Influence Of Mathematics Teachers' Personality On Students' Interest And Performance In Senior Secondary School Mathematics In Niger State, Nigeria

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ABSTRACT
This study investigated the Influence of Mathematics Teachers' Personality on Students' Interest and Performance in Senior Secondary School Mathematics in Niger State, Nigeria. The research was guided by six research questions and six hypotheses tested at 0.05apha level of significance. Ex-post facto research design was adopted for the study. The target population for this study was all the 42,433 senior secondary three (SS 3) students in the 224 senior secondary schools of the seven Education Zones in Niger State. It also included all the 382 mathematics teachers who have taught the SS 3 students in their senior secondary school two (SS 2) before they wrote their mock examination in the 2016/2017 session in Niger State owned senior secondary schools. The sample for the study was the SS 3 students and mathematics teachers drawn from the seven Education Zones in Niger State. Multistage Sampling technique was used for this study. Simple random sampling by balloting was used to select three schools, representing each of the seven Education Zones, making a total of twenty one schools from the existing 224 senior secondary schools. Three instruments were used in gathering data for the study. The instruments were; Mathematics Teacher Personality Questionnaire (MTPQ), Students' Interest in Mathematics Questionnaire (SIMQ) and the Students' Mock Result. The Cronbach's Alpha (α) was used to calculate the reliability indices of the MTACQ and SIMQ and they were found to be 0.82 and 0.79 respectively. The data collected were analyzed using mean, percentage and using Chi-Square. The results from the data analyzed revealed that; the students' interest and performance in Mathematics were influenced by the Mathematics Personality attitude. From the results, it was recommended that a proper orientation be given to the Mathematics teacher by the school management, government and professional bodies as to the importance of Mathematics to national development. This will make them put up a good personality before the students which will in turn increase the students' performance in Mathematics. It also recommended that attitudinal training workshops and seminars should be organized for Mathematics teachers to address the way they behave during Mathematics classes.
Keywords: Mathematics, Mathematics Teacher personality, Students' interest, Students' performance.

INTRODUCTION
The Big Five (also called Five Factor Model; FFM) a hierarchical model of personality said to describe the general traits of human universal personality in five factors; extroversion, neuroticism (negative affectivity), conscientiousness, agreeableness and openness (DeYoung, 2010). Besides that, there are several suggestions that personality, gender and intelligence quotient (consisting of verbal and numerical ability tests generating a measure of general intellectual ability) all have a role to play

in predicting academic performance (Leeson, Chiarrochi & Heaven, 2008), particularly that personality traits predict academic performance to a higher extent when IQ is controlled (Rosander, 2013).

A study by Richardson and Arker (2010) suggested that personality styles need to be recognized to meet individual students' needs. Understanding personality profiles allows educators to be proactive in determining a better fit for each student. They also suggested that overall productivity can be enhanced by bringing together individuals with similarities. Mathematics teachers in school are supposed to display certain personality styles such as, emotional stability, approachable, enthusiastic, outgoing, sense of humour, thinker, supportiveness, warm, kind, friendly, just, cheerful, communicative, able to relate to uninterested students and tolerate usage of mother-tongue. Despite this, a concern facing education is the variety of personality styles that could either negatively or positively affect academic excellence in secondary learners (Garcia, Kupczynski & Holland, 2011).

It has been shown that conscientiousness, the ability to persist in task and goal oriented behaviour in order to reach non-immediate reward is the factor most strongly associated with academic performance (John, Naumann & Soto, 2008). Openness, manifesting the tendency to explore, detect and enjoy abstract and sensory information occasionally has positive relationships to academic performance. While extroversion, being sensitive to reward and positive effect occasionally is negatively related to the same criterion (John, Naumann & Soto 2008; DeYoung, 2010 and Rosander, 2013).

In addition, the definition of conscientiousness also includes following norms, planning subsequent tasks and putting them in order of importance, captured in the facets order and self-discipline. All the Big Five factors encompass lower level traits called facets and the ones belonging to conscientiousness show stronger associations to academic performance than the conscientiousness itself (John, Naumann & Soto, 2008). Furthermore, all the above mentioned behaviours belonging to conscientiousness are important in order to go through educational programmes successfully (Veroude, Jolles, Knezevic, Vos, Croiset & Krabbendam, 2013).

