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Tracing the Path: Analyzing Trends in Grade 10 Mathematics Performance Over the Academic Year

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Abstract

Background and Aim: Mathematics learning is a dynamic process marked by conceptual complexity and variable performance over time. In the Philippine context, most studies rely on year-end summaries, overlooking how performance evolves throughout the academic year. This study traced quarterly trends in mathematics performance among 168 Grade 10 students from a public secondary school and examined how sex and section-based grouping influenced these trajectories.

Materials and Methods: Using archival academic records, quarterly mathematics grades (Q1–Q4) were analyzed through repeated measures ANOVA and mixed-design models. Sex and academic section (homogeneously grouped by prior performance) were treated as between-subject factors. Statistical assumptions were tested, and Bonferroni-adjusted post hoc comparisons were performed to examine significant differences across time and subgroups.

Results: Significant main effects were found for time ($F(3, 495) = 57.50$, $p < .001$), sex ($F(1, 165) = 7.08$, $p = .009$), and section ($F(3, 159) = 90.00$, $p < .001$), with additional interaction effects observed. Female students and those in higher-ranked sections consistently outperformed their peers. Performance trends were non-linear, featuring early gains, mid-year plateaus, and an eventual decline in the final quarter.

Conclusion: These findings highlight the utility of sub-annual analysis in identifying critical shifts in student performance. By uncovering how sex and academic grouping shape performance trajectories, the study advocates for more responsive and equity-driven instructional strategies, particularly in underexamined educational settings such as the Philippines.

Keywords: Mathematics performance; Longitudinal study; Repeated measures ANOVA; Sex differences; Sectioning; Philippine education; Trend Analysis

Introduction

Academic performance in mathematics is typically evaluated at the end of the school year, offering a single snapshot of performance. While useful for reporting and accountability, this year-end perspective overlooks the fluid and evolving nature of students' academic trajectories. In reality, mathematics performance fluctuates throughout the school year, shaped by shifting instructional emphases, escalating conceptual complexity, varying cognitive readiness, and changes in classroom motivation. Socio-contextual factors—such as unequal access to learning resources, teacher expectations, and peer dynamics—further influence these patterns, producing periods of acceleration, mid-year stagnation, or unexpected declines. Because mathematics is a cumulative subject in which new concepts build upon previous knowledge, a missed lesson in one quarter may widen into a larger learning gap later on, while early mastery can amplify performance gains over time.

A growing body of international literature highlights the importance of examining within-year changes in student performance. Studies utilizing quarterly or trimester-based grading cycles have shown that key inflection points often arise midway through the academic year, when curricular pacing intensifies and student motivation may begin to wane. This

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evidence raises concerns about overreliance on final grades, which may mask early difficulties or late recoveries, leading to misinformed evaluations of student progress. In contrast, continuous multi-point assessment can provide a more accurate and timely depiction of learning trajectories, supporting instructional adjustments, targeted interventions, and more equitable academic decisions.

However, there remains limited research in the Philippine context that examines mathematics performance at multiple points throughout the year. Most local studies still emphasize summative data or focus on isolated performance indicators, overlooking the nuanced interplay between time, student characteristics, and classroom context.

Responding to this gap, the present study tracks the mathematics performance of Grade 10 students across four grading periods in a public secondary school. By examining quarterly changes—whether growth, stagnation, or decline—the study aims to surface patterns that static, end-of-year assessments might conceal. In particular, it explores how performance trajectories vary by sex and by academic sectioning, both of which are commonly used in the Philippines to organize classrooms. This longitudinal lens offers researchers and educators a deeper understanding of when and for whom interventions may be most impactful. Recognizing mathematics performance as a dynamic and context-sensitive process creates a stronger foundation for data-informed policy and responsive teaching practices.

Objectives

This study aimed to examine the progression of Grade 10 students' mathematics performance over four grading periods within a school year. Specifically, it sought to:

1. Analyze the trends in mathematics performance across the four academic quarters.
2. Investigate whether performance trajectories differ between male and female students.
3. Explore variations in performance among homogeneously sectioned classes.
4. Examine whether sex and section interact to influence students' quarterly mathematics performance.

