Teacher Personality Traits as Predictors of Mathematics Achievement among Students in Oyo State, Nigeria

[*1]Ayanwoye, O.K., [2]Akinsola, M. K., & [3]Oyeniran, J.O.
[1]Department of Science Education, Federal University Oye-Ekiti, Ekiti, Nigeria.
[2]Department of Science and Technology Education, University of Ibadan, Ibadan, Nigeria.
[3]Department of Mathematics and Computing Science Education, Emmanuel Alayande University of Education, Oyo State, Nigeria

*Corresponding author email: olubunmi.ayanwoye@fuoye.edu.ng

Abstract
Literacy in mathematics is crucial in almost every area of human endeavour, and no endeavour can be separated from a mathematical bent. Despite all the changes and initiatives, students' achievement in Mathematics at public examinations is still not encouraging. There is therefore the need to shift research focus from teaching strategies and student-related factors to Teacher personality traits. This study therefore examined the teacher personality traits (OCEAN) that would be effective in predicting students' achievement in Mathematics. The study adopted survey design of correlational type. The sample consisted of 1387 students who were randomly selected from 45 public secondary schools across Oyo State. Instruments used were: Teachers' Personality Traits Inventory with five subscales (Neuroticism, r=0.85; Extraversion, r=0.83; Openness, r=0.81; Agreeableness, r=0.68 and Conscientiousness, r=0.78.) and Mathematics achievement test (r=0.82). Multiple regression and Pearson product moment correlation were used to analyse the data at the 0.05 level of significance. Neuroticism (r=0.88); Extraversion (r=0.83); Openness (r=0.97); Aggreableness (r=0.92) and Conscientiousness (r=0.87) had significant relationship with students' achievement in Mathematics. There was a significant joint correlation of personality traits (R=1.00); $(F_{(5,1381)}=502716.05)$ on students' achievement in mathematics with contribution of 99% to the total variance of students' achievement in Mathematics. Students' mathematical achievement was significantly influenced by openness (β=1.59, t=362.92) and agreeableness (β=0.19, t=57.19). Students' mathematical achievement was most impacted by openness. Among other things, it was suggested that mathematics teachers should have personalities that are adaptable, proactive, and dynamic when teaching the subject. Teachers should be exposed to regular series of in-service training.

Keywords: Teaching, Personality trait, Achievement in Mathematics, Oyo State, Nigeria

Introduction
Mathematics has proven beneficial in many facets of human endeavours, beginning from simple day-to-day household mathematical activities to the complex technological inventions. There are no limits to the value of mathematics, and the quantity and calibre of mathematics taught in a nation's educational system determines its level of wealth. No human endeavour can be separated from a mathematical bent, and the study of mathematics is crucial in almost every facet of existence. Ayanwoye and Hamzat (2022) and Smith et al. (2022) elaborated on the potential contribution of mathematics to the study of other academic areas. According to Ayanwoye and Hamzat (2022), Berger et al. (2020) and Wekesa (2017), mathematics is the foundation of science and technology, and mathematical competency is necessary to train the highly skilled workers needed for science, technology, and industry. As a result, understanding national issues would be superficial without mathematics. Scientists and mathematics teachers Falebita et al. (2022), Çiftçi and Yıldız (2019) and Akanmu (2017) hypothesized that since science has been recognized globally as a means of advancing technology, social progress, and economic advancement, mathematics is not only fundamental to these but also the language of science. According to Anaduaka and Olaoye (2018), mathematics is a vital tool for surviving in the current technological era. For this reason, Ayanwoye (2020), Malik and Salman (2018) and Abdulhamid et al. (2017) claimed that teaching mathematics is crucial to human existence since it is all about solving problems. For these reasons, mathematics is now required in the curriculum at both the basic and secondary school levels in Nigeria, as the government believes it should be taken seriously in the country's educational system and as it moves toward technological advancement (Federal Republic of Nigeria (FRN, 2013).