For Mathematics teachers to teach effectively, they are expected to attain some certain level of qualifications. There are known to be some studies as to what these qualifications could be, which have categorized Mathematics teachers as liked (excellent, effective, good, qualified) and disliked (hated, amateur and inefficient) (Grieve, 2010 and Helterbran, 2008). As far as the content of this kind of categorization is concerned, it appears that Mathematics teachers have so far been categorized as liked and disliked depending on three basic domains: academic qualifications, relationship with students, and personality traits (Hill & Christian, 2012). As to the third domain, the personalities of Mathematics teachers entail that Mathematics teachers should be polite and friendly, serious, eager to teach, fond of their job, warm, cheerful, and well-balanced. In addition, Mathematics teachers should have creative and flexible viewpoints and high levels of cognitive proficiency and creativity (Eilam & Vidergor, 2011). Furthermore, some studies on the characteristics put emphasis on conscientiousness, agreeableness, openness to experience, and extroverted personality traits in order to yield positive educational results (Eilam & Vidergor, 2011).

According to Vandana (2014), in a comparative study on mathematical interest of 8 standard students he suggested that teachers can stimulate the interest of students in Mathematics by teaching with models, charts, online tutorials and multimedia packages. Students may be given more opportunities to take part in general Mathematics examinations to increase their mathematical interest.

In another study carried out by Nwoke and Ugwuegbulam (2016), they investigated the causes and solutions to Mathematics phobia among secondary school students and recommended that, Mathematics teachers should be retrained periodically in order to have ideas of innovative approaches of teaching Mathematics to avoid phobia.

Spengler, Lüdtke, Martin and Brunner (2013) in their study, personality is related to educational outcomes in late adolescence: Evidence from two large-scale performance, observed that no previous research has assessed personality in a large-scale study of student performance and therefore recommended that since personality is important in explaining educational outcomes, the mathematics teacher should improve on its personality traits.

Recently, another study by Di Giunta, Alessandri, Gerbino, Luengo, Zuffiano, and Caprara (2013) investigated the determinants of scholastic performance: The contribution of personality traits, self-esteem, and academic self-efficacy. They therefore suggested that educators should be aware of students' personality antecedents in order to improve their students' beliefs about their capabilities to master different areas of coursework and to regulating their motivation and learning activities.

Komarraju, Karau and Schmeck (2009) in a study of the role of the big five personality traits in predicting college students' academic motivation and performance, and suggested that teachers could play an active role by mentoring students and providing external rewards for hard work, training students to develop successful learning strategies may increase their confidence in their abilities and providing students with multiple learning and assignment options may also facilitate performance.

Another study by Weber and Ruch (2012) investigated if character strengths matter in school and demonstrated that the strengths of persistence, love of learning, prudence and self-regulation were associated with academic success, in the middle and the end of the school year. Interestingly, certain strengths (persistence, love of learning and prudence) had an indirect effect on academic success through classroom behavior; indicating that students' behaviour in the classroom matter in relation to academic performance.

A study carried out by Eyong, David & Umoh, (2014), investigated the influence of personality traits on academy performance of secondary school students in Cross River State and suggested that the Mathematics teacher should endeavor to be close to their students through interaction outside the classroom. Also Neurotic tendencies such as anger, depression, anxiety, and a low self esteem should be discouraged in students at all levels both at home and in the school. Teachers and counseling psychologists should help students have a positive self esteem through affirmation. This is why guidance and counseling units must be encouraged in all school where this is not the case.

The above beliefs by the aforementioned researchers necessitated this present study in an attempt to further investigate and make recommendations on the influence of Mathematics teachers' personality on students' interest and performance in senior secondary school Mathematics.

Research Questions
The study answered the following research questions:
1. To what extent do Mathematics teachers' personality styles influence students' interest in Mathematics?
2. To what extent do Mathematics teachers' personality styles influence students' performance in Mathematics?

Statement of the Hypotheses
Based on the above research questions, the following null hypotheses were formulated and tested at 0.05 level of significance.

H_{01}: Students' interest in Mathematics is not significantly influenced by Mathematics teachers' personality.

H_{02}: Students' performance in Mathematics is not significantly influenced by Mathematics teachers' personality.

METHODOLOGY
This study employed ex-post facto research design which involves the interpretation of facts without manipulating any variable. The dependent variables are students' interest towards Mathematics and their performance in senior secondary school two Mathematics mock results for the 2016/2017 academic session. The target population for this study was all the 42,433 Senior Secondary Three (SS 3) students in the 224 senior secondary schools of the seven Education Zones in Niger State under the Niger State Secondary Education Board. It also includes all the 382 Mathematics teachers who have taught the Senior Secondary two (SS 2) before they wrote their mock examination in the 2016/2017 session in Niger State owned Senior Secondary Schools. The Senior Secondary three (SS 3) students have been exposed to pre-requisite mathematical skills and knowledge in Senior Secondary two (SS 2) and they have written the Senior Secondary two (SS 2) mock examination for the 2016/2017 session.