Literature review

In the Philippine context, research on mathematics performance still relies mainly on end-of-year data or single-quarter snapshots. Such studies focus on factors like study habits, teaching strategies, and teacher characteristics, yet they offer limited insight into how performance develops across an academic year (Cabilan & Peteros, 2024; Guinocor et al., 2020; Silangan et al., 2023). For instance, Bernardo et al. (2022) applied machine-learning techniques to classify low-performing students in Filipino schools but likewise used only final or aggregate grades. Investigations that discuss quarterly assessments from a constructivist perspective remain largely qualitative and do not quantify change over time (Dagdag, 2020). This suggests a gap between the availability of quarterly data and their actual use in tracking academic progress. Consequently, although schools routinely record quarterly grades, these data are seldom analysed longitudinally. This underutilization represents a missed opportunity to detect inflection points that could guide timely intervention.

A similar pattern appears internationally. Large-scale programmes such as TIMSS and most national examinations release only annual results, restricting opportunities to examine within-year dynamics (Schmidt, 2015). Where sub-annual tracking has been attempted, such as Nordic trimester studies or district-level quarterly reports in U.S. districts (Fuchs, Fuchs, & Compton, 2014), researchers have identified mid-year plateaus and late-year surges that single-point assessments overlook. These findings collectively highlight the limitations of static assessment models and point to the need for dynamic performance monitoring. Mercader et al.

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(2017) further demonstrated in early-stage longitudinal work that periodic measurement can reveal motivational shifts affecting mathematics outcomes. When these motivational fluctuations are mapped across time, they allow educators to better understand the behavioral and emotional correlates of academic performance.

Sex and classroom sectioning add further complexity to performance patterns. Meta-analyses suggest that mean score differences between male and female students are generally small (Hyde, Fennema, & Lamon, 1990; Lindberg, Hyde, Petersen, & Linn, 2010), but recent work documents sex-specific trends in confidence, motivation, and mathematics anxiety that may affect trajectories even when final marks converge (Ganley & Lubienski, 2016; Bohrnstedt et al., 2024). Such affective factors may influence performance unevenly across the academic year, contributing to fluctuations that remain hidden in year-end summaries. International longitudinal studies also show points in the school year when sex gaps widen or narrow, often in response to instructional context (Jansen, Schroeders, & Lüdtke, 2020; Espinoza, Lupiáñez, & Segovia, 2022). Within the Philippines, however, such temporal patterns remain largely unexplored. This leaves unanswered questions about how classroom practices or cultural expectations might shape sex-based performance trends over time in local contexts.

Classroom sectioning, typically based on prior academic standing, shapes teacher expectations, peer interactions, and resource distribution (Baker & Jones, 1993; Li, Zhang, Liu, & Hao, 2018). Cross-national reviews note mixed outcomes: some tracking systems intensify inequality, whereas flexible grouping can reduce gaps (Slavin, 1990; Kelz & Krammer, 2024). Studies have shown that students placed in lower sections often receive less challenging instruction and fewer enrichment opportunities, potentially reinforcing underachievement. Few studies, however, integrate time, sex, and sectioning in a single model. This omission is especially salient in Philippine schools, where homogeneous sectioning is widespread. By failing to capture the interactions between these factors, current research provides an incomplete picture of academic trajectories. Addressing these gaps, the present study tracks Grade 10 students across four grading periods and tests the joint effects of time, sex, and section on mathematics performance, thereby contributing sub-annual evidence to both local and international discussions on equitable learning trajectories.

