Gender Differences in Mathematics Values and Orientation as Predictors of Academic Achievement Among Senior Secondary 1 Students in Southwest Nigeria

RESEARCH ARTICLE

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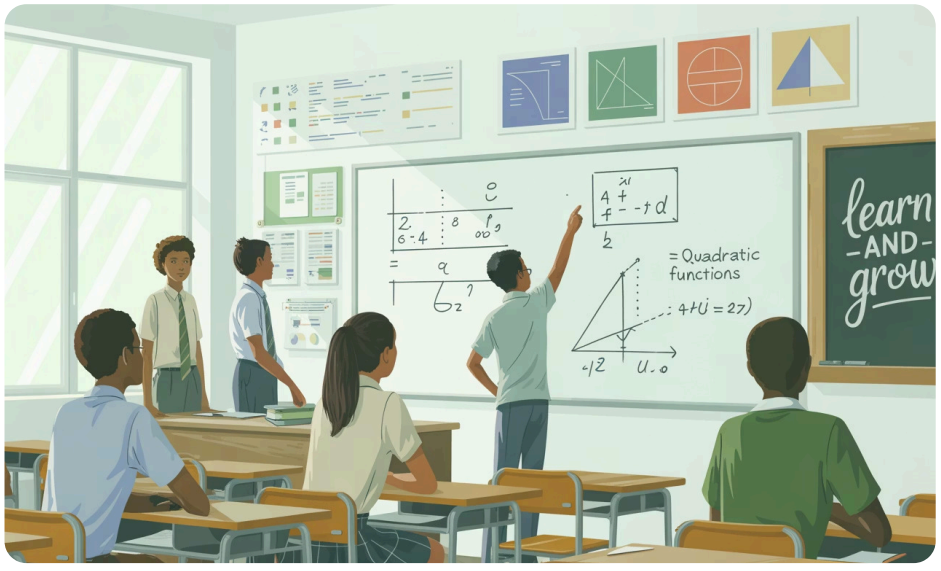

ABSTRACT

This study investigated gender differences in mathematics values and value orientation as predictors of academic achievement among secondary school students in Nigeria. A total of 847 students participated in the study. Descriptive statistics revealed a mean mathematics achievement score of 16.56 (SD = 9.92), with average mathematics values and value orientation scores of 96.06 (SD = 24.67) and 96.30 (SD = 23.27), respectively. A Spearman's rank-order correlation indicated a statistically significant, moderate positive relationship between value orientation and mathematics achievement, $\rho(847) = .234$, $p < .001$. While the correlation was modest, it suggests that students who place greater value on education tend to perform better in mathematics. Gender-based analysis (not detailed here) further emphasised the role of values in academic performance. The study concludes that enhancing students' educational values can contribute to improved achievement. It is recommended that schools adopt value-based learning strategies and promote positive attitudes toward mathematics to foster academic success across gender lines.

Methodology

Causal-comparative research design using data from 847 Senior Secondary 1 students in Southwest Nigeria

Key Variables

Mathematics achievement scores, mathematics values, value orientation, and gender differences

Main Finding

Moderate positive correlation ($\rho = .234$) between value orientation and mathematics achievement

Keywords: Gender Differences, Mathematics Value, Value Orientation, Academic Achievement, Predictors.

INTRODUCTION

Gender remains a central focus in educational research, particularly in the fight against inequality. All genders deserve equal educational opportunity, regardless of life stage or identity. In Nigeria, as Sasu (2022) reports, about 77% of children completed elementary school in 2020, with marginal differences between males (78.2%) and females (77.1%). However, disparities widened in subsequent levels, as middle school (4% gap) and high school (13.8%), indicating rising gender imbalance as education progresses.

Academic achievement, especially through the West African Senior School Certificate Examination (WASSCE), serves as a vital benchmark. Between 2014 and 2024, pass rates fluctuated. In 2014, only 31.28% passed. By 2015, rates improved to 38.68%, and in 2016 crossed the 50% mark with 52.97%. This upward trend continued to 59.22% in 2017, dipped to 48.15% in 2018, then rose again to 64.18% in 2019, 65.24% in 2020, peaking at 81.70% in 2021. Slight drops followed: 76.36% in 2022, 79.81% in 2023, and down to 72.12% in 2024 (Adeyemi, 2024; Adetula, 2024). Gender-specific analysis shows varying performance between males and females, prompting further investigation.