Multistage sampling technique was used to select the sample for the purpose of this study. The sample of the study was the Senior Secondary School three (SS 3) students and teachers drawn from the seven Education Zones in Niger State. The seven Education Zones in Niger State include, Bida, Kutugi, Minna, Suleja, Kontagora, New Bussa and Rijau. The sample size for the students' population was found to be 396, but the researcher made use of 420 students for this research which is also a good sample size for the population. Simple random sampling technique by balloting was used to select three schools, representing each of the seven Education Zones, making a total of twenty one schools from the existing 224 senior secondary schools. This represented 9.38% of the total number of schools under the Niger State secondary education board. From the twenty one schools, 20 students each were selected to make the 420 students. The researcher preferred simple random sampling because it gave equal chance to all students to be selected. The entire Mathematics teachers who taught the students during the 2016/2017 session in the sampled schools were used.

In this study, three instruments were used. Two of the instruments developed by the researcher, were used to collect data and the third instrument consists of the students result for the 2016/2017 session, these are:

    a. Mathematics Teacher Personality Questionnaire (MTPQ).
    b. Students' Interest in Mathematics Questionnaire (SIMQ)
    c. Students' Mock result for the 2016/2017 session.

The pilot test was conducted using 20 students and nine teachers. The data obtained were used for the calculation of the reliability indices. Cronbach's Alpha (α) was used in the calculation of the reliability indices of Mathematics Teacher Personality Questionnaire (MTPQ) and Students' Interest in Mathematics Questionnaire (SIMQ). Reliability indices of the two instruments were found to be 0.82 and 0.79 respectively. These were considered to be high enough for a good internal consistency and the instruments were considered to be reliable.

Data analysis was carried out using both the descriptive and inferential statistics. The descriptive statistics include percentage; means and standard deviation were employed in analyzing data for the research question. The mean and standard deviation are used to determine the extent to which the Mathematics teachers' attitude affects the students' interest and performance in Mathematics. Inferential statistics was the Chi-square, which is used to examine the influence of the teachers' attitude on the dependent variable (students' interest and Mathematics performance). The hypothesis was tested at 0.05 level of significance.

RESULTS
Result of the study was presented according to research questions asked and hypotheses formulated
Research Question One
R_{Q1}: *To what extent do Mathematics teachers' personality influence students' interest in Mathematics?*
Table 1. Percentage of the extent to which Mathematics Teachers' Personality influenced Students' Interest in Mathematics.

Teacher Personality	Frequency count of Students' Interest in Mathematics		
	HE	**ME**	**LE**
Extroversion	36(8.6%)	32(7.6%)	20(4.8%)
Agreeableness	26(6.2%)	18(4.3%)	23(5.5%)
Conscientiousness	48(11.4%)	40(9.5%)	29(6.9%)
Neuroticism	26(6.2%)	23(5.5%)	24(5.7%)
Openness	20(4.8%)	21(5.0%)	36(8.6%)

HE=High Extent, ME=Moderate Extent, LE=Low Extent

Table 1 shows the percentage of the extent to which Mathematics teachers' personality influence students' interest in Mathematics. The result reveals that the combined percentage of the high and moderate extent to which Mathematics teachers' personality (Extroversion, Agreeableness, Conscientiousness, Neuroticism and Openness) influence students' interest in Mathematics was (16.2%, 10.7%, 20.9%, 11.7% and 9.8%) respectively and the percentage of those with low extent to which Mathematics teachers' personality influence students' interest in Mathematics was (4.8%, 5.5%, 6.9%, 5.7% and 8.6%) respectively

Hypothesis One
H_{01}: Students' interest in Mathematics is not significantly influenced by Mathematics teachers' personality.

Table 2.Chi-square test of Students' Interest in Mathematics and Mathematics Teachers' Personality

		df	Sig
Pearson Chi Square	783.556		
Likelihood Ratio Chi-Square	734.530	4	0.000

The result from table 2 shows that the two variables, student interest in Mathematics and personality of Mathematics teachers, have influence since p-value = 0.000 is < 0.05. This implies that the null hypothesis, which states that students' interest in Mathematics is not significantly influenced by Mathematics teachers' personality, is rejected. It therefore means that students' interest in Mathematics is significantly influenced by personality of the Mathematics teacher.

Research Question Two
R_{Q2}: *To what extent does Mathematics teachers' personality influence students' performance in Mathematics?*

Table 3.Percentage of the extent to which Mathematics Teachers' Personality influence Students' Interest in Mathematics.