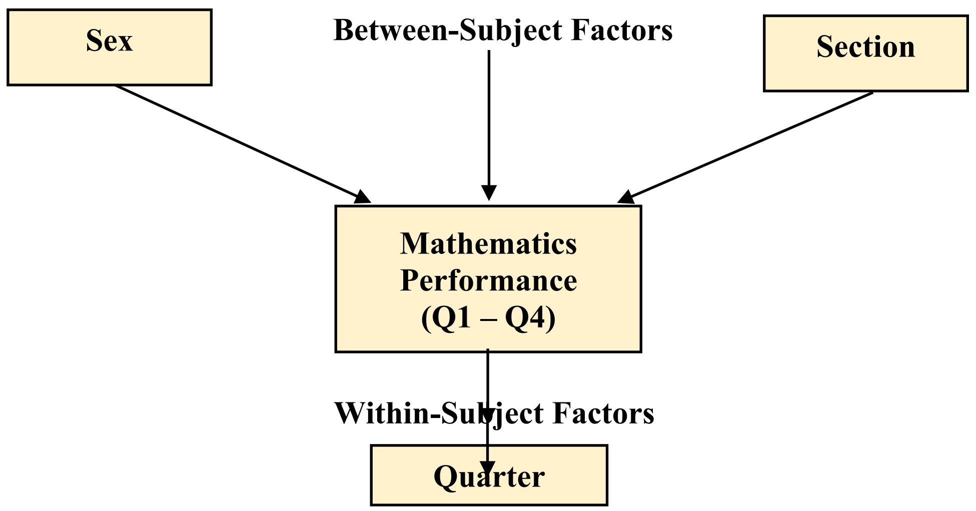

Figure 1. Conceptual Framework

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Methodology

1. Research Design

This study employed a quantitative longitudinal research design utilizing repeated measures. It involved the secondary analysis of archival academic records to examine changes in students' mathematics performance across four grading periods. The design also incorporated between-subjects factors, such as sex and class section, allowing for the assessment of both individual trends over time and interaction effects across subgroups.

2. Population and Scope

This study employed total enumeration of all 168 Grade 10 students enrolled at a Philippine public high school during the 2024–2025 academic year. Students were organized into four performance-based sections (Section 1 = lowest, through Section 4 = highest) by their prior academic records. Recorded demographic variables included sex (male, female) and section code (1–4). Because the entire population of interest was analyzed, no sampling procedure or power calculation was required. Sex and section were subsequently examined as moderators of quarterly mathematics performance.

3. Data Source and Variables

This study drew on archival academic records of Grade 10 students, specifically their quarterly mathematics grades from Quarter 1 to Quarter 4 of a single academic year. The primary variable analyzed was mathematics performance, measured on a 100-point scale, to examine performance trends throughout the year. Demographic variables included sex (male or female) and academic section. Students were assigned to one of five homogeneously grouped sections based on prior academic performance. For consistency in analysis, section codes were reverse-coded so that Section 1 corresponded to the lowest-performing group and Section 4 to the highest, ensuring alignment with statistical modeling conventions.

4. Data Analysis Procedures

The data analysis procedures for this study were conducted using Jamovi and followed a structured, multi-step approach to ensure statistical rigor and clarity in interpreting trends in students' mathematics performance. First, descriptive statistics were computed to capture central tendencies and variability across the four grading periods, providing an overview of performance patterns. To address the first research question (RQ1), a Repeated Measures ANOVA was employed to detect significant changes over time within subjects. For RQ2 to RQ4, a Mixed Between-Within Subjects ANOVA was used to explore not only the within-subjects effect of time (quarter) but also between-subjects factors such as sex (RQ2), section (RQ3), and their interactions with grading periods (RQ4). To further probe significant findings, post hoc pairwise comparisons with Bonferroni adjustments were conducted to control for Type I error in multiple comparisons. Assumption testing was an integral part of the analysis: the normality of residuals was checked through Q-Q plots and Shapiro-Wilk tests, with minor violations addressed via outlier removal. Mauchly's Test was used to assess sphericity, and Greenhouse-Geisser corrections were applied where violations occurred. Levene's Test confirmed homogeneity of variances for between-subjects variables, and interaction plots were generated to visualize patterns and effects. These comprehensive procedures ensured that the analyses adhered to the assumptions necessary for robust statistical inference and allowed for valid conclusions regarding both overall performance trends and their variation across demographic subgroups.

Results

1. Trends in Mathematics Performance Across Academic Quarters

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Student mathematics performance showed noticeable variation across the four academic quarters. As seen in Figure 1, there was a steady improvement from Quarter 1 to Quarter 2, followed by a slight plateau in Quarter 3 and a sharp decline in Quarter 4. This pattern suggests early gains that were not sustained, potentially due to mounting academic demands or reduced engagement later in the school year.

