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THE IMPACT OF CULTURAL AND SOCIAL FACTORS ON LEARNING MATHEMATICS AMONG STUDENTS OF HIGHER INSTITUTION OF KATSINA STATE

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ABSTRACT

This research investigates the impact of cultural and social factors on mathematics learning among students in higher institutions in Katsina State, Nigeria. Given the fundamental importance of mathematical competence in academic and professional fields, understanding the socio-cultural dynamics influencing student engagement with mathematics is essential. The study examines how family background, social expectations, teacher practices, and community resources shape students' attitudes, motivation, and academic performance. Data collected from students through surveys reveal that family support, peer interactions, and culturally relevant instructional methods significantly affect mathematics achievement. Results indicate that while strong family support and community engagement foster positive learning outcomes, social and cultural barriers, including gender norms and limited community resources, hinder student performance. The findings underscore the need for educational policies and teaching practices that consider socio-cultural factors, promoting inclusivity and support tailored to diverse student backgrounds. This study offers recommendations to educators, policymakers, and community leaders on implementing culturally responsive teaching strategies to enhance mathematics education in Katsina State.

Keywords: Culture; Social Factors; Mathematics; Students.

1. INTRODUCTION

In the realm of education, mathematical proficiency stands as a fundamental skill, essential for navigating numerous aspects of modern life. However, the attainment of mathematical competence is not uniform across student populations, and this variation is influenced by a myriad of factors beyond traditional instructional methods. Among these factors, cultural and social elements wield a profound impact on students' attitudes, motivations, and ultimately, their performance in mathematics. Since the 1990s, international large-scale assessments, notably the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS), have consistently highlighted the superior mathematics achievement of students from East Asian countries compared to their counterparts (Chen & Uttal, 1988; Minkov, 2008). Despite varying economic indicators and educational resources among these countries, the shared cultural background, particularly rooted in Confucian heritage, has been identified as a plausible explanation for this trend (Leung, 2001; Leung, Graf, & Lopez-Real, 2006; Stankov, 2010; Watkins & Biggs, 2001; Wong, 2004). However, empirical studies on the relationship between culture and mathematics achievement remain scarce. While some research has explored cultural influences on mathematics education, it often adopts an emic approach, which lacks quantitative examination of this relationship (Berry et al., 2002). In 1980, Hofstede introduced four dimensions to encapsulate culture: power distance, uncertainty avoidance, individualism versus collectivism, and masculinity versus femininity. Power distance pertains to the extent to which members of an organization or institution, such as a family, anticipate and tolerate unequal distribution of power (Hofstede, 2011). Due to the expansive and intricate nature of culture, it is imperative to deconstruct the concept into various dimensions to enhance its scientific utility. Over the past fifty years, numerous cultural typologies (theories) have been advanced to delineate culture, such as the Chinese Culture Connection (1987). Moreover, previous literature has tended to dichotomize cultural effects by focusing solely on the East-West divide, neglecting the diversity of cultural traditions worldwide (Leung, 2002). This limitation undermines the generalizability of findings and restricts understanding of how culture impacts mathematics performance across various cultural contexts.

1.1 Understanding the Influence of Attitudes on Students' Mathematics Performance: A Theoretical and Contextual Exploration

Syyeda (2016) identifies three core components of attitude: affective, cognitive, and behavioral, all of which are interconnected and contribute to students' overall attitude towards learning mathematics. This study draws on the ABC model (Affective, Behavioral, and Cognitive) developed by Ajzen (1993) to examine students' attitudes towards

mathematics, and Walberg's theory of productivity (Walberg, Fraser, & Welch, 1986) to interpret how these attitudes influence performance. According to Walberg's theory, individual psychological attributes and the surrounding psychological environment impact cognitive, behavioral, and attitudinal learning outcomes. This framework is particularly relevant to this study as it helps explain why students form specific attitudes toward mathematics.

Following the ABC model, this research focuses on several attitude-related factors, including students' self-confidence in their mathematics abilities, mathematics anxiety, enjoyment of the subject, perceptions of its usefulness, and intrinsic motivation. The guiding questions for the study include:

- What are the students' attitudes toward learning mathematics?
- Why do students develop a liking or disliking for mathematics?
- What is the relationship between different attitude aspects and students' performance (grades)?
- How do attitudes correlate with students' grades in mathematics?

