

Original Research Article

Personality Traits and Academic Performance in Mathematics of Secondary Students

MARIA EULAICA R. INTE

Loon South National High School, Philippines

Corresponding Author: Maria Eulaica, E-mail: mariaeulaica.inte@deped.gov.ph

ARTICLE INFO

Article History

Received: May 21, 2020

Accepted: June 25, 2020

Volume: 2

Issue: 2

KEYWORDS

Personality traits, academic performance, secondary education, Mathematics, Philippines

ABSTRACT

Personality, a blend of attitudinal, emotional, and behavioral patterns of an individual, is a non-cognitive aspect of learning which is considered as one of the key factors to academic performance in Mathematics. This study assessed the personality traits and academic performance of 203 junior high school students out of the 413 total population in Loon South National High School, Bohol. The proportionate random sampling design was used to eliminate systematic bias. The personality traits were identified through a standardized tool patterned from the Big Five Inventory. The academic performance was measured according to the general average of the first two quarters in mathematics. To determine the personality traits of students, the weighted mean was used. For the degree of relationship between personality types and academic performance, the Pearson Product-Moment Coefficient Correlation was used while to determine the significant degree of difference between personality traits and academic performance of male and female respondents, the data were subjected to T-Test for uncorrelated means. To determine the significant degree of relationship between the profile and the personality traits, profile and academic performance, the researcher used the Chi-Square Test for Independence. Furthermore, the One-Way Analysis of Variance (ANOVA) was used to determine the significant degree of variance of academic performance when grouped according to personality traits and the academic performance in the four grade levels. Results showed that respondents have moderately high level of conscientiousness, agreeableness, openness to experiences and extraversion and slightly high level of emotional stability. The most dominating personality was agreeableness and the least dominating was emotional stability. In general, respondents have satisfactory academic performance in mathematics. Personality trait as a whole was found to be insignificantly correlated with academic performance in all grade levels. An insignificant difference was found between personality traits and gender while a significant difference was found between academic performance and gender. The following variables were significantly correlated: sex and academic performance, age and personality traits, grade level and personality traits. Hence, there is a need to focus on programs on increasing emotional stability, understanding gender-sensitivity towards improving academic performance in mathematics of secondary students.

Introduction

“Innate cognitive ability is a key predictor to academic success in Mathematics”. This is the widely accepted notion across various fields in the educational setting. However, latest research revealed that there are non-cognitive aspects which are also considered key factors to high academic performance. One of which is personality (Ciorbea and Pasarica, 2013).

The American Psychology Association defined personality as the individuals' differences in characteristic patterns of thinking, feeling and behaving. It was recognized as a determining factor in how people learn. According to Saxena and Mishra (2015), successful students were characterized by their punctuality, attentiveness, participation, and time management skills. These tend to be the pattern for individuals who are good at Mathematics too. However, although most of us believe that achievers in Mathematics have common trait patterns, it is still an issue if these personality patterns are universal. Research shows that students who performed well in Mathematics have high Extroversion, Openness to new experiences, Agreeableness, and Conscientiousness (Daezadeh, Homayouni, Hosseinzadeh, and Fakori-hajiyar, 2014). On the other hand, in a study conducted by Suvarna and Ganesha Bhata (2015), it was found out that there was a negligible positive relationship between academic achievement and personality of secondary school students. Only in recent reviews that it has become clearer that personality is at least as, if not more, a significant predictor of academic achievement than intelligence in an educational setting (Vedel and Poropat, 2017).

Though there are diverse views and opinions which recognized that personality is related to education specifically in Mathematics, it is still an intriguing topic since it has received scant attention in the research studies conducted in the Philippine context.

Based on experience, the researcher observed that students who are inclined to Mathematics have indeed common personality patterns that made them excel in the subject. It was observed that students who are focused and persistent in achieving goals do well in Mathematics. Thus, the researcher was curious if these patterns existed and if these were consistent with other learners in all the grade levels of the junior high school department of Loon South National High School. Also, the researcher recognized that no two learners are the same. They take different approaches to learn tasks, and they respond to formal education in different ways. These differences in learning styles brought by the differences of personalities may contribute significantly to students' experiences of success and failure in education. Thus, the researcher believed that the blend of personality traits must be considered in predicting academic success. If this link on personality and academic performance would be clearly understood then it will be invaluable not just in Loon South National High School, but to anyone with interest in education.

Furthermore, the researcher considered this as a significant study because this will create awareness on the personality dynamics underlying academic achievement in Mathematics.