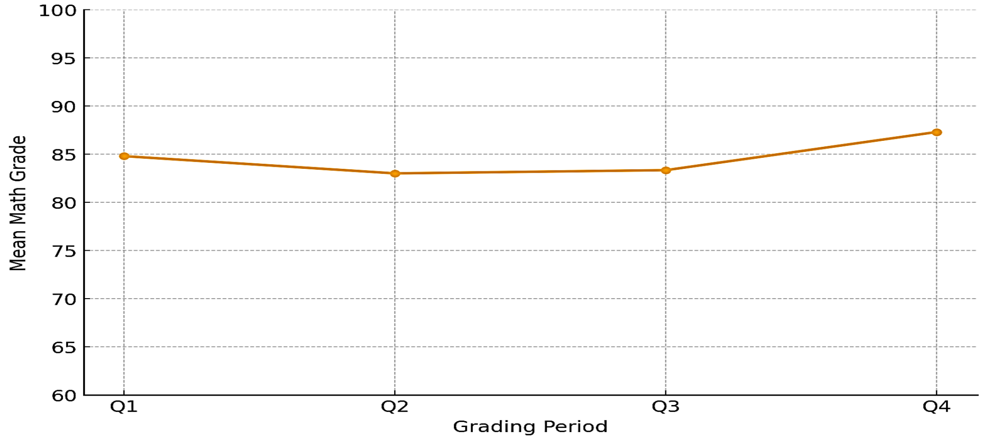

Figure 2. Trends in Mathematics Performance Across Quarters

Table 1. *Repeated Measures ANOVA Results: Trends in Mathematics Performance Across Grading Periods*

Quarter	Compared To	Mean Difference	p-value (Bonferroni)
Q1	vs Q2	1.747	< .001*
	vs Q3	1.44	.002*
	vs Q4	-2.506	< .001*
Q2	vs Q3	-0.307	1
	vs Q4	-4.253	< .001*
Q3	vs Q4	-3.946	< .001*

To statistically confirm the observed trends in performance, a repeated measures ANOVA with Bonferroni-adjusted pairwise comparisons was conducted. As shown in Table 1, mathematics grades significantly increased from Quarter 1 to Quarter 2 (MD = 1.747, $p < .001$) and continued to improve in Quarter 3 (MD = 1.440, $p = .002$). However, a notable decline occurred in Quarter 4, with scores significantly lower than those in Quarter 1 (MD = –2.506, $p < .001$), Quarter 2 (MD = –4.253, $p < .001$), and Quarter 3 (MD = –3.946, $p < .001$). No significant difference was observed between Quarter 2 and Quarter 3 ($p = 1.000$), indicating a mid-year plateau before the end-of-year drop.

These findings suggest a performance trajectory that rises early in the year, stabilizes mid-year, and then declines sharply toward the end. This may reflect cumulative academic load, motivational fatigue, or reduced engagement over time. Figure 2 illustrates this progression, emphasizing the shift from early improvement to late-year decline.

2. Quarterly Mathematics Performance by Sex

To determine whether male and female students differed in their mathematics performance across quarters, a mixed repeated measures ANOVA was conducted.

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Table 2. Mixed Repeated Measures ANOVA Results on Mathematics Performance by Sex

Effect	**SS**	**df**	**MS**	**F**	**p**	**ε (G-G)**
Quarter	1889	3	629.8	48.51	< .001	0.859
Sex	812	1	812	7.08	0.009	—
Quarter × Sex	150	3	50	3.85	0.01	—

The significant main effect of sex indicates that, on average, one sex consistently outperformed the other across quarters. Meanwhile, the interaction effect reveals that performance trajectories were not parallel. Specifically, female students demonstrated a more stable pattern of performance across quarters, while male students showed a slight decline in the middle quarters before recovering in the final quarter.

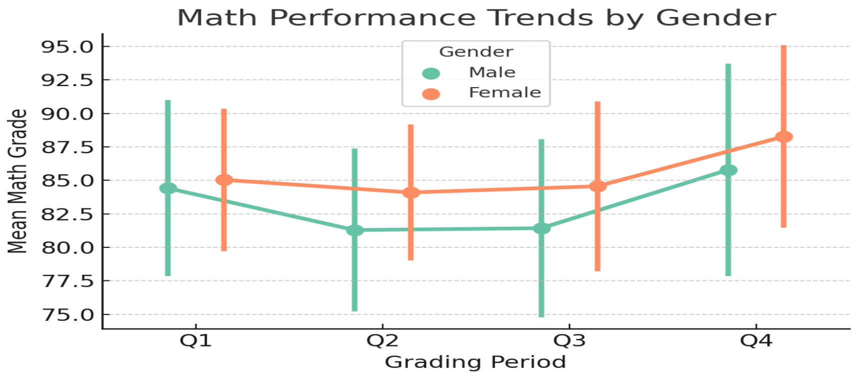

Figure 3. Mean Mathematics Grades Across Quarters by Sex

Figure 3 above visually illustrates these trends. It shows that although both groups followed a generally upward trend by Quarter 4, female students maintained higher mean mathematics grades throughout the academic year.