01

Global Education Crisis

244 million children between ages 6-18 were not attending school worldwide in 2021, with conflict as a main reason affecting educational access.

02

Gender Disparities

Girls in vulnerable situations are 2.5 times more likely than boys to miss school, with 50% more women and girls living in conflict areas.

03

Mathematics Achievement Gap

Girls' underperformance in mathematics has long-term impacts, including reduced entry into high-paying, STEM-related fields.

Conflict was one of the main reasons why 244 million children between the ages of 6 and 18 were not attending school worldwide in 2021 (UNESCO, 2022). 50% more women and girls lived in war areas in 2022 (614 million) than in 2017 (UN Women, 2023). According to UNICEF (2017), girls in vulnerable situations are 2.5 times as likely than boys to miss school. Moreover, being in school do not guarantee learning. The global education expansion has not always yielded proportional learning gains (Bonfert & Wadhwa, 2024).

Girls' underperformance in mathematics has long-term impacts, including reduced entry into high-paying, STEM-related fields. Gender stereotypes, shaped from early life, contribute significantly to these patterns. Although women's higher education attainment has improved over 70 years, they still earn about 6% less than men on average and 10% less at the top earning levels (Sevilla & Cuevas-Ruiz, 2022). Improving performance, particularly in mathematics, may rely on value orientation, which has been defined as the attitudes, beliefs, and values individuals and societies hold toward mathematics.

These affect how mathematics is taught and learned and may explain trends such as the drop-in pass rates from 79.81% in 2023 to 72.12% in 2024. Personal value orientation emphasises logic, reasoning, and problem-solving. For instance, students who see mathematics as useful for daily decisions or critical thinking may perform better (Isaac-Oloniyo, 2023). Literature supports the argument that gender disparities in mathematics achievement stem more from orientation and confidence than raw ability. Adediwura & Adeniyi (2010), found that although boys and girls may perform similarly, boys exhibit higher confidence while girls experience more anxiety. Awofala's (2012) decade-long SS3 data in Southeast Nigeria showed boys outperforming girls, especially in rural, single-sex settings, possibly due to context-driven factors.

Conversely, Wahab (2023) showed females had slightly higher mathematics pass rates between 2018 - 2020, although male dominance in tertiary admission persisted. Kwame et al. (2020), comparing Nigeria and Ghana, found mixed results: some regions favoured girls (especially in Ghana's single-sex schools), others found no significant gender gap. These inconsistencies highlight the importance of studying local contexts, as this study does with SS1 students in Southwest Nigeria.

Ajai & Imoko (2014) found no significant gender gap in mathematics outcomes when using Problem-Based Learning (PBL), suggesting that instructional methods affect gender performance. Another study (Arhin & Offoe, 2015) showed similar results that, achievement equalised under performance-based, inclusive pedagogy. This aligns with the present study's focus on value orientation as a mediating factor. Broader studies across Sub-Saharan Africa and India also report persistent gender gaps due to socio-cultural norms (Das & Singhal, 2023). Nigeria's national data from WASSCE exams show year-to-year gender fluctuations. While boys often slightly outperform girls, recent years show closing gaps in some states and even female advantages in mixed schools. However, there's a lack of national data linking performance directly to value orientation, underscoring the originality of this study.

The total percentage was 44.29% of students that had credit in at least five subjects, including mathematics, in the WAEC 2024 exam (49.21% of males and 50.79% of females). In 2025, only 38.32% achieved credit-level passes, with 46.01% being male and 53.99% female, marking a subtle female edge (WAEC, 2025). This trend emphasises the role of data in improving educational outcomes and supports tools like MaVscale that personalise instruction and inform policy (Innovare, 2023).

This research is grounded in Gender Schema Theory (Bem, 1981), which posits that individuals internalise societal norms from childhood. These schemas shape perceptions and behaviour, particularly in gendered domains like mathematics. Boys may grow to see mathematics as aligned with their identity, valuing success in it more, while girls may internalise doubts, even when equally capable (Sevilla & Cuevas-Ruiz, 2022).

The theoretical model presented in Figure 1 (Isaac-Oloniyo, 2023) supports this conceptualisation, showing how age, value orientation, and mathematics values interact to influence students' achievement outcomes.