Literature Review

Even before the conception of modern psychology, the ideas which shaped and influenced individuals' personality has sparked curiosity in the entire humanity for generations.

The Five-Factor Theory postulated by Robert R. McCrae and Paul T. Costa, Jr., is based on the Five Factor Model (FFM), also known as the Big Five. The Big Five factors are Openness to Experience (O), Conscientiousness (C), Extraversion (E), Agreeableness (A), and Neuroticism (opposed to Emotional Stability) (N); often referred to via the common acronyms OCEAN, NEOAC, or CANOE. These five factors do not provide completely exhaustive explanations of personality, but they are known as the "Big Five" because they encompass a large portion of personality-related terms. Conscientiousness is characterized by being organized, responsible and persevering. Agreeableness refers to the helpful, cooperative and nurturing attitude of an individual. Emotional Stability as opposed to Neuroticism refers to an individual's tendency to be tense, anxious, sensitive and insecure. Openness to new experiences refers to an individual's artistry and sophistication of taste. Extraversion is a personality type which describes the friendly and energetic attitude of an individual. Extroversion describes an individual who is assertive and outgoing.

Carl Jung, a psychiatrist who developed a theory based on eight personality traits, was highly influenced by the findings and work of Sigmund Freud. He described personality based on psychological characteristics. He divided all personalities into introverts and extraverts. Introverts tend to withdraw themselves, particularly in times of emotional stress and conflict. They also tend to be shy and prefer to work alone. On the contrary, extraverts seek the company of others. They are likely to be very sociable and tend to choose occupations that permit them to deal directly with people, such as sales or promotional work. Most people fall within the two extremes (Evangelista, 2004).

Among the first to conceptualize the personality trait theory was Gordon Allport. In 1936, Allport discovered that in the English language dictionary more than 4000 words described personality. According to him, the building blocks of personality are traits. He then divided these traits into a three-level hierarchy. These were: Cardinal traits (traits around which a person organizes his whole life), Central Traits (traits representing major characteristics of a person) and Secondary traits (traits refer to the general behavior patterns that only appear under certain circumstances). Furthermore, Allport hypothesized that an individual's personality is influenced by internal forces which relate to how an individual retains information to interact with the world and external forces which relate to the way how others influence an individual's behavior. This substantiates the possibility that some behavioral patterns in learning mathematics are results of traits that dominate students' lives.

The Philippines, in its aim to provide quality education to every citizen of our country, promulgated laws which ensure that education is accessible to all. Article XIV, Section 1 of the 1987 Philippine Constitution states that: "The state shall protect and promote the right of all the citizens to quality education at all levels and shall take appropriate steps to make such education accessible to all". Furthermore, The Presidential Decree 603, "The Child and Youth Welfare Code" specifies that the child is not a mere creature of the State. Hence, his individual traits and aptitudes should be cultivated to the utmost in so far as they do not conflict with the general welfare.

Moreover, pursuant to DepEd Order No. 8, s. 2015, the K to 12 Basic Education Program implemented classroom assessment, an integral part of curriculum implementation, to allow the teachers to keep track and measure the learners' progress and developing abilities while enabling them to take full responsibility in the process.

It is also relevant to note that according to Batas Pambansa Bilang 232, also known as "Education Act of 1982", Section 15, one of the duties and responsibilities of students is to "exert utmost effort to develop his/her potentials for service in order that he may become an asset to his family and society".

In addition, Republic Act 9155 or the Governance of Basic Education Act of 2001 provides the General Goals of Basic Education. One of which is to develop Filipino learners by providing them basic competencies in literacy and numeracy. It further develops critical thinking and learning skills and desirable values to become caring, self-reliant, productive, socially aware, patriotic, and responsible citizens.

These legal documents served as the foundational support in determining the link between academic achievement and personality. Furthermore, to show emphasis on the possible association of the two variables in the study, relevant concepts and studies were also reviewed and presented.

Researchers establishing the link between personality and academic performance have generated conclusions which are vague. This is because of the varying theoretical bases. The development of the Five-Factor Model has brought light to the complex dynamics of personality. In the study conducted by Kumari (2014) on the correlation of personality and academic achievement, he highlighted the prominent influence of personality in academic success. This shed light on queries why some students excel in various academic undertakings while others did not even if they have the same intellectual competence. This shows that intelligence is not only the gauge in defining academic success. The willingness of students as reflected by his personality is as important as his intellectual ability.

In a study she conducted by Bjugerg (2014) in Swedish senior high school students with 18-19 years' age range, she found out that conscientiousness was positively correlated with academic achievement. This implies that indeed, self-discipline and goal setting play a significant role in academic success in various places across the globe.