The importance of mathematics in the growth of any country makes students' mathematical performance a highly sought-after and crucial topic in any school (Oladipo & Tomori, 2016; Malik, 2017). Efforts have been made continuously to improve mathematics education, particularly at the post-basic level, in order to provide a solid basis for future research. The general public is very concerned about the problems associated with mathematics education worldwide, but particularly in developing nations like Nigeria (Ayanwoye, 2021). Over the past few decades, Nigerian mathematics education has seen significant changes in terms of curriculum, assessment, and instructional methods. Sadly, despite all the attempts and reforms, mathematics education still appears to be an issue in this nation; pupils' performance on public examinations shows that their attainment is far below average (Ayanwoye, 2021; Aborisade & Adebule, 2014). According to Anaduaka and Olaoye (2018), the meaning of such bad outcomes is that the skills that these students are supposed to gain are repressed. This tendency is not only problematic for the Nigerian educational system, but it also denies the country the opportunity to realize her vision 20: 2020. According to Gonzales and Rosales (2022) and Liu (2023), the majority of research conducted to raise students' achievement in mathematics concentrated mostly on instructional strategies, paying little attention to other psychological factors that also have a big impact on students' performance in the subject.

Improvements in instructional strategy alone are not enough to improve students' achievement in mathematics, according to Davadas and Lay (2018) and Isa (2017). This means that instructional strategy is only one of many factors that could affect how mathematics is taught and learned; other important factors should also be considered. To this end, there is the need to shift research focus from teaching strategies and student-related factors to other psychological factors. Davadas and Lay (2018) have shown that the student's difficulty in learning Mathematics is a product of many factors within the child himself, however, Anigbo (2016) was of the opinion that the success of a lesson depends to a larger extent on the teacher, in the attainment of any educational objective. According to Ayanwoye (2023), teachers are essential components of any educational system. He believed that education is a potent force that can help bring about the desired changes in a country's social and cultural life. He also proposed that the teacher, a human personality, is responsible for shaping and molding the entire educational process. To this end, Kenni (2020) and Isah and Galadim (2023) emphasized the importance of teachers' psychological factors in the teaching and learning of Mathematics and later advocated that personality traits of teachers during teaching be put under proper utilization.

Personality is viewed as strongly ingrained and comparatively stable cognition, emotion, and behaviour patterns. Generally speaking, personality relates to what makes an individual special and what sets them apart from other individuals. Personality suggests the capacity to predict an individual's behaviour or response to various situations. According to Kenni (2020), personality is a dynamic organization of psychophysical systems inside an individual that produces their distinctive cognition, behaviour, and emotional patterns. A person's behaviour is constant over time and differs from what other individuals would do in similar circumstances due to more or less stable internal causes (Child, 2003). According to the aforementioned definitions, personality is an internal process that directs behaviour. In addition to being what distinguishes individuals from one another, personality is what makes behaviours, ideas, and emotions constant—or at least somewhat consistent. Teachers' personality is important in controlling the lessons and the learning process; it plays an important role in the interaction between teachers and students. Researchers, Lukashova and Kadyr (2023) and McCrae et al. (1999) identified five teachers' personality traits (called the BIG FIVE) as affecting the teaching and learning of Mathematics in Nigerian classrooms. These are Openness to experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism (OCEAN).

Openness is a reflection of a teacher's level of creativity, intellectual curiosity, and a penchant for novelty and variation. In addition to expressing a teacher's preference for a range of activities over a rigid schedule, it also describes how creative or autonomous they are. The inclination to be reliable and well-organized, exhibit self-control, act responsibly, strive for success, and choose planned behaviour over impromptu behaviour is known as conscientiousness. A teacher who exhibits high conscientiousness is frequently seen as unyielding and meticulous, whereas a teacher who exhibits low conscientiousness is adaptable and impulsive yet may be viewed as careless and untrustworthy. An extrovert teacher is characterized by qualities like gregariousness, assertiveness, excitement seeking, warmth and positive emotions, such teacher is social and self-assertive and is optimistic in terms of life experience, this teacher accommodates students freely and the students feel free to express themselves before him/her, this will invariably make the students to associate themselves with such teacher and his/her teaching subject (Lukashova & Kadyr, 2023; McCrae et al., 1999).

