



IMPACT OF AFFECTIVE DOMAIN BEHAVIOUR ON SENIOR SECONDARY STUDENTS MATHEMATICS ACHIEVEMENT IN KANO STATE, NIGERIA

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ABSTRACT

Students' emotional responses and expressions in many settings, particularly in mathematics as a subject taught in schools, influence their thoughts, behaviors, and relationships with peers, leading them to regard mathematics as a difficult subject. To that end, the study looked into the impact of affective domain behavior on the mathematics achievement of senior secondary pupils in Kano State, Nigeria. The investigation was led by research question and the accompanying hypothesis. The study employed a

INTRODUCTION

The concept of affective domain behaviour is rooted in the field of psychology, particularly in the study of emotions and their impact on behavior. Emotions are complex psychological and physiological states that arise in response to specific stimuli or events. They involve subjective feelings, physiological changes (such as changes in heart rate or facial expressions), and behavioral tendencies (such as approaching or avoiding certain situations). Galle, Saleh and Awaisu, (2022) defines affective domain behaviour refers to the range of emotional responses and expressions that individuals exhibit in various situations. It encompasses how people experience, express, and regulate their emotions, as well as how emotions influence their thoughts, actions, and interactions with others.

Affective domain behaviour is influenced by a combination of internal factors (such as personality, genetics, and cognitive processes) and external factors (such as social and environmental context). For example, an individual's personality traits, such as extraversion or neuroticism, can influence their emotional responses to different situations (Galle, et'al 2022). Similarly, cultural norms and social expectations play a significant role in shaping how individuals express and regulate their emotions. Kibrislioglu (2016) defines affective domain behaviour towards mathematics as liking or disliking of the subject; a tendency to engage in or avoid mathematical activities; a



descriptive survey research approach, with 520 students serving as the sample size. Affective Domain Behaviour Questionnaires (SADBQ) were utilized to gather data, with Strongly Disagree=1, Disagree=2, Agree=3, and Strongly Agree=4 on a four-point Likert scale. SADBQ was validated and piloted, yielding a validity index of 0.77 and a reliability index of 0.77. Data were examined using mean and standard deviation to answer research question, while analysis of covariance (ANCOV) was employed to test the null hypothesis (H_0) at the 0.05 level of significance. The findings revealed that respondents have relatively similar attitudes and emotions toward mathematics across the different statements, with some variations in response for specific statements; thus, there is a significant impact of attitude, value, interest, motivation, self-concept, empathy, and emotional intelligence on students' mathematics achievement in Kano State senior secondary students. Based on the data, it was suggested that positive motives, encouragement, and a strong interest in students' affective behaviour at the affecting knowledge can increase their mathematics ability.

Keywords: Affective Domain, Behaviour, Mathematics, Achievement, Students

belief that one is good or bad at mathematics; and a belief that mathematics is useful or useless. Considering affective domain behaviour towards mathematics, both aspects of beliefs and emotions. Hence, there should be a positive learning environment, so that students can develop a positive behaviour towards the subject that would lead to better performance (Tran, 2012) secondary school mathematics classroom, students are expected to reflect on concrete examples and associate these with abstract theories. A metacognition is based on the premise that “when one understands how his/her cognitive processes work, he/she will be able to control and rearrange these processes for more qualified learning (Adejumo, 2012)”. Secondary school mathematics classroom, students are expected to reflect on concrete examples and associate these with abstract theories. A metacognition is based on the premise that “when one understands how his/her cognitive processes work, he/she will be able to control and rearrange these processes for more qualified learning (Adejumo, 2012)”.

In secondary school mathematics classroom, students are expected to reflect on concrete examples and associate these with abstract theories. A metacognition is based on the premise that “when one understands how his/her cognitive processes work, he/she will be able to control and rearrange these processes for more qualified learning (Adejumo, 2012)”. Metacognition refers to ones knowledge concerning one’s own cognitive.