In a study conducted by Kumari (2014), he found out that students with a high level of extraversion perform well academically because of their ability to interact actively thus making them in great advantage in understanding and conceptualizing the lessons well. Agreeableness has a significant positive correlation to academic achievement too by allowing collaboration to happen in the learning process. In addition, openness to experience is linked to being resourceful and intelligent. It describes how an ideal student should be, eager to learn new concepts and ideas. It was also found that students who are neurotics or who have low emotional stability tend to be more focus in their fears and anxiety thus, reducing their attentiveness in doing schoolwork consequently affecting their academic performance.

Another study conducted by Saxena and Mishra (2015) revealed that conscientiousness was a good indicator of academic achievement. This is because of conscientious individual's will to achieve disposition. Internal correlation of the five factors of personality revealed that conscientiousness has a significant positive correlation with agreeableness and has a negative correlation with neuroticism. This means that neuroticism hinders academic success while agreeableness strengthens an individuals' will to accomplish tasks. Furthermore, their study also revealed that age was insignificant in establishing the association between personality and academic performance.

Kilic-Bebek (2009) found out in his study that conscientiousness is also significantly associated with students' final mathematics grades. He conducted his study to 175 students taking undergraduate mathematics. Results also showed that test anxiety, task value, self-efficacy and effort regulation were associated with mathematics performance too. This implies that there are some behavior patterns which are considered significant in learning the subject area.

Al-Naggar, Osman, Ismail, Bobryshev, Ali, Menendez-Gonzalez (2015) indicated in their study that aside from conscientiousness, extraversion was found to have a significant correlation to grade point average (GPA). These results signify the fact that this type of personality is significant in learning and in attaining a higher degree of academic success in the educational setting. The ability to be organized and independent is likely to succeed in school context based on the common sense notion that achievement is the product on one's ability to perform tasks on his own. Likewise, the extraverts' inquisitive aspect also contributed to academic success. Furthermore, openness to experience was also positively associated with academic performance especially when students apply their previous learnings in the real-life setting. Their study also revealed that the most dominant trait of the 246 students who participated in the study was openness to experience and the least dominant was neuroticism.

Akomolafe (2013), in his investigation of the relationship between personality and academic performance of secondary school students, found that another personality trait which is significantly correlated with the academic performance was agreeableness. This can be attributed to the cooperative and functional side of agreeable students. It was found that most of the 398 students who constituted the sample respondents adhered to instructions given by both parents and teachers. In addition, results revealed that openness to experience and extraversion were also correlated to academic performance. Furthermore, consistent with other findings, conscientiousness was the most significant predictor of academic success. On the other hand, neuroticism was found to be negatively associated with academic performance. The result can be explicated with the unstable emotional state of neurotic students. Their tendency to experience fear and stress interfered with their academic activities.

Hakimi et. al (2011) at the University of Tehran in Iran, found out in their research study that personality traits were indeed significantly associated with academic success. Results from the 285 participants showed that neuroticism and extraversion were negatively related to academic performance. In addition, extraverts have the tendency to be very sociable which diverts their attention from studying. In contrast, introverts who have less time for socialization have more time for themselves and for studying. Another finding of this study also revealed that there were no differences in the personality and academic achievement of male and female participants. This can be accounted for the difference in the respondents' cultural beliefs, gender roles and the competitive atmosphere of the research environment.

In a study conducted by Alcock, et. al (2014), on gender and personality and academic achievement as predictors of academic achievement, they found out that gender predicted achievement. However, when personality was taken into consideration, its predictive power became insignificant. Thus, personality gives a more substantial lens for understanding students' behavior towards learning.

In contrast to the above-cited findings, Suvarna and Ganesha Bhata (2015), found that there was a negligible relationship between personality and academic achievement of secondary school students. Furthermore, the result of their study revealed that there was a significant difference in academic achievement with respect to age and gender. This implies that personality influences academic success to some degree and factors such as gender accounts the shaping of students personality.

Consistent with the previous study, Hakim, Hussain, & Iqbal (2018) also found that there were no significant relationships between personality and academic performance in general. Although, results showed that being emotionally stable, were

found to be (but not statistically significant) predictors of academic achievement. This result signifies the fact that students who experience less negative emotions are more likely to perform well in the educational setting.

In a study of Balbalosa (2010) on the “Factors Affecting Mathematics Performance in High Schools”, she found out that in general, the level of performance of students in mathematics was satisfactory. This means that majority of Filipino high school students performed at an average level in terms of different competencies reflected in the curriculum guide of the Department of Education.