Extraversion is the behaviour, attitude, or habit of focusing primarily on getting pleasure from things that are not part of oneself. In addition to being social, outspoken, energetic, and aggressive, extraverts typically love

interacting with people. Extraverts get their energy and flourish in social situations. They like activities like parties, community events, public protests, and political or corporate associations that entail sizable social gatherings. They usually function effectively in teams as well. A personality attribute known as agreeableness shows up as warm, thoughtful, cooperative, kind, and empathetic individual behaviours. Instead of being wary and hostile toward other people, agreeableness is a propensity to be sympathetic and helpful. The inclination to feel negative emotions like anger, anxiety, melancholy, and helplessness readily is known as neuroticism. The level of emotional stability and impulsive control is another term for neuroticism. Although a high neurotic instructor has a steady and composed demeanour, they may come out as uninspired and indifferent. Reactive and impulsive, low neurotic teachers are frequently highly energetic people, but they may also come out as unstable or insecure. Among the characteristics of neurotic instructors include shyness, severe anxiety, and an unstable temperament (Lukashova & Kadyr, 2023; McCrae et al., 1999).

Personality facilitates teaching because it allows for communication between the instructor and the student, even when spoken words are not used (nonverbal communication). According to studies (Oludipe, 2012; Ali, 2013), a teacher's personality affects their behaviour in a variety of ways, including how they connect with their students, the teaching strategies they choose, and the learning experiences they choose. When doing educational activities, a teacher's personality must be used effectively. Based on instructor personality style, Gonzales and Rosales (2022) discovered a substantial difference in secondary school pupils' academic achievement. According to Kell (2019), in order to address the demands of each individual student, personality types must be identified. By knowing personality profiles, teachers may take the initiative to find a more suitable match for each student. Since it is one of the main factors influencing students to dislike mathematics, Kim et al. (2019) found that teachers' attitudes and personalities have a significant impact on how students perceive the subject. They recommended that teachers work to build strong relationships with their students and engage in classroom activities that emphasize active teaching-learning and student participation. According to Camilus' (2011) research, students' academic success in Agricultural Science is influenced by the personality traits of their teachers. Nonetheless, Deshmukh (1988) discovered a statistically significant negative connection between temperamental traits and mathematical learning. Based on the aforementioned, it has been established that there is a strong correlation between the personality traits of teachers and students' academic achievement. However, the majority of these studies were conducted in fields other than mathematics, and the extent to which these traits (OCEAN) would predict students' academic achievement in mathematics is the focus of this study.

Statement of the Problem
Despite mathematics being a fundamental and required subject in elementary and secondary school, as well as a prerequisite for admission to almost every subject in Nigerian tertiary institutions, research indicates that students perform poorly in the subject. According to a study of research done to raise students' mathematical proficiency, the majority of these studies concentrated mostly on teaching tactics and paid little attention to other psychological aspects.

Studies have, however, shown that raising students' mathematical proficiency is not solely dependent on improving instructional strategies. They have also highlighted the significance of other psychological aspects in mathematics instruction and learning, and they have subsequently argued for teachers' personality traits to be appropriately managed while teaching.

Various studies have established strong link and relationship between teacher personality traits and students' cognitive achievement, however, most of these studies were carried out outside Nigeria and the few that were conducted in Nigeria were in other areas than Mathematics and the extent at which these teacher personality traits (Openness to experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism (OCEAN)) would jointly and relatively predict students' academic achievement in Mathematics were not examined. This study therefore examined the teacher personality traits (OCEAN) that would be effective in predicting students' achievement in Mathematics in Oyo State.

Research Questions:
1. What is the relationship between teachers' personality traits (OCEAN) and students' achievement in Mathematics?
2. What is the joint contribution of the teachers' personality traits (OCEAN) to students' achievement in Mathematics?
3. What is the relative contribution of the teachers' personality traits (OCEAN) to students' achievement in Mathematics?

Methodology

The study adopted survey of correlational type. This study investigated and reported the existing situations and conditions in view of the variables in the study. The study population composed of Students in the public secondary schools in Oyo State. Mixed method of sample selection was used and One thousand three hundred and eighty-seven (1387) SS 2 students were purposively and randomly drawn from 45 public secondary schools in the three senatorial districts across Oyo state. The following criteria were used in the sample selection:

i.   The school administrator including the mathematics teachers and students in the school must be willing to participate in the study.
ii.   The Mathematics teacher must be the one who taught the class throughout the previous term.
iii. Such Mathematics teacher must have been teaching Mathematics concurrently for the past six years in the same school.