According to Mohammed and Waheed (2011) reviewed the factor affecting students’ behaviour including; anxiety, self- efficacy, self -concept, motivation, school experiences; Factors associated with the school including the teacher and teaching – teaching materials, classroom management, teachers’ knowledge, attitude towards mathematics, beliefs and motivation.; Factors from home environment and society including educational background, parental expectations and occupation



of the parent. There is no explanation to this but prenatal exposure to testosterone is believed to be the cause. One influence of this exposure is its selective benefit to the right half of the brain, which induces hemispheric differences in girls but not in boys. Davis and Rimm (2011) attributed the under achievement of the females in Mathematics.

Mathematics is an expanding and evolving body of knowledge as well as a way of perceiving, formulating and solving problems in many disciplines. Mathematics is offered in primary and post primary schools in Nigeria as core subject because it is a mandatory requirement for admission into post-secondary school education in Nigeria. It is a basic requirement for day-to-day accomplishment of man's social economic and technological needs. Such importance justifies its inclusion as a compulsory subject in the primary and secondary school levels of education system (Kibrisioglu, 2016). Mathematics teachers have the problem of students' negative behaviour towards mathematics. Tudy (2014) discovered that only behaviour towards mathematics manifested significant influence to academic performance of the students. Galle and Kukwi (2020) on studies on econometrics test anxiety and students' academic achievement in Nasarawa State University, Keffi, Nigeria, revealed student's attitude is a contributory factor to their academic achievement, resting the high level of anxiety and formative assessment help in reducing the anxiety level to some extent with subject to individual student attitude. In developing a positive affective domain behaviour towards mathematics can improve the mathematics achievement of students (Tudy, 2014). These affects students' affective domain of learning and encompasses a range of behaviors, attitudes, and values. The indices of affective domain include: attitudes, values, interests, motivation, self-concept, empathy, and emotional intelligence as indices which constitutes major obstacles in learning Mathematics among students.

Several studies emerged related to this study such as finding of Esomonu and Anekwe (2021) revealed internal consistency reliability coefficient is 0.805 while the norm is 66.65. A maximum likelihood factor analysis with a varimax rotation yielded four factors: enjoyment of mathematics; value of mathematics; self-confidence in solving mathematics problems and peer pressure influence in learning mathematics. Mzomwe, Calkin and Respickius (2019) results show that initially students exhibit a positive attitude towards mathematics, but their attitude becomes less positive as the students move forward to higher levels of education. A significant positive weak correlation between students' attitude and performance was established. Mathematics' enjoyment and attitude significantly predicted students' performance in our data. The factors influencing the students' liking or disliking of mathematics constituted student's aptitude attribute, instructional and social psychological environmental factors. Furthermore, the results show that failure in examinations is attributed to teacher didactic strategies, institutional resources, poor learning and examination strategies, and failure to understand instructions. The results provide insights for future research and inciting changes in teaching- learning practices that would promote mathematics enjoyment and subsequent better performance in the subject. Alphine (2015) findings revealed that, students had a positive attitude towards mathematics and that they perceived mathematics as doable, learnable and important yet this did not translate to good grades. The findings also show that perceptions and beliefs, perceived learning abilities and competencies and previous performances of students in mathematics affected their level of motivation leading to low outcomes. It is against this background that this present study deemed it fit to investigated the impact of affective behaviour on senior secondary students Mathematics achievement in Kano State, Nigeria, summed seven (7) indices of affective domain to formed a research question with corresponding null hypothesis as shown below.



Research Question: The following research question formulated to guide this Study:

RQ: To what extent do attitude, value, interest, motivation, self-concept, empathy, emotional intelligence affect students' mathematics achievement in senior secondary students in Kano State?

Statement of Hypothesis: The following null hypothesis was tested at the 0.05 level of significant.