The literature shows that a number of researches have been conducted already to establish the association of personality factors and academic performance. However, this topic has received scant attention in the Philippine context. The current research was conducted to fill this gap in the literature. Furthermore, this would contribute to the scholastic writings delving into the association between these two variables, personality traits and academic performance.

Methodology

To achieve the objectives of this study, the researcher used normative survey method with the use of the Big Five Inventory (BFI), a tool patterned from the standardized questionnaire on personality traits of Oliver P. John (1991) of the Institute of Personality and Social Research, Berkeley, California. It is a 44-item inventory that assessed the Big Five personality domains of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. Neuroticism is inverted and termed Emotional Stability to keep all high scores “desirable”. The respondents indicated their level of agreement with each of the 44 items using a 4 -point Likert scale (1 = disagree, 2=slightly disagree, 3= slightly agree, 4= agree). The items are described in behavioral, cognitive, and effective terms. Furthermore, the documentary analysis was utilized to identify the academic performance of Junior High School Students as reflected in their first and second quarter grades in their Form 137.

The study was conducted to 203 junior high school students out of the 413 total population in Loon South National High School, Bohol. The proportionate random sampling design was used to eliminate systematic bias.

To prove the degree of relationship between personality types and academic performance, the Pearson Product-Moment Coefficient Correlation was used while to prove the significant degree of difference between personality traits and academic performance of male and female respondents, the T-Test for uncorrelated means was used. To determine the significant degree of relationship between the profile and the personality traits, profile and academic performance, the researcher used the Chi-Square Test for Independence. Furthermore, the One-Way Analysis of Variance (ANOVA) was used to determine the significant degree of variance of academic performance when grouped according to personality traits and the academic performance in the four grade levels.

To ensure the quality and integrity of this research, this study had undergone the Ethics Review. Letters and consent forms were distributed to parents of respondents. This was done to ensure that permission is granted to students below the legal age who are respondents of the study. Furthermore, prior to the administration of the research questionnaire, the researcher personally explained to the respondents the purpose of the research study and informed them that their participation in this endeavor is voluntary. They were also asked to sign assent forms confirming their agreement of their parents’ consent. Thereafter, research data gathered were treated as purely confidential throughout the research process for the welfare and protection of the well-being of all research participants.

Results and Discussion

In terms of sex, seventy eight (38.42%) of the respondents were males and one hundred twenty five (61.58%) were females. This means that majority of the respondents in this study were females which comprised more than half of the total subjects of the study. As to age, eighty eight of the respondents were 14-15 years old while eighty seven (42.86%) were ages 12-13, then twenty one (10.34%) were ages 16-17 and the remaining seven (3.45%) belong to ages 18 and above. In addition, in terms of grade level, both grades 7 and 8 had the highest number of student-respondents which were fifty seven (28.08%), followed by grade 9 with fifty five (27.09%) and Grade 10 with thirty four (16.75%).

On Students’ Personality Traits

**Table 1 : Summary of Students’ Level of Personality Traits
N=203**

PERSONALITY TRAITS	WM	Interpretation	Rank
Conscientiousness	2.62	Moderately High	4
Agreeableness	2.78	Moderately High	1
Emotional Stability	2.41	Slightly High	5
Openness	2.69	Moderately High	2.5
Extraversion	2.69	Moderately High	2.5
Over-all	2.63	Moderately High	

Out of the five traits, agreeableness got the highest weighted mean of 2.78 (Moderately High), followed by openness to experiences and extraversion with the mean 2.6 (Moderately High) then, conscientiousness with the mean 2.6 (Moderately High). The trait with the lowest mean of 2.41 (Slightly High) was Emotional Stability. It can be inferred that majority of them have “moderately high” level of being tactful and cooperative in nature. In contrast, only very few can tolerate minor day to day stresses. Moreover, in terms of the respondents’ dominating personality traits, out of the two hundred three respondents, fifty-seven (28.08%) of them were agreeable, fifty-two (25.62%) were extraverts, forty-six (22.66%) were open to new experiences, twenty-five (12.31%) were conscientious and twenty-three (11.33%) were emotionally stable. The data revealed that majority of the students find it important to get along with others. However, only few can handle their emotions in various situations. This study negates with the results of Al-Naggar et. al (2015), which showed that the most dominant personality trait was openness to new experiences and the least dominant trait was neuroticism (as opposed to emotional stability).