This research is significant because poor performance in Science, Technology, Engineering, and Mathematics (STEM), particularly in mathematics, presents a barrier to economic and social progress at both individual and national levels. In Tanzania, as in other Sub-Saharan African (SSA) countries, students consistently perform poorly in mathematics and science, diminishing the nation's competitive advantage in the global economy. Countries in SSA, including Tanzania, have been ranked significantly below average in international assessments of student achievement (Bethell, 2016). Bethell emphasizes that the long-term development of SSA countries depends on major improvements in STEM education to remain competitive in a technology-driven global economy. Given the importance of improving students' performance in mathematics, it is crucial to explore the role of attitudes and related factors in shaping academic outcomes. The results of this study will offer valuable insights to educators, parents, students, and other stakeholders, helping to develop strategies to enhance mathematics learning and performance.

1.2 Understanding the Role of Attitude in Mathematics Learning: Self-Confidence, Anxiety and Enjoyment

Attitude is defined as a learned predisposition to react positively or negatively to an object, situation, concept, or person. It reflects individual beliefs, opinions, and feelings, which are often expressed through behavior (Joseph, 2013). Attitudes, behaviors, and emotions are interconnected, with attitudes shaping how people behave toward various stimuli and influencing the relationships between these variables (Joseph, 2013). While attitudes are not directly observable, they can be inferred through measurable responses to certain objects or situations (Ajzen, 1993). In the context of this study, attitudes towards learning mathematics are examined. Syyeda (2016) suggests that attitudes are multidimensional, encompassing three main components: affect, cognition, and behavior. The affective component includes emotions, beliefs, and perceptions about the subject emotions relate to whether students find the subject enjoyable or boring; beliefs are tied to students' confidence in their mathematical abilities; and perceptions reflect their overall view of mathematics. Cognition involves the perceived usefulness of the subject, while behavior refers to the motivation to learn, as reflected in students' actions, commitment, and performance in class. In this study, attitudes towards mathematics are analyzed through the following aspects:

− Self-confidence, anxiety, and enjoyment (affect)

− Intrinsic motivation (behavior)

− Perceived usefulness (cognition)

Self-Confidence: Self-confidence in mathematics pertains to students' perceptions of their own ability to learn and perform well in the subject (Adelson & McCoach, 2011). According to Hannula et al. (2004), self-confidence plays a critical role in learning and directly impacts performance. Van der Bergh (2013) highlights that students with high self-confidence tend to approach mathematical challenges with a belief in their own success, leading to greater academic achievement. Conversely, students with low self-confidence avoid these challenges, limiting their opportunities to develop mathematical skills and succeed (Adelson & McCoach, 2011). Thus, understanding students' attitudes toward their own self-confidence is essential in exploring how it relates to performance.

Mathematics Anxiety: Mathematics anxiety refers to a negative emotional response towards mathematics that causes students to experience stress, tension, and helplessness when confronted with mathematical concepts and tests (Chaman & Callingham, 2013). Zakaria and Nordin (2008) note that this anxiety impairs concentration and learning. Studies have shown that mathematics anxiety negatively affects both attitudes and motivation, which in turn hampers academic performance (Getahun et al., 2016). For instance, Hoorfar and Taleb (2015) found that mathematics anxiety is negatively correlated with metacognitive knowledge the ability to reflect on and control one's learning. Mohamed and Tarmizi (2010), in their comparative study of higher education institutions in Malaysia and Tanzania, also revealed a significant negative correlation between mathematics anxiety and achievement. Given this relationship, it is crucial to assess students' levels of anxiety across different education levels to better understand its impact on their performance.

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Enjoyment of Mathematics:

The enjoyment of mathematics is the extent to which students derive pleasure from learning and engaging with the subject (Kupari & Nissinen, 2013). Syyeda (2016) suggests that enjoyment affects both behavioral and cognitive aspects of attitude. According to the PISA 2012 results (OECD, 2013), students often engage more deeply in learning when they find it enjoyable and interesting. Enjoyment, therefore, plays a significant role in sustaining engagement and fostering a deeper understanding of mathematical concepts. By promoting enjoyment, students are more likely to embrace problem-solving and improve their learning outcomes. Thus, evaluating students' enjoyment of mathematics is critical in tracking both their learning progress and academic performance.

1.3 Exploring Factors Influencing Students' Motivation and Attitude Towards Mathematics

Intrinsic motivation and Perceived Usefulness:

Intrinsic motivation in this study relates to students' interest in and desire to learn mathematics (Guy, Cornick, & Beckford, 2015). Students are intrinsically driven to engage with mathematics when they find it interesting (OECD, 2013). Motivation is often seen as the fundamental force behind learning (Yunus & Ali, 2009). According to the 2012 PISA results from the OECD (2013), intrinsic motivation influences the degree of student engagement, career choices, and academic performance. Thus, examining motivational factors in relation to attitudes and achievement is essential.