3. Quarterly Mathematics Performance by Section

To examine whether students' mathematics performance differed based on academic sectioning, a mixed repeated measures ANOVA was conducted. As shown in Table 3 (below), significant main effects were found for both quarter *($F(3, 495) = 57.5, p < .001$)* and section *($F(3, 165) = 90.0, p < .001$)*, indicating that performance varied across grading periods and between section groupings. A significant interaction effect *($F(9, 495) = 13.4, p < .001$)* suggests that the trajectory of performance over time differed depending on section membership.

Table 3. Mixed Repeated Measures ANOVA Results: Mathematics performance by Section

Effect	**SS**	**df**	**MS**	**F**	**p**	**ε (G-G)**
Quarter	1861	3	620.3	57.5	< .001	0.941
Section	12322	3	4107.2	90	< .001	—
Quarter × Section	1300	9	144.5	13.4	< .001	—

These patterns are visualized in Figure 4, which shows that students in higher-ranked sections (Sections 3 and 4) consistently outperformed those in lower sections, with Section 4 demonstrating steady gains across the year. In contrast, lower sections (Sections 1 and 2) had

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relatively lower and more variable scores, though all groups exhibited some improvement by Quarter 4.

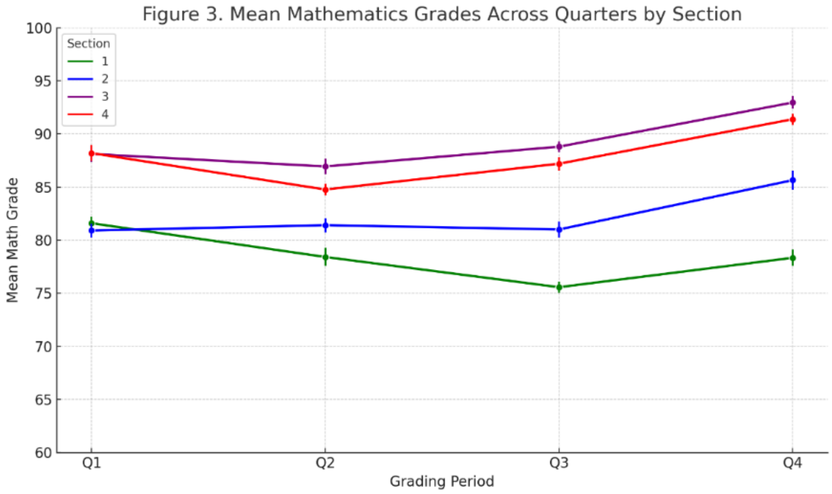

Figure 4. Mean Mathematics Grades Across Quarters by Section

To identify the extent of these differences, Bonferroni-adjusted pairwise comparisons were conducted and are summarized in Table 4. All between-section comparisons were statistically significant *($p < .001$)*, confirming meaningful performance gaps between homogeneous groupings. The largest difference was between Section 3 and Section 1 *(MD = 10.72)*, while the smallest was between Section 2 and Section 1 *(MD = 3.76)*.

Table 4. Pairwise Comparisons of Mathematics Performance Across Sections

Comparison	Mean Difference	pBonferroni
Section 4 vs 2	5.64	< .001
Section 4 vs 1	9.41	< .001
Section 3 vs 2	6.96	< .001
Section 3 vs 1	10.72	< .001
Section 2 vs 1	3.76	< .001

Note. *Although section labels in the school originally identified Section 1 as the highest-performing class, the data were recoded such that Section 1 represents the lowest-performing group and Section 6 the highest, to reflect ordinal ranking for statistical analysis.*