From the list of schools which qualify for inclusion in the study, forty-five public schools were randomly selected.

Research Instruments

Two research instruments were employed in this study. These are:
1.   Teachers' Personality Traits Inventory (TPTI) and
2.   Mathematics Achievement Test (MAT).

Teachers' Personality Traits Inventory (TPTI).

This is a 60-item instrument adapted from the Revised NEO Personality Inventory (NEOPI), The NEOPI has been updated over the years, with its last update published in 2011, McCrae and Costa, (2011). The statements were rated on a four point Likert scale. For evaluation in terms of substance, relevance, extent of coverage, language of presentation, clarity of expression, and general appropriateness, the initial 60-item questionnaire was modified and distributed to specialists in psychology and science and mathematics education. Some of the elements were changed in response to their feedback. A pilot test of the sixty-item instrument was then conducted at an Osun State school. Using the Cronbach alpha measure, the reliability coefficient of the instrument was determined. The average reliability index was 0.79, with neuroticism ($r = 0.85$), extraversion ($r = 0.83$), openness ($r = 0.81$), agreeableness ($r = 0.68$), and conscientiousness ($r = 0.78$).

Mathematics Achievement Test (MAT).

This instrument was designed to measure the students' achievement in Mathematics based on the first term SS 2 scheme of work. A test blueprint was formulated following Bloom's taxonomy of educational objectives. An initial pool of thirty (30) items was developed. The items were subjected to face and content validity by submitting copies to experts in education, educational evaluation and Mathematics education. Twenty-five (25) items survived scrutiny. The 25 validated Mathematics Achievement Test (MAT) was pilot tested at a school in Osun state. The result was used to calculate the average item difficulty of the test and its reliability index was determined using Kuder-Richardson formula 20 (KR-20). Five of the items with extreme (high or low) difficulty indices were removed leaving a total of 20 items on the test with a reliability index of 0.82 and an average item difficulty value of 0.51.

In each School used for the study, the researchers obtained the consent of the Principal, the Head of Mathematics Department and Teachers in the Mathematics Department and discussed the importance of the study and the need for cooperation. The researchers together with other trained research assistants visited the schools to carry out the study on SS 2 Mathematics teachers and students, Mathematics Achievement Test (MAT) was administered on the students followed by the administration of the TPTI, and the content of the instrument was carefully explained to the respondents. A Pearson product moment correlation analysis was performed on the study's data to ascertain the link between the dependent variables and personality characteristics. To investigate the relative and composite contributions of teacher personality qualities to the prediction of students' mathematical success, a multiple regression approach was employed.

Results

Table 1: Descriptive Statistics of Teachers' Personality Traits and Students' Achievement in Mathematics

	Mean	Std. Deviation	N
Achievement	10.28	2.49	1387
Neuroticism	36.00	4.11	1387
Extraversion	33.14	4.26	1387
Openness	35.99	5.04	1387
Aggreableness	30.99	3.74	1387
Conscentiousness	27.00	3.78	1387

The mean (10.28) and standard deviation (2.49) of the achievement scores of students indicates a moderate performance level. The standard deviation reflects some variability, implying that students' performance varies significantly. High neuroticism (Mean = 36.00, SD = 4.11) suggests that teachers may experience stress or emotional instability, which could affect their teaching effectiveness. Extraversion score (Mean = 33.14, SD = 4.26) indicates that teachers tend to have outgoing and interactive personalities, which could positively engage students. High openness (Mean = 35.99, SD = 5.04) suggests that teachers are likely open to new ideas, fostering a learning environment conducive to exploration and creativity. Agreeableness (Mean = 30.99, SD = 3.74) reflects the teachers' cooperative nature, potentially improving student-teacher relationships. A lower (Mean = 27.00, SD = 3.78) score in conscientiousness may suggest a need for increased diligence and organization among the teachers.

Research Question 1: What is the relationship between the teachers' personality traits (OCEAN) and students' achievement in Mathematics?