Perceived usefulness refers to how students view the significance of mathematics in their daily lives and future (Adelson & McCoach, 2011). Recognizing the importance of mathematics is known to positively affect students' attitudes toward the subject. If students understand the relevance of mathematics in their lives, they are more motivated to study, practice, and learn it (Syyeda, 2016). This study indicates that although many students expressed negative emotions towards mathematics, they demonstrated positive cognitive recognition of its value. According to research by Guy et al. (2015), perceiving mathematics as useful is a positive predictor of success.

Why Do You Like Mathematics?

The analysis of responses to this question initially revealed ten categories, which were condensed into six main themes: the usefulness of mathematics, career prospects, having a good teacher, achieving good results, receiving encouragement and support, and mathematics being a compulsory subject.

Usefulness of Mathematics:

Some students appreciated mathematics because it has practical applications in everyday life, such as in shopping, school, or business. As one respondent remarked, "Mathematics is applied in our daily lives, whether in the shop or business matters" (Lower secondary). Others noted that mathematics aids in other subjects, as another student explained: "I like mathematics because I can apply this knowledge in different subjects like statistics" (Upper secondary). Students also acknowledged mathematics' role in enhancing critical thinking and decision-making skills, with one commenting, "Mathematics improves quick observation and critical thinking" (Lower secondary).

1.4 Career Prospects Having a Good Teacher and having Good Results in Mathematics:

For some students, liking mathematics stemmed from its importance in future careers. Students who aspired to pursue fields such as engineering, science, or business recognized the necessity of strong mathematical skills. As one student explained, "I want to be a pilot or an engineer, so I need to study mathematics because the combinations I want to take include it" (Lower secondary).

A key reason students enjoyed mathematics was having a teacher who made lessons engaging and was supportive and kind. One student stated, "Our teacher teaches well, and that makes mathematics enjoyable" (Lower secondary). Another remarked, "I like mathematics because our teacher is kind and patient" (Primary). This shows how teachers' characteristics significantly impact students' attitudes toward mathematics.

Achieving good results was another factor motivating students to like mathematics. Some respondents mentioned that receiving high grades encouraged them to engage more deeply with the subject. As one student explained, "I like mathematics because I performed well in my last exam and got an A" (Junior Secondary).

Encouragement and Support from Others:

Students also liked mathematics because of the support and encouragement they received from parents, teachers, and peers. When they encountered difficulties, these sources of support helped them persist. One student explained, "My teachers and parents encourage me to keep practicing and correct me when I make mistakes" (Primary), while another said, "When I face challenges, my teachers and classmates help me understand" (Primary). This highlights the importance of external support in building a positive attitude towards mathematics.

Additionally, some students liked mathematics because they found it easy, interesting, or enjoyable, and had confidence in their abilities. One student said, "I enjoy studying mathematics" (Upper secondary), while another added, "I like

mathematics because I am very confident" (Primary). This suggests that making lessons enjoyable and fostering students' confidence can contribute to positive attitudes and improved performance.

Mzomwe, et al. (2019). Investigate Students' Attitude towards Learning Mathematics, Students' learning of and performance in mathematics is affected by a number of factors, including students' attitude towards the subject, teachers instructional practices and school environment.

This research seeks to address this gap by investigating the impact of cultural and social factors on mathematical learning among students in Katsina state. By examining the interplay between cultural backgrounds, societal norms, and educational environments, the study aims to identify the underlying mechanisms through which these factors influence students' mathematical learning experiences. Through this exploration, the research will seek to inform educational practices and policies that will promote inclusivity and equity in mathematics education, ultimately working towards closing the achievement gap and ensuring that all students have the opportunity to succeed in mathematics.

1.5 Objectives of the Study

The aim of this research is to investigate the impact of cultural and social factors on mathematical learning among students, with the goal of enhancing understanding and informing educational practices to promote equitable learning outcomes through the following objectives:

- To explore the cultural backgrounds and social contexts of students and their influence on attitudes towards mathematics learning.
- To investigate the role of family dynamics and community influences on students' mathematic learning experiences.
- To assess the influence of teacher expectations, instructional approaches, and curriculum relevance on students' mathematic learning outcomes.
- To identify effective strategies and to propose recommendations for educators, policymakers, and curriculum developers to create cultural and social response and supportive learning environments that may enhance students' mathematic learning experiences.