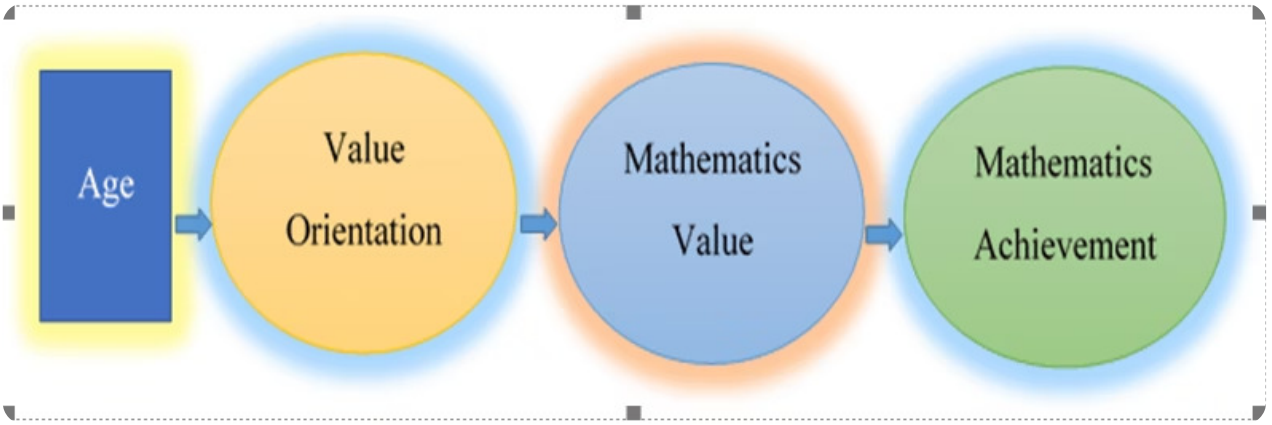

Figure 1: Path Model and Constructs' Relationship

Source: Isaac-Oloniyo (2023)

Value orientation in this study was defined as students' personal dispositions toward mathematics, including interest, utility, importance, and emotional response factors shaped by societal cues and personal experience. As Isaac-Oloniyo (2023) outlines in their theoretical model, factors like age, orientation, and perceived value of mathematics interact to shape outcomes (Figure 1) Studies support this framework. Adediwura & Adeniyi (2010) showed boys have higher mathematics confidence, while girls feel more anxious, despite equal performance. National WASSCE data (2014-2024) also show inconsistent gender superiority, suggesting performance is shaped by socio-cultural and psychological, not cognitive, factors. Findings from PBL and performance-based teaching methods affirm that supportive pedagogy reduces gender gaps, reinforcing the importance of addressing value schemas (Ajai & Imoko, 2014; Arhin & Offoe, 2015).

Empirical studies further strengthen this theoretical grounding. Awofala (2012) found boys outperforming girls in rural schools, again indicating context-specific outcomes. Kwame et al. (2020) reported mixed gender results between Ghana and Bayelsa, Nigeria. In 2025, though only 38.32% of students achieved credit passes in both English and Mathematics, females outperformed males slightly (WAEC, 2025), possibly reflecting changing gender perceptions in education.

Ultimately, this study aimed at understanding how internalised gender norms affect mathematics value orientation and, consequently, academic performance. Gender Schema Theory explains how such internal schemas affect students' self-beliefs, particularly in mathematics. By applying this theory to SS1 students in Southwest Nigeria, the research explored how early value formation can predict future outcomes and inform interventions that promote gender equity in academic achievement. Value-Expectancy Theory (Eccles et al., 1983) further complements this perspective. It suggests that expectations of success and task value both affect accomplishment choices. Students who think they can succeed and who value mathematics are more inclined to stick with it. These beliefs are themselves shaped by gender norms: boys may expect success due to positive reinforcement, while girls may doubt their capabilities even when equally skilled.

Together, these theories offer a robust foundation for understanding how gendered differences in value orientation develop and how they predict achievement. This study contributes to a growing body of work that seeks to understand not just whether gender disparities exist in mathematics achievement, but why and how to address them through pedagogical, psychological, and sociocultural interventions.

STATEMENT OF THE PROBLEM

Mathematics is one of the backbones of educational development of any country. It was discovered that, the completion rate for upper secondary school in Nigeria is sixty-seven percent (67%) for males, and fifty-three percent (53%) for females. This implies fourteen percent (14%) disparity. The completion rate disparity must be noted as one of the root-cause of gender inequality. So that, advocacy against gender inequality will be more efficient and effective.