Teacher Personalit	Freq. count of Students' Performance in Mathematics			
	80-100	**70-79**	**40=69**	**<40**
Extroversion	35(8.3%)	31(7.4%)	19(4.5%)	30(7.1%)
Agreeableness	28(6.7%)	26(6.2%)	10(4.2%)	24(5.7%)
Conscientiousness	20(4.8%)	13(3.1%)	14(3.3%)	30(7.1%)
Neuroticism	21(5.0%)	18(4.3%)	14(3.3%)	20(4.8%)
Openness	22(5.2%)	14(3.3%)	10(4.2%)	21(5.0%)

Table 3 shows the extent to which Mathematics teachers' personality influence students' performance in Mathematics. It shows that the percentage of students' with good performance who were taught by teachers with the following personality (Extroversion, Agreeableness, Conscientiousness, Neuroticism and Openness) was 20.2%, 17.1%, 11.2%, 12.6 and 12.7% and the percentage of students' with poor performance were taught by teacher with the following personality (Extroversion, Agreeableness, Conscientiousness, Neuroticism and Openness) was 7.1%, 5.7%, 7.1%, 4.8% and 5.0%.

Hypothesis Two
H02: Students' performance in Mathematics is not significantly influenced by Mathematics teachers' personality.

Table 4. Chi-square test of Students' Performance in Mathematics and Mathematics Teachers' Personality

		df	*Sig*
Pearson Chi Square	132.931		
Likelihood Ratio Chi-Square	140.581	3	0.000

The result from table 4 shows that the two variables, student performance in Mathematics and personality of Mathematics teachers, have influence since p-value = 0.000 is < 0.05. This implies that the null hypothesis, which states that students' performance in Mathematics is not significantly influenced by Mathematics teachers' personality, is rejected. It therefore means that students' performance in Mathematics is significantly influenced by personality of the Mathematics teacher.

DISCUSSIONS
The finding of the study showed that Mathematics teachers' personality influenced the students' interest in Mathematics. The study also agreed with that of Vandana (2014) who suggested that teachers can stimulate the interest of students in Mathematics. This is also in line with the study carried out by Nwoke and Ugwuegbulam (2016) who found out that Mathematics teacher-students relationship and the use of abusive words on students as causes of Mathematics phobia among students which in turn affect their interest in the study of Mathematics. Therefore, this study has shown a clear dependency of students' interest in Mathematics on the personality styles exhibited by the Mathematics teacher during Mathematics class.

The result of this study shows that students' performance in Mathematics is influenced by the Mathematics teachers' personality. This agreed with the study carried out by Spengler, Lüdtke, Martin and Brunner (2013) in explaining educational outcomes have demonstrated the importance of personality traits in predicting academic performance. It also agreed with another study carried out by Di Giunta, Alessandri, Gerbino, Luengo, Kanacri, Zuffiano and Caprara (2013) investigated the relationship between conscientiousness, openness, self-esteem, and academic self-efficacy and academic performance and found conscientiousness and self-esteem to contribute to academic self-efficacy, which indirectly had an effect on senior high school grades. It is in line with Komarraju, Karau and Schmeck (2009), Weber and Ruch (2012) who found persistence, love of learning, prudence, zest, honesty, self-regulation, hope, gratitude and teamwork were associated with academic success indicating that students' behaviour in the classroom matter in relation to academic performance.

Other researchers whose works are in agreement with the findings of this research include Lounsbury, Fisher, Levy & Welsh, (2009), Spengler, Lüdtke, Martin and Bruner, (2013); Rosander, (2013) and Eyong, David & Umoh, (2014) which show that personality predicts academic performance to a higher degree than do Intelligent Quotient (IQ). More specifically personality traits such as conscientiousness and character strengths such as persistence and prudence are most strongly correlated to academic performance. This study which was carried out in Niger State, Nigeria has revealed that the Mathematics teachers' personality style will greatly influence the students' performance in Mathematics.

CONCLUSION
The study focused on the influence of Mathematics teachers' personality on senior secondary school students' interest and performance in Mathematics in Niger State, Nigeria. Particularly, the study examined the following and concluded that the Mathematics teachers must work on his personality so as to have a good relationship with his/her students. The Mathematics teacher should avoid using abusive words on the students. The Mathematics teachers can stimulate the interest of students in Mathematics by his/her personality style. The study also found that the Mathematics teachers' conscientiousness and self-esteem will contribute to students' self-efficacy, which indirectly will have

an effect on the students' performance in Mathematics. Also, some specific parts of personality, such as being gritty, social and emotionally stable can largely influence students' performance in Mathematics.

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