2. RESEARCH METHOD

2.1 Study Area

This research was conducted in Katsina State, located in the northern region of Nigeria. Katsina State is home to several higher institutions, including universities, polytechnics and colleges of education, which serve as the focus of this research. These institutions provide a diverse population of students from various cultural, social and economic backgrounds, making them ideal for examining the impact of cultural and social factors on the learning of mathematics.

The research includes both public and private higher institutions such as Umaru Musa Yar'adua University, Hassan Usman Katsina Polytechnic, Federal College of Education Katsina and Al-Qalam University. These institutions offer a variety of academic programs, including mathematics and other STEM subjects.

2.2 Data collection

The data was gathered From higher institution students such as colleges/university who are currently studying mathematics, education mathematics and any other mathematics combinations and Mathematics lecturers who can provide visions into the impact of cultural and social factors on students' learning experiences. Then Parents/Guardians To understand family dynamics and support systems related to mathematics learning. Responses is to ensure that the data is complete and accurately reflects the participants' feedback.

2.3 Statistical Analysis

Regression analysis was used to determine the key predictors of success in mathematics based on cultural and social factors. Analyze the Likert-scale responses to identify patterns and relationships between variables, Summarize the results, discuss the implications for educational practices, and propose recommendations based on the analysis.

3. Result and Discussion

In this section, we present the data, results and analysis examining the impact of cultural and social factors on mathematics learning among students in Katsina State, Nigeria. Through a detailed analysis of the respondents' demographics, educational backgrounds, and socio-cultural influences, we assess the factors that contribute to students' attitudes, motivations and performances in mathematics.

Table 1 Demographic profile of the respondent

Pupils/students Age	Frequency	Percentage
Under 10	5	3.3

10-12	15	10
16-15	40	26.7
16-18	80	53.3
Over	10	6.7
Total	**150**	**100%**
Pupils/students Gender		
Male	80	53.3
Female	70	46.7
Total	**150**	**100%**
Pupils/students Current educational level		
Primary	35	23.3
Secondary	75	50
College/University	40	26.7
Total	**150**	**100%**
family's primary language		
English	2	1.3
Hausa	108	72.0
Yoruba	27	18.0
Igbo	10	6.7
Others	3	2.0
Total	**150**	**100%**
Pupils/students Socioeconomic status		
Low	44	29.3
Lower-middle	48	32
Upper-middle	50	33.4
High	8	5.3
Total	150	**100%**

The age distribution of the Pupils/students in the study reveals that the majority of participants are in the 16-18 age group, with 80 students (53.3%) falling within this range. The next largest group comprises students aged 16-15, with 40 students (26.7%). A smaller proportion of participants are in the 10-12 age group, accounting for 15 students (10%), while 10 students (6.7%) are aged over 18. The youngest group, under the age of 10, has the smallest representation with only 5 students (3.3%). This demographic breakdown indicates that the sample is predominantly composed of older students, suggesting a focus on secondary and higher education levels in the study. The gender distribution of the Pupils/students shows a slight male majority, with 80 male students (53.3%) and 70 female students (46.7%). This indicates that the sample is relatively balanced in terms of gender, with a marginally higher proportion of male participants. The distribution suggests that both genders were adequately represented in the study, allowing for a diverse perspective on the impact of cultural and social factors on learning mathematics.

The Pupils/students current educational level distribution of the respondents indicates that the majority of participants are in secondary school, with 75 students (50%) falling under this category. The second largest group consists of college or university students, comprising 40 students (26.7%). A smaller proportion of respondents are in primary school, accounting for 35 students (23.3%). This distribution highlights that the study primarily focuses on secondary and higher education levels, with a notable representation of college/university students, reflecting a diverse range of academic experiences in the sample.

The distribution of Pupils/students family primary language reveals that the majority of participants come from households where Hausa is the primary language, with 108 students (72.0%) reporting it as their family's main language. A smaller portion of respondents, 2 students (1.3%), have English as their family's primary language, followed by others with 2.0%, and Igbo has 6.7% languages as their family's primary language, while Yoruba representing 18.0% of the sample. This distribution indicates that the study is predominantly influenced by Hausa-speaking families, reflecting the cultural and linguistic landscape of the area. The socioeconomic status of the respondents shows a diverse distribution

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across different income levels. The majority of participants fall within the lower-middle and upper-middle categories, with 48 students (32%) and 50 students (33.4%), respectively. This indicates that a significant portion of the sample comes from middle-income backgrounds. The next largest group is the low socioeconomic status category, comprising 44 students (29.3%). A smaller group, 8 students (5.3%), belong to the high socioeconomic status category. This distribution suggests that the study's participants are largely from middle and lower-middle-income households, with a small proportion from higher-income backgrounds, reflecting a broad range of socioeconomic experiences in the study.