Table 2: Correlation matrix showing the relationship between Teachers' Personality Traits and Students' Achievement in Mathematics

	Achievement	Neuroticism	Extraversion	Openness	Aggreableness	Conscentiousness
Achievement	1					
Neuroticism	0.88[**]	1				
Extraversion	0.83[**]	0.98[**]	1			
Openness	0.97[**]	0.97[**]	0.95[**]	1		
Aggreableness	0.92[**]	0.86[**]	0.86[**]	0.93[**]	1	
Conscentiousness	0.87[**]	0.95[**]	0.97[**]	0.95[**]	0.94[**]	1

** Correlation is significant at the 0.05 level (2-tailed).

The results in table 2 show significant positive relationship between Mathematics achievement and Neuroticism (r = 0.88); Mathematics achievement and Extraversion (r = 0.83); Mathematics achievement and Openness (r = 0.97); Mathematics achievement and Aggreableness (r = 0.92) and Mathematics achievement and Conscentiousness (r = 0.87). This suggests that higher neuroticism among teachers does not necessarily correlate with decreased student performance. A positive high correlation of extraversion with achievement, indicated that, extraverted teachers may positively influence students' performance. Strong positive correlation of openness trait with students' achievement suggested that openness is a significant predictor of students' performance. High positive correlation of agreeableness trait highlighted that, agreeableness also strongly influences achievement. High positive correlation of conscientiousness indicated that conscientiousness is important for students' success, though not as influential as openness or agreeableness.

Research Question 2: What is the joint contribution of the teachers' personality traits (OCEAN) to students' achievement in Mathematics?

Table 3: Model Summary of the relationship between Teachers' Personality Traits and Students' Achievement in Mathematics

R	R^2	Adj. R^2	Std. Error of the Estm.	ΔR^2	ΔF	df_1	df_2	Sig. ΔF	Durbin-Watson
1.00	0.99	0.99	0.06	0.99	502716.05	5	1381	0.00	2.11

The results show that there is a significant joint contribution of teachers' personality traits to the prediction of students' achievement in Mathematics. R value of 1.00 and R^2 value of 0.99 indicated that 99% of the variability in students' achievement can be explained by teachers' personality traits, suggesting an extremely high predictive power. The Durbin-Watson value of 2.11 which is very close to 2 indicates a minimal level of autocorrelation, validating the model's accuracy in predicting students' achievement.

Table 4: ANOVA of Teachers' Personality Traits and Students' Achievement in Mathematics

	Sum of Squares	df	Mean Square	F	Sig.
Regression	8599.35	5			
			1719.87	502716.05	0.00
Residual	4.73	1381	0.00		
Total	8604.08	1386			

The large F-value (F$_{(5,1381)}$ = 502716.05) and significant p-value (p < 0.00) indicate that teachers' personality traits as a whole significantly predict students' achievement in mathematics.

Research Question Three: What is the relative contribution of each of the teachers' personality traits (OCEAN) to students' achievement in Mathematics?

Table 5: Coefficients of the relationship between Teacher's Personality Traits and Students' Achievement in Mathematics

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	β	t	Sig.	Tolerance	VIF
(Constant)	-6.00	0.03		-197.93	0.00		
Neuroticism	-0.00	0.00	-0.01	-1.02	0.31	0.02	63.87
Extraversion	-0.31	0.00	-0.54	-112.06	0.00	0.02	57.54
Openness	0.79	0.00	1.59	362.92	0.00	0.02	48.41
Aggreableness	0.13	0.00	0.19	57.19	0.00	0.04	27.43
Conscentiousness	-0.20	0.00	-0.31	-63.90	0.00	0.02	57.11

Neuroticism trait has a negligible and non-significant (β = -0.01) impact on achievement, suggesting that it does not meaningfully predict students' success. Extraversion's negative impact (β = -0.54) indicates that excessive extraversion could potentially distract students, reducing achievement levels. Openness' positive and significant (β = 1.59, p < 0.00), shows that openness in teachers promotes higher students' achievement. Agreeableness also positively influences achievement (β = 0.19, p < 0.00), indicating that agreeable teachers foster a supportive environment conducive to learning. While conscientiousness is generally positive, the slight negative coefficient (β = -0.31) suggests that overly meticulous or demanding behaviour could have a mixed effect on students' performance.