Ho: There is no significant impact of attitude, value, interest, motivation, self-concept, empathy, emotional intelligence on students' mathematics achievement in senior secondary students in Kano State

MATERIAL AND METHODS

Design

The study adopted a descriptive survey research design. This is because of the implicit nature of the study. The study target population were the all Senior Secondary School two (SSS 2) students who were about to sit for their Senior School Certificate examination in Kano State. Purposive random sampling technique was employed in selecting the ten (10) senior schools thus: Government Secondary School, Kano, Rumfa College, Kano, Government Girls Secondary School, Kano, Government Secondary School, Gwale, Government Girls Arabic Secondary School, Kano, Government Girls College, Kano, Government Secondary School, Dala, Government College, Kano, Government Girls Unity School, Kano, and Government Technical College, Kano and five hundred and twenty (20) students selected as a sample size of the study respectively.

Instrument:

Students' Affective Domain Behaviour Questionnaires (SADBQ) was used for data collection. The SADBQ were designed to capture students' perceptions and beliefs regarding the achievement mathematics as a subject which contained ten (10) items statements on affective domain behaviour anchored on four point Likert scale as Strongly Disagree=1, Disagree=2, Agree=3, Strongly Agree=4. SADBQ was validated and piloted which yielded validity index of 0.77 and reliability index of 0.79 respectively. Data collected were analyzed using mean and standard deviation to answer research question while Analysis of covariant (ANCOV) was used to test the null hypothesis (Ho) at the 0.05 level of significant. The results are presented in the Tables below.

Results

RQ: To what extent do attitude, value, interest, motivation, self-concept, empathy, emotional intelligence affect students' mathematics achievement in senior secondary students in Kano State?

Table 1: Mean and Standard Deviation on Affective Domain Behaviour for Students Mathematics Achievement

Description of Statements	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Std Dev
Mathematics classes make me feel anxious or stressed	320	90	60	50	3.36	1.83
I believe that having a positive attitude towards mathematics helps improve my performance	310	120	60	30	3.52	1.87
I feel motivated and engaged when solving challenging mathematics problems	290	130	50	50	3.31	1.81



I believe that my emotions, such as confidence or frustration, can affect my mathematics achievement.	350	110	40	20	3.63	1.90
I often use effective strategies to manage my emotions during mathematics exams or tests.	320	90	60	50	3.36	1.83
I believe that a supportive learning environment positively impacts my emotional well-being in mathematics classes.	350	130	20	20	3.67	1.91
I feel comfortable seeking help from my mathematics teacher or peers when I am struggling with a concept or problem.	330	130	40	20	3.35	1.83
I believe that my emotional state can influence my level of concentration and focus during mathematics lessons.	350	110	40	20	3.38	1.83
I find it challenging to maintain a positive attitude towards mathematics when I encounter difficulties.	310	160	30	20	3.52	1.87
I believe that managing my emotions effectively can lead to improved mathematics achievement	350	110	40	20	3.63	1.90
Clustered Mean (CM)					3.57	1.88

Table 1 shows mean and standard deviation on affective domain behaviour for students Mathematics achievement. The mean values of all items statements are equal to 3.57 and standard deviation of 1.88. Likewise, the data suggests that respondents have relatively similar attitudes and emotions toward mathematics across the different statements, with some variations in the respond for specific statements. This answered the research that states to what extend do attitude, value, interest, motivation, self-concept, empathy, emotional intelligence affect students' mathematics achievement in senior secondary students in Kano State? Making inference from the Ho, the result is presented in table 2 below.