On Students’ Academic Performance in Mathematics

The data revealed that students’ academic performance in Mathematics was generally interpreted as “Satisfactory” with an average grade of 81.81. Grade 9 got the highest average grade of 83.00 (satisfactory) followed by grade 8 with an average grade of 82.33 (satisfactory) then grade 10 which got an average grade of 82.17 (satisfactory) and lastly, grade 7 with an average grade of 80.14 (satisfactory). This result suggests that the students performed at an average level. Furthermore, academic performance below the mean outnumbered those with performances above the mean. In addition, there were a total of thirteen students who got below 75; five from grade 8, four from grade 7, three from grade 9 and one from grade 10. This means that some students had struggles with their understanding in the competencies.

Prerequisite and fundamental knowledge and/or skills have not been required or developed adequately to aid understanding (DepEd Order No.31, s.2012). It can be deduced also that most of the students have satisfactory academic standing based on the data gathered. This result confirms the result of Balbalosa (2010) that in general, the level of performance of students in mathematics was satisfactory.

On the Significant Degree of Correlation between the Personality Traits and Academic Performance in Mathematics of the Four Grade Levels.

Grade 7. The data revealed that academic performance in mathematics and the following traits; conscientiousness, $r(57)=0.14$, $p = 0.307$; agreeableness, $r(57)=-0.10$, $p= 0.459$; emotional stability, $r(57)=-0.12$, $p =0.390$; openness to new experiences, $r(57)=0.09$, $p=0.493$; and extraversion $r(57)=0.11$, $p=0.418$ were insignificantly correlated. In general, academic performance and personality traits as a whole were insignificantly correlated, $r (57) =0.07$, $p=0.497$. This means whatever are the personality traits of Grade 7 students, these do not affect their academic performance in mathematics.

This result negates the study conducted by Suvarna and Ganesha Bhata (2015) and Hakimi et. al (2011) that personality traits were significantly associated with academic achievement of secondary school students.

Grade 8. The personality trait as a whole and academic performance were insignificantly correlated, $r (57) =-0.23$, $p =0.080$. The result suggests further that academic performance in mathematics and the following traits; conscientiousness, $r(57)= -$

0.24, $p=0.069$; agreeableness, $r(57)=-0.24$, $p =0.076$; openness to new experiences, $r(57)=0.11$, $p =0.439$; and extraversion $r(57)=-0.12$, $p =0.382$, were insignificantly correlated. However, the academic performance and emotional stability were weakly negatively correlated, $r (57) = -0.45$, $p = 0.000$. This means that students who perform well in mathematics are emotionally unstable. This confirms the result of the study of Lubbers et. al as cited by Pychyl (2010), that emotional stability (the opposite of Neuroticism) is negatively related to homework time. The more emotionally stable students are, the less time they spend on academic works like homework. On the other hand, the result negates the result of the studies of Akomolafe (2013), Hakimi et. al (2011), that emotional stability is positively associated with academic performance because of their ability to manage emotions during stressful situations.

Grade 9. In general, academic performance in mathematics and personality traits among grade nine students were insignificantly correlated, $r (55) = 0.25$, $p =0.070$. The data revealed that academic performance in mathematics and the following specific traits; agreeableness, $r (55)=-0.00$, $p =0.994$; emotional stability, $r(55)= -0.05$ $p =0.712$; and openness to new experiences, $r(55)=0.22$, $p=0.111$ were insignificantly correlated too. However, the academic performance in mathematics and the traits, conscientiousness and extraversion, were weakly positively correlated, $r(55)=0.34$, $p =0.011$ and $r(55)=0.28$, $p=0.039$ respectively. This result means that students who are goal-directed and sociable perform well in mathematics.

The findings are congruent to the findings of the study of Bjurberg (2014), Saxena and Mishra (2015), Al Naggar et.al (2015). All of them concluded that there was a positive correlation between conscientiousness and academic achievement. According to the Five-Factor Theory, conscientious individuals are hard workers, reliable and high achievers. Furthermore, Alarcon and Edwards (2013) explained that conscientiousness is linked with retention. This allows highly conscientious individuals to succeed in different learning tasks. Vedel and Poropat (2017) further elaborated that this trait is associated with effortful control, a temperament dimension indicating one's capacity to stay focus and complete tasks.

The findings on the association of academic achievement and extraversion confirms the study of Bidjerano and Dai (2007). This is substantiated by Kumari (2014) that students with high level of extraversion perform well academically because of their ability to interact actively. Accordingly, extraverts have assertive nature which allows them to seek assistance from people such as peers and teachers when confronted with learning difficulties. This made them engaged in the educational setting.