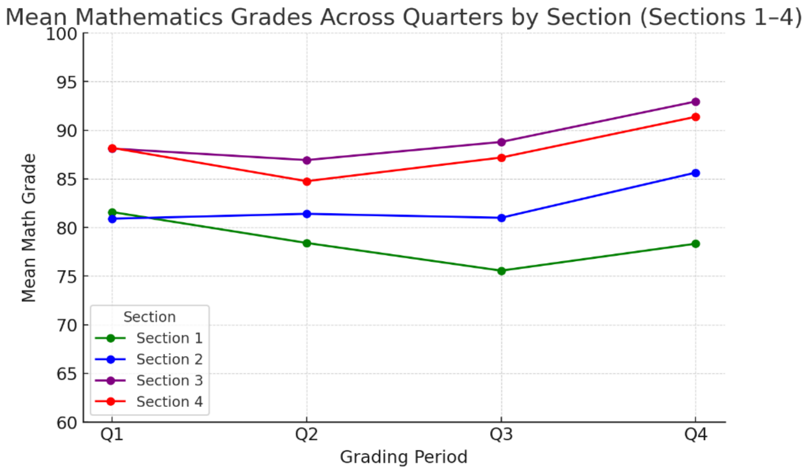

Figure 5: Estimated Marginal Means of Mathematics Performance by Quarter

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4.Interaction Effects of Sex and Section on Mathematics Performance

To assess whether the combined effects of sex and section influenced quarterly mathematics performance, a three-way mixed ANOVA was conducted with Quarter as the within-subjects factor, and Sex and Section as between-subjects factors. The analysis revealed a significant Quarter × Sex × Section interaction *($F(9, 495) = 2.56$, $p = .007$)*, indicating that performance trajectories varied depending on both sex and section placement.

This interaction is detailed in Table 5 below, where patterns suggest that differences between male and female students were more pronounced in certain sections and grading periods. In particular, female students in Section 4 maintained relatively stable and high performance, while male students in the lower sections exhibited greater volatility.

Table 5. Mixed Repeated Measures ANOVA Results: Effects of Sex and Section on Mathematics Performance Across Quarters

Effect	***F***	**df**	***p***
Within-Subjects Effects			
Quarter	57.69	3, 477	< .001
Quarter × Sex	4.03	3, 477	.008
Quarter × Section	13.44	9, 477	< .001
Quarter × Sex × Section	2.95	9, 477	.002
Between-Subjects Effects			
Sex	5.77	1, 159	.017
Section*	86.69	3, 159	< .001

These results underscore the complex nature of student performance in mathematics. The significant interactions suggest that changes in performance across quarters were influenced not only by time but also by the students' sex and their assigned section. While the three-way interaction was not statistically significant, the differing performance patterns across subgroups point to the need for instructional strategies that are both inclusive and sensitive to learner diversity. Greenhouse-Geisser corrections were applied where assumptions of sphericity were violated, and Bonferroni-adjusted post hoc comparisons were used to explore pairwise differences, as detailed in Table 5.

Discussion

1. How does students' mathematics performance vary across the four grading periods?

Mathematics performance increased modestly from Quarter 1 to Quarter 2 (Cohen's d = 0.34), leveled off in Quarter 3, and declined in Quarter 4 (d = 0.45). This pattern mirrors early-year gains followed by late-year deterioration reported in other sub-annual studies (Fuchs, Fuchs, & Compton, 2014). Such mid-year plateaus and end-of-year dips may reflect growing curricular demands, assessment fatigue, or reduced instructional novelty. The declines suggest that cumulative workload and assessment pressure may exceed students' adaptive capacity as the academic year progresses, underscoring the diagnostic value of quarterly monitoring. Timely feedback loops and staggered intervention checkpoints might help mitigate these downturns.

2. How do these trends in mathematics performance differ between male and female students?

A significant Quarter × Sex interaction (partial $\eta^2 = .04$) showed that male and female students followed distinct trajectories even though mean sex differences were small. Female

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scores remained comparatively stable through Quarter 3, whereas male scores rose in Quarter 2 but fell more sharply by Quarter 4. Similar time-specific sex divergences have been noted when ancillary skills are controlled (Lu, Zhang, & Zhou, 2023). This suggests that while achievement levels may converge, the learning process—and its vulnerabilities—may differ. The present pattern points to quarter-specific motivational or confidence factors that may differentially affect boys and girls. Instructional strategies such as confidence-building tasks, goal-setting routines, or growth mindset framing may prove beneficial if introduced before known dips in motivation.

3. Does mathematics performance significantly differ among the various class sections across grading periods?

Section membership accounted for nine percent of the variance in quarterly scores (Quarter × Section, partial $\eta^2 = .09$). Higher-ranked sections (3 and 4) began the year with stronger baselines and sustained steeper gains, whereas lower-ranked sections (1 and 2) experienced deeper Quarter 3 to 3-Quarter 4 declines. Although instructional practices were not measured, discourse-rich classrooms are known to support stronger mathematics growth (Banes et al., 2019), and grading-policy changes can alter quarterly trends (Huey, 2022). It is plausible that higher-performing sections received more cognitively demanding tasks or sustained teacher expectations, which buffered their progress. Future studies pairing classroom observation with performance tracking are needed to test these mechanisms. Additionally, curriculum pacing guides and differentiated resource allocation could help ensure that lower sections receive equitable instructional support across quarters.

