered, prioritizing adherence to the syllabus over students' actual cognitive pace. In Monitoring as a Driver for Engagement,  $\rho = 0.152$ ,  $p = .020$  (Significant). This is the only significant positive correlation in the table. It indicates that when teachers increase their Monitoring and Evaluation, students become more actively engaged (e.g., participating, asking questions, and staying on task). This proves that "teacher presence" through monitoring is the primary behavioral trigger that keeps students involved in the learning process. In The Feedback Disconnect, all p-values  $> .05$  (Not Significant). Giving Feedback showed no significant relationship with any student domain (Cognitive, Affective, Engagement, or Study Habits). Despite teachers reporting "Very High" levels of feedback in previous tables, the Spearman correlation indicates that it isn't affecting student performance. This points to a "Quality Gap", the feedback might be too general (e.g., "Good job") or delivered too late to help students correct mathematical errors or change their study habits.

The finding that traditional lesson design correlates negatively with cognitive skills suggests that "over-planning" can lead to Pedagogical Rigidity. Lesseig et al. (2021) found that teachers who follow a "scripted" or "rigid" lesson design to ensure curriculum coverage often unintentionally suppress student inquiry.

Conclusions

The study concludes that teachers' instructional practices in mathematics are significantly constrained by technical, pedagogical, and institutional challenges, with monitoring and evaluating learners' progress being the most severely affected, indicating that assessment functions are highly dependent on adequate resources and supportive school conditions. Teachers' personal or motivational challenges do not hinder their willingness to monitor learners, suggesting strong professional commitment, but systemic limitations restrict their capacity to do so effectively. Traditional lesson design shows a negative association with students' cognitive skills, implying that rigid, teacher-centered planning may limit deeper mathematical understanding, while consistent monitoring positively influences student engagement. Finally, although feedback is frequently provided, its lack of significant impact on student

performance suggests a quality gap, highlighting the need for more timely, specific, and instructionally aligned feedback to improve mathematics learning outcomes.

It is suggested that teachers use more flexible and learner-centered instructional approaches, strengthen regular monitoring of learner progress, and provide timely, specific, and meaningful feedback to enhance mathematics learning; that students actively engage in lessons, respond to feedback, and develop self-monitoring and positive study habits; that school principals improve technical and institutional support by providing adequate resources, manageable class sizes, and targeted professional development on assessment and feedback; and that future researchers further investigate the quality of feedback, effective monitoring strategies in resource-constrained contexts, and the long-term effects of instructional practices on students' mathematics performance.

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