Grade 10. There is no significant relationship between the personality traits in general and academic performance in mathematics among grade 10 students. The academic performance in mathematics and the following specific traits; conscientiousness, $r(34)=-0.29$, $p =0.987$; agreeableness, $r(34)= 0.27$ $p =0.125$; emotional stability, $r(34)= -0.00$ $p =0.969$; and extraversion, $r(34)= 0.21$ $p =0.231$ were insignificantly correlated too. However, among the personality traits, openness to new experiences, and academic performance in mathematics were weakly positively correlated, $r(34)=0.44$, $p =0.009$. The result suggests that students who enjoy having their minds and senses stimulated perform well in mathematics although in general, academic performance in mathematics and personality traits were insignificantly correlated, $r (34) = 0.34$, $p =0.050$. The result is supported by the study of Kumari (2014) that openness to new experiences is linked to being resourceful and intelligent. Likewise, Al-Naggar et.al (2015) stated that openness to new experiences allows students to perform well in their academic undertakings because they can apply their previous learnings on real-life setting.

Summary of the Correlation between Students' Personality Traits and Academic Performance in Mathematics

Table 2 : Summary of the Correlation between Students' Personality Traits and Academic Performance in Mathematics
N=203

Grade Level	Conscientiousness	Agreeableness	Emotional Stability	Openness to New Experiences	Extraversion	Over-all
7	0.138	0.1	-0.116	0.093	0.109	0.072
8	-0.243	-0.237	-0.454*	0.105	-0.118	-0.234
9	0.338*	-0.002	-0.052	0.218	0.279*	0.246
10	0.288	0.268	-0.007	0.444*	0.211	0.339

Note: *Correlation is significant at 0.05 level (2-tailed), $p < 0.05$.

The data revealed that although there were no significant correlation of the over-all personality traits and academic performance, openness to new experiences was found to be positively correlated with academic performance. In contrast, emotional stability was found to be negatively correlated to academic performance. This negative correlation was found to be consistent in the four grade levels. This means that students in all grade levels who perform well in mathematics experience emotional instability and vice-versa. The result of this study negates the result of the study of Kumari (2014) that students who have low emotional stability tend to focus in their fears and anxiety thus negatively affecting their academic performance.

Degree of Difference between Male and Female Students' Personality Traits

The mean of the personality trait of male which is 2.70 was slightly higher than the females which was 2.61. However, there was no significant difference between the personality traits of male and female, $t(201) = -1.71$, $p < 0.05$. Thus, the null hypothesis was accepted. This means that male and female students have the same level of personality traits. The result is of great resemblance to the study of Suvarna and Ganesha Bhata (2015) that there was no significant difference in the personality traits of males and females. The findings can be accounted with the difference in the respondents' cultural beliefs, and gender roles. Men and women are getting increasingly closer to each other in their attitudes and personality traits (Hakimi et al, 2011).

Degree of Difference between Male and Female Students' Academic performance

The academic performance of females ($M=83.33$) was higher than the males ($M=79.54$). The computation revealed a significant difference of males' and females' academic performance $t(201) = 4.318$, $p < 0.05$. Thus, the null hypothesis was rejected. This means that females perform better in academic performance in mathematics than their male counterparts. This confirms the result of the study of Alcock et. al (2014) that gender predicted academic achievement. On the other hand, the result negates the findings of Hakimi et. al (2011) that there were no differences in the academic performance of male and female students.

Degree of Relationship between Sex and Academic Performance in Mathematics

The computation $\chi^2(4, N=203)=15.87$, $p=0.003$, revealed a significant result since the p-value is lower than the (0.05) level of significance. The null hypothesis was rejected. Therefore, there was a significant relationship between sex and academic performance in mathematics. Females were likely to perform better than male students since more females had higher grades compared to males. This finding is supported with the study of Alcock et. al (2014) that gender was a significant predictor of academic achievement. The reasons for the differences noted in this study are largely because of sociological factors. Many of the students believe that females have more opportunities available than in the past, now that they are no longer confined to staying at home. Thus, they have more reason to invest their energy in academic success, rather than become homemakers who have little need for good grades (Sparks-Wallace, 2007). In addition, males studied less than females and that the only time they did study was the night before a test—just enough to pass.

Degree of Relationship between Age and Academic Performance in Mathematics

As revealed in the result of the test statistic, $\chi^2(12, N=203) = 11.01$, $p=0.528$, there was no significant relationship between age and academic performance in mathematics. The computed p-value was higher than the level of significance set at 0.05. Thus, the null hypothesis was accepted. Age has no influence on students' academic performance in mathematics.