4. Which sections significantly differ from one another in terms of mathematics performance?

Bonferroni-adjusted comparisons confirmed a clear hierarchy: Sections 3 and 4 scored significantly higher than Sections 1 and 2 (all $p < .001$; $d = 0.82–1.05$). No difference emerged between Sections 3 and 4 ($p = .434$; $d = 0.12$). Sections were recoded so that Section 1 represents the lowest-performing group and Section 4 the highest. Prior research links ambitious and cognitively demanding instruction to similar hierarchies (Kim, Salloum, Lin, & Hu, 2022); however, direct evidence of teaching practices was outside the scope of this study. Nevertheless, these patterns highlight the possible reinforcing effect of high expectations, peer effects, and access to enriched learning environments on sustained academic advantage.

5. What are the combined effects of sex and section on students' mathematics performance across quarters?

The significant Quarter × Sex × Section interaction (partial $\eta^2 = .02$) indicates that trajectories depend jointly on sex and section. Female students in Sections 3 and 4 maintained growth during demanding quarters, aligning with findings that discourse-rich settings bolster girls' mathematics self-concept (Banes et al., 2019). Male students in Sections 1 and 2 showed greater volatility, consistent with evidence that low-ability grouping can depress long-term progress (Nelson & Powell, 2018). Analyses of mixed-ability classes suggest that flexible regrouping may narrow such gaps (Chen, 2022). These findings reinforce the need to align instructional differentiation not only with achievement levels but also with socio-emotional factors like confidence and belonging. Differentiated supports should therefore be timed to the quarters when each sex-section subgroup is most vulnerable. Professional development on adaptive pacing and formative assessment use may help teachers scaffold support more responsively across learner profiles.

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Limitations

The study is based on archival quarterly grades from a single Philippine public high school; results may not generalize to other year levels, school types, or regions. Because only teacher-assigned marks were available, instructional quality, student motivation, and classroom climate were not directly measured, and causal inferences cannot be drawn. Variations in grading policies, teacher experience, and pedagogical approaches were not accounted for and may have influenced observed trends. Section labels were treated as fixed, yet the criteria for grouping can vary across cohorts. Finally, some subgroup cell sizes were modest, so effect-size estimates should be interpreted with caution. These constraints highlight the need for multi-site studies that integrate observational and survey data with sub-annual performance tracking, while controlling for classroom-level and instructional variables.

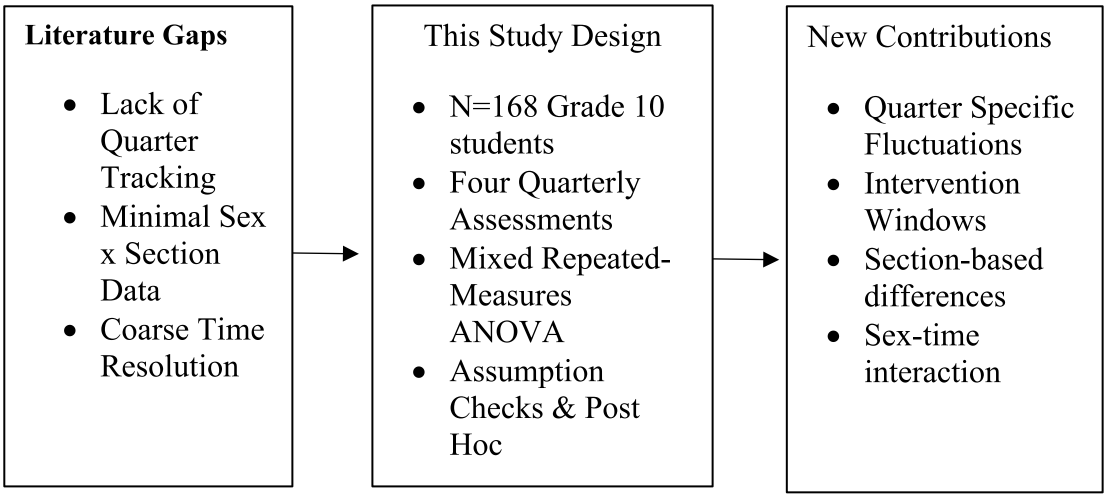

Figure 6. Knowledge Contribution

Figure 6 summarizes the knowledge contribution of the study, linking prior gaps to methodological design and new insights. This framework reflects how sub-annual data analyses can inform equity-focused, adaptive instruction in mathematics education.