Ho: There is no significant impact of attitude, value, interest, motivation, self-concept, empathy, emotional intelligence on students' mathematics achievement in senior secondary students in Kano State

Table 2: ANCOVA Test for Significant Impact of Attitude, Value, Interest, Motivation, Self-Concept, Empathy, Emotional Intelligence on Students' Mathematics Achievement

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	221.677 ^a	14	15.834	.499	.002
Intercept	674.760	1	674.760	21.246	.000
Pre-Test	221.677	14	15.834	.499	.002
Error	5716.703	505	31.759		
Total	10412.000	520			
Corrected Total	5938.379	519			



a. R Squared = .037 (Adjusted R Squared = -.038)

Table 2 shows ANCOVA test for significant impact of attitude, value, interest, motivation, self-concept, empathy, emotional intelligence on students' mathematics achievement. At 0.05 level of significant, $Df=14-519=21.246$, $Sig(P)=0.000$. This implies that $P<0.05$, hence the H_0 is not retained, therefor, there is a significant difference impact of attitude, value, interest, motivation, self-concept, empathy, emotional intelligence on students' mathematics achievement in senior secondary students in Kano State.

Discussion of Findings

Finding from Table 1 shows mean and standard deviation on affective domain behaviour for students Mathematics achievement. The mean values of all items statements are equal to 3.57 and standard deviation of 1.88. Likewise, the data suggests that respondents have relatively similar attitudes and emotions toward mathematics across the different statements, with some variations in the respond for specific statements. This answered the research that states to what extend do attitude, value, interest, motivation, self-concept, empathy, emotional intelligence affect students' mathematics achievement in senior secondary students in Kano State? Drawing inferences from null in Table 2 shows ANCOVA test for significant impact of attitude, value, interest, motivation, self-concept, empathy, emotional intelligence on students' mathematics achievement. At 0.05 level of significant, $Df=14-519=21.246$, $Sig(P)=0.000$. This implies that $P<0.05$, hence the H_0 is not retained, therefor, there is a significant difference impact of attitude, value, interest, motivation, self-concept, empathy, emotional intelligence on students' mathematics achievement in senior secondary students in Kano State. Nigeria.

This is in agreement with that of Alphine (2015) findings revealed that, students had a positive attitude towards mathematics and that they perceived mathematics as doable, learnable and important yet this did not translate to good grades. The findings also show that perceptions and beliefs, perceived learning abilities and competencies and previous performances of students in mathematics affected their level of motivation leading to low outcomes. Mzomwe, Calkin and Respickius (2019) results show that initially students exhibit a positive attitude towards mathematics, but their attitude becomes less positive as the students move forward to higher levels of education. A significant positive weak correlation between students' attitude and performance was established. Mathematics' enjoyment and attitude significantly predicted students' performance in our data. The factors influencing the students' liking or disliking of mathematics constituted student's aptitude attribute, instructional and social psychological environmental factors. Furthermore, the results show that failure in examinations is attributed to teacher didactic strategies, institutional resources, poor learning and examination strategies, and failure to understand instructions. The results provide insights for future research and inciting changes in teaching- learning practices that would promote mathematics enjoyment and subsequent better performance in the subject. Esomonu and Anekwe (2021) revealed internal consistency reliability coefficient is 0.805 while the norm is 66.65. A maximum likelihood factor analysis with a varimax rotation yielded four factors: enjoyment of mathematics; value of



mathematics; self-confidence in solving mathematics problems and peer pressure influence in learning mathematics.

Conclusion

It was concluded that, the data suggests that respondents have relatively similar attitudes and emotions toward mathematics across the different statements, with some variations in the respond for specific statements. Meaning, there is a significant impact of attitude, value, interest, motivation, self-concept, empathy, emotional intelligence on students' mathematics achievement in senior secondary students in Kano State. Nigeria,

Recommendations

Based on the major findings, the following recommendations were made:

1. Mathematics teachers should inculcate the right positive value, attitudes and emotions toward mathematics across the different students' affective domain behaviour.
2. Educational stakeholders such as parent/guidance should encourage students positively on their affective domain behaviour (attitude, value, interest, motivation, self-concept, empathy, emotional intelligence) to enhance mathematics achievement in senior secondary students in Kano State. Nigeria
3. The students should be encouraged to apply the taught knowledge and skills through feedback and assignments. There is therefore, a need to offer and build on experiences and opportunities that inspire the students to engage fully in the material fact and acquire knowledge and skills that would enable them excel in the mathematics because they like and value it

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