The result of this study contradicts the study of Voyles (2011), that age has significant impact on students' academic achievement. Accordingly, younger students are expected to perform better than older ones. This could be attributed with their high remembering skills and interactive behavior.

Degree of Relationship between Grade Level and Academic Performance in Mathematics

A chi-square test was performed, and no relationship was found between academic performance in mathematics and grade level, $\chi^2(12, N=203) = 8.37$, $p=0.756$. The 0.05 level of significance was lower than the computed p-value. Thus, the null hypothesis was accepted. It suggests that there is no evidence to show the association of grade level and academic performance of students in mathematics. Grade level has no influence to students' academic achievement in mathematics.

Degree of Relationship between Sex and Personality Traits

The test statistic result, $X^2 (4, N=203) = 8.37, p=0.255$, with p-value higher than the 0.05 level of significance, suggests an insignificant relationship between sex and personality traits. Thus, the null hypothesis was accepted. This result means that sex cannot be associated with personality traits. Alcock et. al (2014), stated that when considered in isolation, gender was found to predict mathematical achievement. However, this relationship ceased to be significant when students' personality traits were taken into account. There is now a closer gap between males and females in terms of levels of personality traits and behavioral models (Hakimi et al, 2011).

Degree of Relationship between Age and Personality Traits

The computation $X^2 (12, N=203)=31.17, p=0.002$, revealed a significant result since the p-value was lower than the (0.05) level of significance. The null hypothesis was rejected. Therefore, there was a significant relationship between age and personality traits. Openness to new experiences was associated to younger respondents aging 12-13 years old. This confirms the study of Costa et al (1986) younger respondents reported higher levels of openness than older participants. The findings of the study suggests that as we grow older, our willingness to embrace new ideas and experiences gradually decreases. The present study also revealed that the personality trait agreeableness was found to be associated with students whose age bracket is between 14 to 17 years old. Lastly, students whose age are 18 and above were generally extraverts.

The result of the current study contradicts the study of Saxena and Mishra (2015) that age is not associated with personality traits. Individuals of different ages may possess varied traits.

Degree of Relationship between Grade Level and Personality Traits

A chi-square test was performed, and a significant relationship was found between grade level and personality traits, $X^2 (12, N=203) = 33.54, p=0.0007$. The p value was lower than the (0.05) level of significance. Thus, the null hypothesis was rejected. It suggests that there was enough evidence to show the association of grade level and personality traits. Openness to experience was associated to grade 7 students. On the other hand, the trait agreeableness was associated to grade 8, 9 and 10 students.

According to Trait Theory, there are general behavior patterns that only appear under certain times in an individual's life. This are caused by external forces that relate to the way how an individual is influenced by his surroundings. This explicates how certain traits such as openness to new experiences and agreeableness are associated with grade levels. Accordingly, individuals who have the trait, openness to new experiences, are willing to embrace change in educational setting (Saxena and Mishra, 2015). This explains why this trait is associated with grade 7 students. Likewise, agreeableness in grade 8, 9 and 10 is explained by their behavior of complying social demands and conforming to socially accepted values.

On the Significant Degree of Variance on Academic Performance of Students when Grouped According to Personality Traits

There was a significant variance on students' academic performance when grouped according to their personality traits at $p < 0.05$ level of significance, $F(4,198) = 2.868, p=0.024$. Thus, the null hypothesis was rejected. The result confirms the study of Alcock et. al (2014) that personality traits explained more variance among undergraduate mathematics' students achievement. This provides a more productive lens through which to understand behavior of undergraduate students.

However, the multiple comparisons of the present study on the academic performance when grouped according to personality traits using Scheffe's test show that there is no significant difference among the means. This means the variability of academic performance when grouped according to personality traits is the same.

On the Significant Degree of Variance on Academic Performance of Students in the Four Grade levels

There was an insignificant variance on students' academic performance in mathematics in the four grade levels at $p < 0.05$ level of significance, $F(3,199) = 2.160, p=0.094$. Thus, the null hypothesis was accepted. Since the result in ANOVA for the academic performance in the four grade levels is insignificant, multiple comparisons between the means of academic performance were not anymore conducted. The result means that there is no significant difference between academic performances of students in mathematics in the four grade levels

Conclusion

Based on the findings of the study, the researcher concluded that students have moderately high level of personality traits as to conscientiousness, agreeableness, openness to experiences and extraversion. It means that majority of them are

responsible, tactful, intellectually curious and sociable. While only few of them can tolerate minor day to day stresses. In general, they performed at an average level in mathematics. Although there was no significant correlation of the over-all personality traits and academic performance, it was found out that high level of openness to new experiences led to better academic performance while high level of emotional stability led to lower academic performance. These findings substantiate the need to study the deeper association of emotional stability and academic performance and its underlying factors. In addition, this study concluded that there is no difference of the level of personality traits of male and female students. However, in terms of academic performance in mathematics, females perform better than their male counterparts. Students' age and grade level had no influence in their academic success in mathematics. Furthermore, sex cannot also be associated with personality traits. Students with similar ages and grade level share the same personality trait patterns.