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This study addresses critical gaps in both Philippine and international mathematics education research by moving beyond end-of-year snapshots to provide a sub-annual perspective on learning trajectories. By tracking 168 Grade 10 students across four quarterly assessments, the analysis revealed notable fluctuations in Performance—a dip in Quarter 2, relative stability in Quarter 3, and a rebound in Quarter 4—that are not apparent in traditional year-end metrics. The application of mixed repeated-measures ANOVA, complemented by Greenhouse–Geisser corrections, rigorous assumption checks, and Bonferroni-adjusted post hoc comparisons, establishes a replicable methodological framework for future investigations of within-year performance patterns. The results further demonstrate how contextual factors and learner characteristics interact over time. Higher-ranked sections exhibited both higher initial performance and steeper growth curves, highlighting the equity implications of homogeneous ability grouping. Additionally, a significant Quarter × Gender interaction indicated that male and female students follow distinct Performance trajectories at different points in the academic year, underscoring the importance of gender-responsive instructional strategies targeted to

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specific performance windows. These contributions offer evidence-based guidance for scheduling interventions, revising grouping practices, and designing responsive, equity-oriented mathematics instruction. Quarterly monitoring identifies the Q3 plateau and Q4 decline as strategic points for remediation. Gender-responsive supports—confidence scaffolding for girls and engagement boosters for boys, should be timed to subgroup-specific performance troughs. Section-based disparities highlight the need for equitable resource allocation and flexible regrouping or peer-tutoring models. The results also highlight the instructional value of integrating language objectives into STEM subjects, aligning with calls for data-driven, language-aware curricular reforms in Philippine education (Gumilao, 2025).

Conclusion

This study examined quarterly trends in mathematics performance among Grade 10 students and investigated the influence of sex and academic sectioning on performance trajectories. Findings revealed meaningful performance fluctuations across the school year. Student grades showed an early improvement, a midyear plateau, and a notable decline in the final quarter. These patterns suggest that learning progress in mathematics is neither uniform nor constant and may be shaped by both instructional and contextual factors.

Female students consistently outperformed their male counterparts, aligning with prior research on gender-related performance gaps. Moreover, students from higher-performing sections achieved significantly stronger results across all grading periods, indicating the effects of academic grouping. Interaction analyses further revealed that changes in performance over time varied between sexes and among sections, although the three-way interaction was not statistically significant.

Overall, these results underscore the need for continuous monitoring and adaptive support throughout the academic year. Rather than relying solely on final grades, educators should track progress at multiple points to better address the needs of students who may experience mid- or end-of-year setbacks. In the Philippine context, where few studies focus on intra-year academic trajectories, this research provides useful evidence to inform responsive and equitable mathematics instruction.

Recommendations

Based on these findings, the following targeted recommendations are proposed to enhance mathematics instruction and support equitable learning trajectories. Select operational strategies are included to increase practical utility at the school level.

1. Establish Quarterly Data Cycles. Implement systematic quarterly assessments and convene a school-based data team to review results, identify at-risk students, and guide instructional adjustments. Simple data trackers and brief post-quarter reflection meetings among teachers can help translate results into action.
2. Differentiate Instruction and Resources. Train teachers in sex-responsive pedagogy and flexible grouping. Allocate peer tutoring, small-group workshops, and technology supports based on patterns revealed by quarterly data. Use a referral sheet to match students with targeted support based on their performance and needs.
3. Deploy Tiered Support Interventions. Develop a multi-tier support model—ranging from in-class scaffolding to remediation triggered by performance thresholds. A color-coded system (e.g., green/yellow/red) can flag students for specific levels of intervention.
4. Institutionalize Continuous Improvement. Document effective practices from top-performing sections and share these during teacher meetings. Encouraging collaborative planning or informal learning huddles can help scale successful strategies across the school.

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5. For Future Research. Future studies should combine sub-annual performance data with classroom observations and teacher logs. This will help identify when and how instructional factors interact with student groupings over time.

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