Several researchers have discovered many other causes of gender inequality and proffered solutions to such issues. Some studies also have been carried out in the area of the students' achievement. Better still, there is need for more studies to close up the gap of the mathematics achievement between the males and females at the completion of their senior secondary education. For this reason, this study compared the values that male students have for mathematics and have in mathematics, to those that the female students have, in order to improve the students' mathematics achievement.

Core Problems

- 14% completion rate disparity between males and females
- Gender inequality in mathematics achievement
- Long-term impacts on STEM career entry
- Limited understanding of value orientation factors

Research Gap

- Need to examine mathematics values by gender
- Understanding value orientation as predictor
- Assessment of gender-specific interventions needed

Research Objectives

The research objectives for this study were:

1. To determine whether there are significant gender differences in mathematics values among Nigerian students.

2. To examine the relationship between students' value orientation and their achievement in mathematics.

Research Questions

S/N	Research Question	Tool/Statistical Test
1	Are there significant gender differences in mathematics values among Nigerian students?	Mann–Whitney U Test
2	How does value orientation correlate with mathematics achievement?	Spearman Rank Correlation

CONCEPTUAL REVIEW

Mathematics Values

Value orientation in this study was defined as students' personal dispositions toward mathematics, including interest, utility, importance, and emotional response factors shaped by societal cues and personal experience. As Isaac-Oloniyo (2023) outlines in their theoretical model, factors like age, orientation, and perceived value of mathematics interact to shape outcomes. Mathematics values encompass the attitudes, beliefs, and values individuals and societies hold toward mathematics, affecting how mathematics is taught and learned.

Academic Achievement

Academic achievement serves as a primary indicator of educational success and is typically measured through **standardised** assessments and examinations. In the Nigerian context, mathematics achievement is commonly evaluated through instruments such as the West African Senior School Certificate Examination (WASSCE) and other **standardised** tests. Academic achievement in mathematics reflects not only cognitive abilities but also the complex interplay of motivational factors, including value orientation and personal beliefs about the subject.

Mathematics Values

Students' personal dispositions toward mathematics including interest, utility, importance, and emotional responses.

Academic Achievement

Performance measured through **standardised** assessments reflecting cognitive abilities and motivational factors.

Gender Differences

Systematic variations between male and female students in mathematics performance and value orientation.

THEORETICAL REVIEW

Gender Schema Theory

This research is grounded in Gender Schema Theory (Bem, 1981), which posits that individuals internalise societal norms from childhood. These schemas shape perceptions and behaviour, particularly in gendered domains like mathematics. Boys may grow to see mathematics as aligned with their identity, valuing success in it more, while girls may internalise doubts, even when equally capable (Sevilla & Cuevas-Ruiz, 2022). The theoretical model presented in Figure 1 (Isaac-Oloniyo, 2023) supports this conceptualisation, showing how age, value orientation, and mathematics values interact to influence students' achievement outcomes.

Value-Expectancy Theory

Value-Expectancy Theory (Eccles et al., 1983) further complements this perspective. It suggests that expectations of success and task value both affect accomplishment choices. Students who think they can succeed and who value mathematics are more inclined to stick with it. These beliefs are themselves shaped by gender norms: boys may expect success due to positive reinforcement, while girls may doubt their capabilities even when equally skilled. Together, these theories offer a robust foundation for understanding how gendered differences in value orientation develop and how they predict achievement.

Social Cognitive Theory

Social Cognitive Theory emphasises the role of observational learning, self-regulation, and self-efficacy in academic achievement. In the context of mathematics education, students develop beliefs about their mathematical capabilities through direct experiences, vicarious experiences, and social persuasion. Gender differences in mathematics achievement can be partially explained through this theoretical lens, as students observe gender-stereotypical behaviours and internalise beliefs about their mathematical competence based on societal expectations and role models.

Gender Schema Theory

Individuals internalise societal gender norms from childhood, shaping perceptions and behaviour in gendered domains like mathematics.

Value-Expectancy Theory

Expectations of success and task value affect accomplishment choices. Gender norms shape these beliefs differently for boys and girls.

Social Cognitive Theory

Observational learning, self-regulation, and self-efficacy influence academic achievement through direct and vicarious experiences.