Table 6: Coefficient Correlations of the relationship between Teachers' Personality Traits and Students' Achievement in Mathematics

		Conscentiousness	Aggreableness	Neuroticism	Openness	Extraversion
Correlations	Conscentiousness	1.00	-0.76	-0.09	0.28	-0.67
	Aggreableness	-0.76	1.00	0.44	-0.72	0.31
	Neuroticism	-0.09	0.44	1.00	-0.75	-0.56
	Openness	0.28	-0.72	-0.75	1.00	0.07
	Extraversion	-0.67	0.31	-0.56	0.07	1.00
Covariances	Conscentiousness	9.87E-6	-5.24E-6	-8.26E-7	1.93E-6	-5.89E-6
	Aggreableness	-5.24E-6	4.83E-6	2.96E-6	-3.45E-6	1.91E-6
	Neuroticism	-8.26E-7	2.96E-6	9.35E-6	-4.99E-6	-4.80E-6
	Openness	1.93E-6	-3.45E-6	-4.99E-6	4.70E-6	4.06E-7
	Extraversion	-5.89E-6	1.91E-6	-4.80E-6	4.06E-7	7.84E-6

The strong negative correlation (0.76) between conscientiousness and agreeableness suggests that highly conscientious teachers might be less agreeable, possibly leading to a stricter classroom environment. A negative correlation (0.75) between openness and neuroticism here could mean that teachers who are more emotionally stable and less neurotic are also less likely to be rigid, promoting a more open and flexible learning environment. Openness and agreeableness' (0.72) suggests that while openness encourages new ideas, it may conflict with agreeableness, as flexibility may limit structure in class dynamics.

Table 7: Collinearity Diagnostics of the relationship between Teachers' Personality Traits and Students' Achievement in Mathematics

Dimension	Eigenvalue	Condition Index	Variance Proportions					
			(Constant)	Neuroticism	Extraversion	Openness	Aggreableness	Conscentiousness
1	5.98	1.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.01	21.01	0.16	0.00	0.00	0.00	0.00	0.00
3	0.00	47.48	0.00	0.01	0.02	0.00	0.12	0.00
4	0.00	74.50	0.00	0.01	0.02	0.18	0.00	0.11
5	0.00	198.41	0.19	0.02	0.75	0.08	0.52	0.85
6	0.00	223.34	0.66	0.95	0.20	0.73	0.36	0.04

Cite this articles as:
Ayanwoye, O.K., Akinsola, M. K., & Oyeniran, J.O.. (2024). Teacher personality traits as predictors of mathematics achievement among students in Oyo State, Nigeria. *FNAS Journal of Mathematics and Science Education, 6*(1), 168-177.

Dimension 1 has a high eigenvalue (5.98), indicating that it explains the majority of the variance in the model. Subsequent dimensions have very low eigenvalues, suggesting they contribute minimal variance, which may be a sign of potential multi-collinearity. A condition index above 30 often indicates severe collinearity. Dimensions 3 through 6 have high condition indices (47.48, 74.50, 198.41, and 223.34), signaling a significant multi-collinearity risk among some predictors. Neuroticism has a high variance proportion (0.95) in Dimension 6, indicating it may contribute strongly to collinearity issues in that dimension. Extraversion and Conscientiousness show relatively high proportions across Dimensions 5 and 6, suggesting they might also be involved in multi-collinearity. The high condition indices and concentrated variance proportions suggest multi-collinearity among the personality traits (especially Neuroticism, Extraversion, and Conscientiousness). This might impact the model's reliability, as collinearity could distort the estimated relationship between these traits and students' mathematics achievement.

Discussion
The study revealed that certain personality traits in teachers, particularly openness and agreeableness, positively correlate with students' achievement in mathematics. Openness had the highest impact, suggesting that students benefit from teachers who embrace new ideas and flexible teaching methods. Agreeableness also emerged as a significant predictor, likely due to the positive and supportive classroom environment it fosters, which encourages student participation and engagement. Interestingly, extraversion and conscientiousness presented mixed results. While moderate levels of extraversion can positively engage students, excessive extraversion might detract from a structured learning environment. Similarly, high levels of conscientiousness, though generally beneficial, could be detrimental if they result in overly demanding expectations that overwhelm students. The near-zero influence of neuroticism indicates that students' achievements are generally unaffected by teachers' emotional fluctuations, as long as they are not excessive.