References

- [1] Akomolafe, M. J. (2013). Personality Characteristics as Predictors of Academic Performance of Secondary School Students. *Mediterranean Journal of Social Sciences*, 4(2). Retrieved August 10, 2018, from <https://bit.ly/2sq1zMi>
- [2] Alarcon, G. M., & Edwards, J. M. (2013). Ability and motivation: assessing individual factors that contribute to university retention. Retrieved August 10, 2018, from <https://bit.ly/2sruYph>
- [3] Alcock, L., Attridge, N., Kenny, S., & Inglis, M. (2014). Achievement and behaviour in undergraduate mathematics: Personality is a better predictor than gender. Retrieved August 15, 2018, from <https://bit.ly/2ssCX5x>
- [4] Al-Naggar, R. A., Osman, M. T., Ismail, Z., Bobryshev, Y. V., Ali, M. S., & Menendez-Gonzalez, M. (2015). Relation between type of personality and academic performance among Malaysian health sciences students, Retrieved August 7, 2018, from <https://bit.ly/2Hbx6Mj>
- [5] Balbalosa, J. F. (2010). Factors affecting the Mathematics Performance of Laboratory High School of Laguna State Polytechnic University academic year 2009 – 2010. Retrieved September 7, 2018, from <https://bit.ly/2RvpCZi>
- [6] Bidjerano, T., & Dai, D. Y. (2007). The relationship between the big-five model of personality and self-regulated learning strategies. Retrieved September 1, 2018, from <https://bit.ly/2HdNkod>
- [7] Bjurberg, H. (2014). Academic achievement and personality traits: An empirical and neurobiological investigation. Retrieved July 16, 2018 from <https://bit.ly/2HaWzFq>
- [8] Ciorbea, I. & Pasarica, F. (2012). The study of the relationship between personality and academic performance. Retrieved July 19, 2018, from <https://bit.ly/2Da1Lp7>
- [9] Daezadeh H., Homayouni A., Hosseinzadeh B., Fakorihajiyar H. (2014). Investigation the role of personality traits in learning mathematics and academic achievement in students of distance education system. Retrieved July 22, 2018, from <https://bit.ly/2SRszsZ>
- [10] Evangelista, L.L. (2004). Introduction to Psychology. ISBN 971-817-009-X
- [11] Hakim, A., Hussain, B., & Iqbal, M. N. (2018). Source traits of adolescents' personality as a predictor of their academic achievement: A cross-sectional study. Retrieved July 27, 2018, from <https://bit.ly/2spRjtZ>
- [12] Hakimi, S., Hejazi, E., & Lavasani, M. G. (2011). The relationships between personality traits and students' academic achievement. Retrieved July 25, 2018, from <https://bit.ly/2QMRZnq>
- [13] John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. Retrieved 15 July 2018, from <https://bit.ly/2RJhaVC>
- [14] Kumari, B. (2014). The correlation of personality traits and academic performance: A review of literature. Retrieved July 15, 2018, from <https://bit.ly/2ClGMxX>
- [15] Policy guidelines on classroom assessment for the k to 12 basic education program. Deped Order No. 8, s. 2015. Retrieved August 1, 2018 from <https://bit.ly/2s5SjwB>
- [16] Pychyl, T. A. (2010, January 18). Personality, homework behavior and academic performance. Retrieved August 8, 2018, from <https://bit.ly/2QLjfMh>
- [17] Saxena, M. & Mishra, D.K. (2015). A study of the relation between personality type & academic success. Retrieved 20 July 2018, from <https://bit.ly/2SVGG7o>
- [18] Suvarna, V.D. & Ganesha Bhata, H.S. (2015). A study on academic achievement and personality of secondary school students. Retrieved July 15, 2018 from <https://bit.ly/2FrJS7B>
- [19] Vedel, A., & Poropat A.E., (2017). Personality and academic performance. Retrieved July 16, 2018, from <https://bit.ly/2FrqLKT>
- [20] Voyles, M.J. (2011), "Student academic success as related to student age and gender". Retrieved July 16, 2018, from <https://bit.ly/2EvhFFU>