EMPIRICAL REVIEW

Several researchers have empirically examined gender differences in mathematics achievement and the role of value orientation in academic performance, both in Nigeria and internationally. We shall thus consider a few of these studies in greater detail to enhance our understanding of their methods and findings.

Literature supports the argument that gender disparities in mathematics achievement stem more from orientation and confidence than raw ability. Adediwura & Adeniyi (2010), found that although boys and girls may perform similarly, boys exhibit higher confidence while girls experience more anxiety. Awofala's (2012) decade-long SS3 data in Southeast Nigeria showed boys outperforming girls, especially in rural, single-sex settings, possibly due to context-driven factors.

Conversely, Wahab (2023) showed females had slightly higher mathematics pass rates between 2018 - 2020, although male dominance in tertiary admission persisted. Kwame et al. (2020), comparing Nigeria and Ghana, found mixed results: some regions favoured girls (especially in Ghana's single-sex schools), others found no significant gender gap. These inconsistencies highlight the importance of studying local contexts, as this study does with SS1 students in Southwest Nigeria.

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Broader studies across Sub-Saharan Africa and India also report persistent gender gaps due to socio-cultural norms (Das & Singhal, 2023). Nigeria's national data from WASSCE exams show year-to-year gender fluctuations. While boys often slightly outperform girls, recent years show closing gaps in some states and even female advantages in mixed schools.

Adediwura & Adeniyi (2010)

Found boys exhibit higher mathematics confidence while girls experience more anxiety, despite similar performance capabilities.

1

2

Ajai & Imoko (2014)

Problem-Based Learning eliminated significant gender gaps in mathematics outcomes, suggesting instructional methods matter.

METHODOLOGY

Research Design

This study adopted a causal-comparative research design to examine gender differences in mathematics values and value orientation as predictors of academic achievement among Senior Secondary 1 (SS1) students in Southwest Nigeria. The use of this design is appropriate for several key reasons and aligns well with both the research objectives and theoretical underpinnings of the study.

Causal-comparative design, also known as ex post facto design, is used to explore possible cause-effect relationships between independent and dependent variables without manipulation of the variables. In this study, gender is the independent variable, while mathematics values, value orientation, and academic achievement serve as the dependent constructs.

RESULTS AND DISCUSSION

Results

The results of the analyses were hereby presented:

Table 1:Tests of Normality

Variable	Kolmogorov–Smirnov[a]			Shapiro–Wilk		
	Statistic	df	p	Statistic	df	p
Val	.082	847	.000	.965	847	.000
Orient	.074	847	.000	.975	847	.000
MAT	.126	847	.000	.931	847	.000

Note. [a] Lilliefors significance correction applied.
p = significance value.

Table 1 shows the results of normality tests. Then, the results of the Research Questions follow.

Research Question 1: Are there significant gender differences in mathematics values among Nigerian students?

The results of the Mann-Whitney U Test as the non-parametric for Research Question 1 were shown in Table 2 and Table 3:

Table 2: The Ranks' results of the variables used for the Mann-Whitney U Test

Variable	Gender	N	Mean Rank	Sum of Ranks
MAT_valuc	Male	384	406.61	156139.50
	Female	456	432.19	197080.50
Total		840		

In Table 2, the Ranks' result show that, female had higher mean rank = 432.19.

Table 3 shows the Grouping Variable of the Gender.

Table 3: Results of the Mann-Whitney U Test for Mathematics Value by Gender

Test Statistic	Value
Mann–Whitney U	82,219.50
Wilcoxon W	156,139.50
Z	–1.522
Asymptotic Significance (2-tailed)	.128

In Table 3, the U-value (Mann-Whitney U statistic) = 82219.500, p-value = .128. Since p>0.05, then there is no significant difference in mathematics values between genders.

Research Question 2: How does value orientation correlate with mathematics achievement?

The Spearman's rank-order correlation results conducted to assess the relationship between the two variables, indicated a statistically significant, positive correlation in Table 4.