This agrees with the ideas of Davadas and Lay (2018); Isa (2017); Ayanwoye (2023); Kenni (2020) and Isah and Galadim (2023) who declared that though, student's difficulty in learning Mathematics is a product of many factors within the child himself, nevertheless, the success of a lesson depends to a larger extent on the teacher, in the attainment of any educational objective. In the cognitive realm, learning and teaching are directly and indirectly tied to teacher personality. Teachers' understanding of their own and others' personality types can aid in both intra-personal and inter-personal growth. The finding also agrees with that of Kenni (2020) where personality characteristics of teachers have been found to be influencing students' academic performance in Agricultural Science. The finding is however at variance with that of Deshmukh (1988) who found negatively significant correlation between Mathematics learning and temperamental dimensions.

When instructors are able to effectively manage their personality qualities, they may both engage students in meaningful activities and address misunderstandings during the teaching process in mathematics classrooms. Also, teachers who are able to regulate their personality traits are more likely to convey mathematical concepts, ideas, and principles in a way that promotes successful learning. Additionally, this implies that students would be actively involved in the teaching-learning process and enhance comprehension of the discourse concept when a teacher makes a calculated effort to manipulate good understanding and control over his or her personality traits taken into consideration in this study during mathematics classes.

This is in confirmation of the fact that the temperament of the teacher is a potent factor in aiding students' achievement in a subject. The result agrees with the findings of Lukashova and Kadyr, (2023); Gonzales and Rosales (2022) and Isa (2017) who stressed the importance of Teacher Personality Traits to Students' Achievement in Mathematics. Therefore, this study has improved our understanding of the personality characteristic factors that may affect students' mathematical success. Thus, it can be inferred from this study that these personality qualities are essential to addressing the issue of low mathematics achievement among Oyo State senior secondary school students.

Teachers' personality traits, particularly openness and agreeableness, are strong predictors of students' achievement in mathematics. These traits create a supportive and engaging learning environment, which is conducive to students' academic success. Conversely, overly high levels of extraversion and conscientiousness can impede students' performance, indicating the need for a balanced approach in teaching styles. For this reason, it is advised that pre-service mathematics instructors in teacher preparation programs take more psychology classes to provide them a solid understanding of teaching techniques. Instead of using a stereotypical personality feature, mathematics teachers should be adaptable, proactive, and dynamic in their teaching. To keep their personality traits up to date, teachers should often participate in conferences, seminars, workshops, and symposia for in-service training.

Besides, Curriculum designers should give adequate attention to personality traits of Mathematics teachers during the development of Mathematics curriculum while Guidance and counselling, in an atmosphere of positive interaction, is suggested as a remedial measure for developing Mathematics teachers' personality traits. Furthermore, Mathematics teachers should be conscious of the influence of their personality traits on their teaching and be able to control them in line to ensure better understanding of mathematical concepts.

Conclusion

This study has underscored the significant influence of teacher personality traits—specifically openness, agreeableness, extraversion, conscientiousness, and neuroticism—on students' achievement in mathematics. Openness emerged as the most substantial predictor, followed closely by agreeableness, with both traits creating a supportive and engaging classroom environment. Teachers who embrace innovation and foster positive relationships are well-positioned to enhance students' outcomes. However, excessive extraversion and conscientiousness were shown to have mixed effects, suggesting that balance in these traits may be essential to prevent a distracting or overly stringent classroom atmosphere. Neuroticism had little effect on students' performance, indicating that minor emotional variations in teachers do not typically impact students' achievement as long as they are well-managed. These findings highlight the necessity of considering teacher personality as a crucial factor in education, suggesting that fostering particular personality attributes in teachers could have a lasting impact on students' academic success in mathematics.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Educational institutions and teacher preparation programmes should integrate personality training into their curriculum.
2. Schools should provide regular workshops, seminars, and conferences that help teachers develop balanced and effective personality traits.
3. Educational institutions should establish a support system within schools that offers teachers access to counseling and personality development sessions.
4. Educational policy makers and curriculum developers should incorporate findings from studies on teacher personality into mathematics curriculum design.
5. Teachers should strive for a balanced approach to teaching by moderating excessive traits, such as extraversion and conscientiousness, which may unintentionally impede students' focus and self-confidence.

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