Table 2: Cultural Backgrounds and Social Contexts

S/N	ITEM	SA	A	U	D	SD	Mean
1	My cultural background influences my attitude towards learning mathematics.	35	65	20	27	3	5.3
2	Social interactions with peers impact my motivation to learn mathematics.	47	42	30	31	0	4.4
3	Cultural values in my community emphasize the importance of mathematics learning.	8	25	21	59	37	3.9
4	My community's perception of education influences my engagement with mathematics.	27	26	32	57	8	4.1

The table which examines the influence of cultural backgrounds and social contexts on learning mathematics, the responses reflect a variety of attitudes and experiences. The statement "My cultural background influences my attitude towards learning mathematics" had a mean score of 5.3, indicating that while many students (35) strongly agreed and 65 agreed with this statement, a significant portion (27) disagreed, suggesting that cultural backgrounds may play a more prominent role for some students than others. The statement "Social interactions with peers impact my motivation to learn mathematics" received a mean score of 4.4, indicating a strong consensus that peer interactions have a positive impact on their motivation to learn, as 47 students strongly agreed and 42 agreed. This aligns with the research focus on how social interactions and cultural values can affect student engagement and motivation in academic settings. The responses to the other two items indicate a mixed impact of cultural and community factors on mathematics learning. With a mean score of 3.9, the statement "Cultural values in my community emphasize the importance of mathematics learning" suggests that cultural values are not always seen as a significant influence, as many respondents (59) disagreed with the idea that their community values mathematics highly. Similarly, the statement "My community's perception of education influences my engagement with mathematics" scored a mean of 4.1, with some students agreeing that their community's views on education influence their own engagement, while others (57) disagreed. These results suggest that while some students experience strong cultural and community influences, others may not find these factors as impactful, reflecting the diversity in how cultural and social contexts affect learning outcomes in mathematics.

Table 3: Family Dynamics and Community Influences.

S/N	ITEM	SA	A	U	D	SD	Mean
1	Family support plays a crucial role in my ability to succeed in mathematics.	70	75	1	3	1	4.4
2	My family's expectations influence my performance in mathematics.	46	84	5	10	5	4.0
3	Community resources, such as tutoring programs, impact my mathematics learning.	50	57	15	23	5	3.8
4	Social events in my community affect my focus and performance in mathematics.	66	79	0	4	1	4.4

This table focuses on the role of family dynamics and community influences on mathematics learning, the results indicate strong support for the influence of family and community on students' academic success. The statement "Family support plays a crucial role in my ability to succeed in mathematics" received a mean score of 4.4, reflecting a high level of agreement, with 70 students strongly agreeing and 75 agreeing. This suggests that most students believe family support is vital for their academic achievement, aligning with the research focus on the critical role that familial encouragement and assistance play in student motivation and success in mathematics. Similarly, the statement "My family's expectations influence my performance in mathematics" also had a mean score of 4.0, indicating that family expectations are a significant factor for many students, as 46 strongly agreed and 84 agreed with the statement. These

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findings emphasize the importance of familial pressure or support in shaping students' attitudes and performance in mathematics.

Additionally, community resources and social events are seen as influencing factors, though the responses are more varied. The statement "Community resources, such as tutoring programs, impact my mathematics learning" had a mean score of 3.8, indicating moderate agreement, with 50 students strongly agreeing and 57 agreeing. While some students benefit from external resources like tutoring, the variation in responses (with 23 disagreeing and 5 strongly disagreeing) suggests that access to such resources may not be universal or may not be perceived as highly effective by all. The statement "Social events in my community affect my focus and performance in mathematics" had a mean score of 4.4, showing that many students believe community events significantly impact their academic focus, with 66 strongly agreeing and 79 agreeing. This aligns with the research objective of understanding how external, community-based factors can either enhance or hinder students' academic focus, especially in relation to mathematics learning. Overall, these findings suggest that family and community are influential in shaping students' learning experiences, with family support and social events being particularly significant.

Table 4: Table representing the Teacher Expectations and Instructional Approaches.