Table 4: Correlations

Spearman's rho	MAT_scores	MAT_valorient
MAT_scores		
Correlation Coefficient	1.000	.234**
Sig. (2-tailed)	.	< .000
N	847	847
MAT_valorient		
Correlation Coefficient	.234**	1.000
Sig. (2-tailed)	< .000	.
N	847	847

16.56

Mean Achievement Score

Average mathematics achievement with SD = 9.92

.234

Correlation Coefficient

Moderate positive relationship between values and achievement

847

Sample Size

Students participated from Southwest Nigeria

DISCUSSION

The present study explored whether significant gender differences exist in mathematics value orientation among secondary school students in Nigeria. The analysis, based on a Mann-Whitney U test, revealed no statistically significant gender difference, $U = 82{,}219.500$, $z = -1.522$, $p = .128$, although female students had slightly higher mean ranks. This suggests that both male and female students in this sample hold relatively similar value orientations toward mathematics.

In a multi-country longitudinal study, Starr et al. (2023) discovered that from early to late adolescence, there is only a slight variance in gender differences in motivational beliefs connected to mathematics, such as perceived competence and task value. Although their research points to changes in views over time, overall motivational structures for girls and boys are still rather comparable.

Nationally, this result reflects positive developments in Nigeria's educational landscape, where increased efforts to promote gender equity and inclusive STEM education are beginning to shift traditional narratives. Programs such as the "Girls in STEM" initiative, supported by both governmental and non-governmental organisations, aim to reduce gender bias and increase female representation in science and mathematics (Adebayo & Olonisakin, 2021).

The current study's finding of a small-to-moderate correlation between mathematics value orientation and mathematics achievement, $\rho(847) = .234$, $p < .001$, further contextualises the gender narrative. Although the effect size suggests moderate practical significance, the strength of the correlation remains relatively weak by conventional standards (Cohen, 1988). This points to the complex nature of academic achievement, which is influenced by a multitude of cognitive, social, and environmental factors.

Gender Convergence Finding

No statistically significant gender difference found in mathematics value orientation, suggesting both boys and girls value mathematics similarly in this sample.

Value-Achievement Relationship

Moderate positive correlation ($\rho = .234$) between mathematics value orientation and achievement indicates values play a role but other factors also matter.

Policy Implications

Results suggest gender-inclusive STEM initiatives and value-based learning strategies can help promote equitable mathematics achievement.

Methodological Considerations and Limitations

This study employed a causal-comparative design, which inherently limits the ability to establish direct causal relationships between mathematics value orientation and achievement. While correlations were identified, these do not imply causation. Future research could benefit from longitudinal or experimental designs to explore causality more robustly.

The study was conducted in Southwest Nigeria, and the observed lack of significant gender differences in mathematics value orientation may be influenced by specific cultural factors prevalent in this region. Local educational policies, societal expectations regarding gender roles in education, and specific pedagogical approaches might contribute to this unique pattern, differentiating it from findings in other cultural contexts. Generalising these findings to other regions or countries should be done with caution.

Potential sampling limitations, such as selection bias, although mitigated by rigorous data collection protocols, could affect the representativeness of the sample. Furthermore, the reliance on self-report measures for value orientation introduces potential measurement limitations, including social desirability bias, which could influence participants' responses.

Recent International Evidence

The findings of this study, particularly concerning gender differences, resonate differently with recent international evidence. The Trends in International Mathematics and Science Study (TIMSS) 2023 findings showed mixed gender patterns globally; while 40 participating countries reported higher mathematics achievement for boys, 17 showed no significant difference, and only 1 country reported higher achievement for girls. This diversity underscores the context-specificity of gender gaps in mathematics.

Contrastingly, recent research by Bulala & Ntumi (2025) on gender gaps in African STEM education continues to highlight persistent structural barriers and societal norms that disproportionately affect girls' participation and performance. Similarly, Madu (2024) observed continued gender imbalances in Nigerian STEM programmes at the university level, with women remaining underrepresented in advanced mathematics and science fields.

These broader findings suggest that while our study indicates a convergence in mathematics value orientation at the secondary school level in a specific Nigerian context, systemic disparities might still emerge or persist at higher educational stages or within different cultural settings. This implies that efforts to promote gender equity in STEM must be multifaceted, addressing both attitudinal factors (as explored in this study) and structural barriers.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. **Gender Parity in Mathematics Value Orientation at Secondary Level:** This study robustly found no statistically significant gender difference in secondary school students' mathematics value orientation in Southwest Nigeria. This suggests that both boys and girls in this context value mathematics similarly, a positive indicator for gender equity in foundational STEM interest, aligning with findings by Starr et al. (2023) and UNESCO (2022) regarding narrowing motivational gaps globally.

2. **Moderate Predictive Power of Value Orientation on Achievement:** A small-to-moderate positive correlation ($\rho = .234$, $p < .001$) was observed between mathematics value orientation and achievement. While valuing mathematics positively influences performance, the moderate effect size underscores that achievement is multifactorial, requiring attention to a broader array of cognitive, social, and pedagogical elements beyond motivation alone.

3. **Contextual Alignment with International Trends:** The absence of significant gender differences in value orientation at this level in Nigeria resonates with the diverse global findings reported by TIMSS 2023, where many countries show no gender achievement gap in mathematics. This contrasts with persistent structural barriers and performance gaps noted in broader African STEM education at higher levels (Bulala & Ntumi, 2025; Madu, 2024), highlighting a critical juncture at secondary education where attitudinal equity can be reinforced.

Policy Implications

The findings from this study carry significant implications for Nigerian educational policy. The observed gender parity in mathematics value orientation at the secondary school level is a testament to the success of ongoing initiatives, such as the "Girls in STEM" programme (Adebayo & Olonisakin, 2021), in fostering inclusive attitudes towards mathematics. Policymakers should build on this foundation by investing further in programmes that reinforce positive attitudes and perceived relevance of mathematics for both genders.

Crucially, given that gender gaps tend to widen at higher educational levels, as highlighted by recent African STEM research (Bulala & Ntumi, 2025; Madu, 2024), targeted interventions are necessary. Policies should focus on bridging the transition from secondary to tertiary education, ensuring that structural barriers, societal norms, and pedagogical practices do not disproportionately affect girls' continued engagement and achievement in advanced mathematics fields. Maintaining gender parity in mathematics values requires sustained support, mentorship, and equitable opportunities to translate value into persistent academic and career pursuits.

Recommendations

1

Strengthen Gender-Inclusive STEAM Programmes

Expand and deepen initiatives like "Girls in STEM" to not only challenge stereotypes but also to provide early exposure and sustained engagement in STEM fields for all students, ensuring equal access to resources and mentorship.

2

Integrate Real-World Relevance into Math Curriculum

Redesign mathematics curricula to explicitly link concepts to real-life applications and career paths, boosting student interest and confidence, particularly for girls, thereby reinforcing their value orientation and perceived utility of mathematics (Starr et al., 2023).

3

Implement Gender-Sensitive Teacher Training

Develop comprehensive training programmes for educators focused on fostering inclusive classroom environments, recognising and mitigating unconscious biases, and employing equitable teaching strategies that empower all students to excel in mathematics.

4

Address Structural Barriers in STEM Education

Develop and implement policies aimed at dismantling systemic inequalities and societal norms that disproportionately affect girls' participation and progression in advanced mathematics and STEM fields, especially at tertiary levels (Bulala & Ntumi, 2025; Madu, 2024).

5

Establish Longitudinal Student Tracking

Implement systems to longitudinally track students' mathematics value orientation and achievement from secondary through tertiary education. This will provide critical data to identify precisely when and why gender gaps emerge or widen, allowing for timely, data-driven interventions.

6

Data-Driven Policy Development

Encourage continuous research using gender-disaggregated analysis to inform policy and design context-specific interventions. Regular evaluation of these interventions is crucial to track their long-term impacts on mathematics achievement and equity.

Future Research Directions

1. **Longitudinal Studies on Value-Achievement Trajectories:** Future research should employ longitudinal designs to track the interplay between mathematics value orientation and achievement over time, from early adolescence through young adulthood. This would illuminate critical junctures where motivational shifts occur and achievement gaps may emerge or widen.

2. **Investigation of Cultural and Socioeconomic Factors:** Further studies are needed to deeply investigate specific cultural, socioeconomic, and educational policy factors prevalent in South-West Nigeria and other regions. This will help understand how these unique contexts contribute to gender patterns in mathematics value orientation and achievement, allowing for more nuanced and localised interventions.

3. **Transition from Secondary to Tertiary Education:** Research should specifically focus on the transition period from secondary to tertiary education, examining the factors that influence students' continued engagement, performance, and representation in advanced mathematics and STEM fields, particularly where gender disparities typically become more pronounced.

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CONFLICTS OF INTEREST

The author declares no conflict of interest

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