S/N	ITEM	SA	A	U	D	SD	Mean
1	My teacher's expectations have a significant impact on my success in mathematics.	40	30	9	41	30	3.1
2	The teaching methods used in my mathematics classes are effective for my learning style.	51	31	17	28	23	3.4
3	The relevance of the mathematics curriculum to real-world problems affects my interest in the subject.	67	50	23	5	5	4.1
4	My teachers provide adequate support and resources for learning mathematics.	27	23	50	23	27	3.0

Morealso this table focuses on teacher expectations and instructional approaches, the responses reveal a mixed perception of the impact of teachers' expectations and teaching methods on students' success in mathematics. The statement "My teacher's expectations have a significant impact on my success in mathematics" received a mean score of 3.1, indicating that the impact of teacher expectations is not universally felt, with 40 students strongly agreeing and 30 agreeing, while a significant portion (41) disagreed. This suggests that while some students feel motivated by their teacher's expectations, others do not perceive these expectations as a key factor in their success. This aligns with the research objective to explore how teacher expectations influence student performance, highlighting that the relationship may not be as influential for all students.

On the other hand, the statement "The teaching methods used in my mathematics classes are effective for my learning style" had a mean score of 3.4, reflecting moderate agreement, with 51 students strongly agreeing and 31 agreeing, but 28 disagreed, suggesting that teaching methods may not always align with students' learning preferences. The statement "The relevance of the mathematics curriculum to real-world problems affects my interest in the subject" scored a mean of 4.1, indicating that many students (67 strongly agreed and 50 agreed) find real-world applicability to be an important factor in their engagement with mathematics. This supports the idea that students are more motivated and interested when they see the relevance of the subject to their daily lives. Lastly, the statement "My teachers provide adequate support and resources for learning mathematics" received the lowest mean score of 3.0, suggesting that many students (50) felt neutral or dissatisfied with the support provided by their teachers. This highlights a gap in the perceived adequacy of teaching resources and support, suggesting that improvements in teacher-student support may be needed to enhance student success in mathematics.

Table 5: Table showing the Effective Strategies and Recommendations.

S/N	ITEM	SA	A	U	D	SD	Mean
1	Educators should incorporate cultural perspectives into mathematics teaching to improve student outcomes.	60	38	40	10	2	4.0
2	Providing additional resources and support tailored to different social contexts enhances learning in mathematics.	70	75	0	15	0	4.5
3	Implementing community-based learning strategies can improve students' performance in mathematics.	32	94	6	10	8	3.9

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4	Policymakers should consider cultural and social factors when developing mathematics education policies	39	63	0	43	5	3.6

Then table 5 focuses on effective strategies and recommendations, the results indicate strong support for incorporating cultural perspectives and providing tailored resources to enhance mathematics learning. The statement "Educators should incorporate cultural perspectives into mathematics teaching to improve student outcomes" received a mean score of 4.0, with 60 students strongly agreeing and 38 agreeing. This suggests a significant belief that integrating cultural elements into teaching methods would improve student engagement and success in mathematics. This aligns with the research focus on understanding how cultural backgrounds impact learning and the importance of adapting educational strategies to students' cultural contexts. Similarly, the statement "Providing additional resources and support tailored to different social contexts enhances learning in mathematics" received the highest mean score of 4.5, indicating overwhelming agreement. With 70 students strongly agreeing and 75 agreeing, it is clear that students perceive tailored support and resources as essential for enhancing their learning experience. This reinforces the idea that addressing social context and individual needs is crucial for improving mathematics education.

The statement "Implementing community-based learning strategies can improve students' performance in mathematics" had a mean score of 3.9, reflecting a strong positive response, with 32 strongly agreeing and 94 agreeing. This suggests that community involvement in the educational process is seen as beneficial for students' academic outcomes in mathematics. However, there was a smaller portion (6) who remained neutral, and 10 disagreed, highlighting that while many students see value in community-based strategies, it may not be universally accepted or applicable. The statement "Policymakers should consider cultural and social factors when developing mathematics education policies" had a mean score of 3.6, indicating moderate support, with 39 strongly agreeing and 63 agreeing. While a majority support the integration of cultural and social considerations in policy development, the presence of 43 students disagreeing and 5 strongly disagreeing suggests that there may be differing opinions on how much influence these factors should have in shaping educational policies. Overall, the findings indicate that culturally responsive teaching, additional support, and community-based strategies are seen as effective approaches for improving mathematics education, but there remains some variation in the extent to which these strategies are embraced.

3.1 Regression Analysis

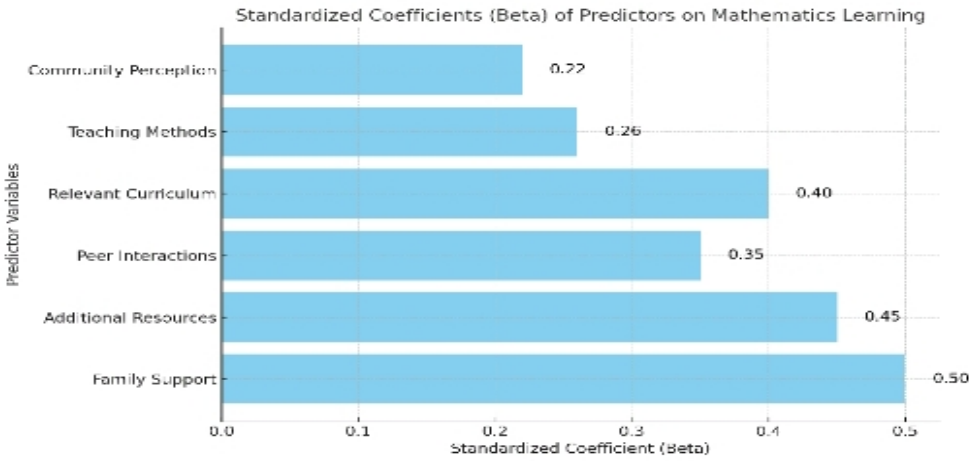

Fig. 1 The overview of how various social and cultural factors influence students' performance in mathematics

The figure 1. provides an overview of how various social and cultural factors influence students' performance in mathematics. Each bar in the chart represents a different predictor variable, with the length of each bar indicating the strength of its influence, measured by the standardized coefficient (Beta). Among the variables, Family Support has the highest Beta value, indicating it is the most impactful factor in enhancing students' mathematics learning outcomes. This finding underscores the critical role that family involvement and encouragement play in shaping a student's motivation and performance in mathematics.

Additional Resources Tailored to Social Contexts also has a strong positive impact, suggesting that access to educational support, such as community tutoring programs or culturally relevant learning materials, can significantly improve mathematics learning outcomes. The influence of tailored resources aligns with the idea that providing students with contextually relevant tools and support not only enhances their understanding but also helps them relate mathematical concepts to their own experiences. Peer Social Interactions is another notable predictor, reflecting the importance of collaborative learning and the motivational boost students may receive from positive peer influences. The remaining

predictors, Relevant Curriculum, Teaching Methods, and Community Perception of Education, while slightly less impactful, also show meaningful contributions to mathematics success. A curriculum that connects mathematics to real-world issues appears to sustain students' interest and relevance in the subject. Teaching methods that align with individual learning styles support deeper comprehension, while community perception indicates that students' engagement is also influenced by how their community values education. These insights suggest that a multifaceted approach that includes family, community support, and teaching strategies may provide the most comprehensive support for students' mathematics learning.

3.2 Discussion of the Findings

This study explored the impact of cultural and social factors on mathematics learning among students. The findings from the data analysis provide valuable insights into how various elements such as cultural background, family dynamics, teacher expectations, and community influences shape students' attitudes, motivation, and performance in mathematics.

Cultural Backgrounds and Social Contexts

The results suggest that students' cultural backgrounds have a noticeable influence on their attitude toward learning mathematics. With a mean score of 5.3, the participants indicated a strong agreement with the statement that their cultural background shapes their approach to learning mathematics. This finding supports the notion that cultural values can play a significant role in students' academic behaviors and attitudes (Nunes, 2016). Social interactions with peers were also found to have a significant impact on students' motivation to learn mathematics, with a mean score of 4.4, indicating a positive relationship. This finding aligns with social learning theories that emphasize the importance of peer influence on student motivation and engagement in learning (Vygotsky, 1978). However, the perception of mathematics learning in the community and cultural values attached to education had mixed results, with many students reporting that their communities do not emphasize the importance of mathematics. This highlights a potential gap between community perceptions of education and the actual emphasis placed on academic subjects like mathematics.

Family Dynamics and Community Influences

The role of family support in mathematics learning was underscored by a high mean score of 4.4, reflecting strong agreement among respondents that family support is crucial for success in mathematics. This finding is consistent with previous research which highlights the importance of family involvement in children's academic achievement (Hill & Tyson, 2009). Additionally, family expectations were found to influence students' performance, further reinforcing the impact of familial factors on academic outcomes. The community's resources, such as tutoring programs, were also positively correlated with improved mathematics learning, although the impact was somewhat less pronounced (mean = 3.8). This suggests that while community resources are beneficial, they may not be as readily accessible or impactful as family support. Social events in the community also showed a strong influence on students' performance, with a mean score of 4.4. This could be interpreted as indicating that external social factors, including community engagement and social gatherings, may either positively or negatively affect students' focus on academic pursuits.

Teacher Expectations and Instructional Approaches

Teacher expectations were found to have a moderately significant impact on students' success in mathematics, with a mean score of 3.1. This suggests that while teacher expectations are influential, the effect may not be as profound as other factors, such as family support and peer interactions. This finding resonates with research indicating that teacher expectations can influence student performance, but this effect may be mediated by other factors such as student self-efficacy and motivation (Rubie-Davies, 2007). The teaching methods used in mathematics classes were moderately effective for students' learning styles (mean = 3.4), indicating that while there is some alignment between teaching approaches and student needs, there is room for improvement. Furthermore, the relevance of the mathematics curriculum to real-world problems (mean = 4.1) was found to be highly motivating for students, suggesting that students are more engaged when they see the practical applications of what they are learning. However, there was a notable concern regarding the adequacy of teacher support and resources for learning mathematics, with a relatively low mean of 3.0. This points to a potential area for improvement in ensuring that students receive the necessary resources and guidance to succeed.

Effective Strategies and Recommendations

In terms of strategies for improving mathematics education, the majority of students agreed that educators should incorporate cultural perspectives into mathematics teaching to enhance student outcomes (mean = 4.0). This finding underscores the importance of culturally relevant pedagogy in making learning more relatable and engaging for students from diverse backgrounds (Ladson-Billings, 1994). Providing additional resources tailored to different social contexts was also highly supported (mean = 4.5), indicating a clear preference for personalized learning approaches that consider

the socio-cultural environment of students. Furthermore, the implementation of community-based learning strategies was seen as an effective means of improving students' performance in mathematics (mean = 3.9). This supports the idea that education should extend beyond the classroom to include community involvement, thus creating a more holistic learning environment. Policymakers were also urged to consider cultural and social factors when developing mathematics education policies (mean = 3.6), although this received a lower level of agreement compared to other strategies. This suggests that while there is recognition of the importance of considering cultural factors in educational policy, there may be hesitations or challenges in translating this into actionable policy changes.

3. CONCLUSION

Overall, the findings suggest that cultural, family, and social factors significantly influence students' learning experiences and outcomes in mathematics. Family support, community resources, and teacher expectations emerged as key determinants of academic success, while the relevance of the curriculum to real-world problems and the incorporation of cultural perspectives in teaching were identified as important factors for improving engagement and motivation. The study also highlights the need for more tailored educational strategies that address the diverse socio-cultural backgrounds of students. These findings provide a foundation for developing more inclusive and effective mathematics teaching practices that take into account the cultural and social contexts of students.

4. RECOMMENDATION

The following recommendation are made to the government in enhancing the learning of mathematics among the students, especially those in higher Institutions for the Katsina state, Northern Nigeria and Nigeria atlarge .

1. Educational institutions should incorporate culturally relevant teaching practices that respect and integrate students' cultural backgrounds. This could include using real-world examples that reflect students' daily lives to explain mathematical concepts.

2. Programs aimed at encouraging female students to participate in mathematics and other STEM subjects should be strengthened. This could include mentorship programs and creating role models within the community.

3. Institutions should engage with parents and guardians, educating them on the importance of mathematics education and how they can support their children academically, regardless of gender or cultural expectations.

4. Establish peer learning groups that encourage collaborative learning in a supportive environment, helping students overcome negative peer influences.

5. The government and institutions should provide financial assistance to students from economically disadvantaged backgrounds to remove the economic barriers to learning.

5. RESEARCH CONTRIBUTION

This research make an important contributions to enriches the existing body of knowledge on how socio-cultural factors influence learning, specifically in mathematics education and provides a framework for understanding these dynamics in a local Nigerian context. The findings also offer actionable perceptions for policymakers, educators and higher institutions on how to address cultural and social barriers that hinder mathematics learning particularly in Katsina State. Morealso, the research can serve as a foundation for shaping educational policies that are more inclusive and sensitive to the socio-cultural realities of students. It emphasizes the importance of tailored interventions for different cultural groups to ensure that all students have equal opportunities to excel in mathematics.

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