Personality Traits and Students' Mathematics Performance

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Abstract

This survey-correlational study sought to ascertain the relation of personality traits to the Mathematics performance of students. This study utilized 261 students of Capiz State University Sigma Satellite College who were selected randomly from a population of 751 for the school year 2016-2017. To determine the personality traits of the respondents, the researchers utilized the Big Five Personality Test. The data collected from the study undergone the analyses of frequency and percentage, mean, standard deviation, t-test for independent samples, and Pearson's r. A 0.05 level of significance was set for all inferential tests. Findings showed that the most dominant personality trait of students of CAPSU Sigma is Conscientiousness followed by Agreeableness, Neuroticism, and Openness to Experience and Extroversion. The performance of CAPSU Sigma students in Mathematics was found to be "low". It was also found out that male and female students significantly differed in their level of extroversion, conscientiousness, and openness to experience. In addition, THM and Technology students differed in terms of their level of extroversion, agreeableness, conscientiousness, and openness to experience. There was a significant difference in the performance of students in Mathematics when they were grouped in terms of sex. A significant relationship was found between performance in Mathematics and extroversion and as well as a significant relationship between performance in Mathematics and conscientiousness.

Keywords: Personality Traits, Mathematics Performance, Survey-Correlational

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Introduction

Teachers have put greater emphasis on the use of different teaching and learning strategies to win the issue of individual differences among students. Knowing the different personalities of the students in relation to their academic performance is important in addressing their needs for them to cope up with the challenges of the society. Understanding the things that contribute or affect the performance of students in Mathematics has indirect consequences for the learning process, especially in meeting the needs of the students individually. Reasoning that personality traits may indicate how a student behaves and how he might act, the researchers would like to find out how personality traits could be related to performance in Mathematics (Conrad et al., 2012).

Performance in Mathematics is a big challenge for students which in turn also affect the teachers, parents, and schools. Many efforts have been done by educators and researchers alike to discover and grasp the complexities surrounding the performance of students in Mathematics. Parents devote their time and effort to get good education for their children. Some are able to send their children abroad as believing that this could ensure greater success and can put them in a better position in employment opportunities for their children. There are different personal views as to why there are some students who perform better in Mathematics while others find the subject very difficult. One of the reasons that has an effect in the academic performance of students is their personality traits (O'connor & Paunonen, 2007).

The study of Barrick & Mount (1991) showed that personality traits are related to job and career success and the research of Lounsbury, et al. (2003) presented that personality traits and academic performance are also related. The researchers, backed by literature and by their experiences in classroom instruction, are of the opinion that personality traits could affect the performance of the students in Mathematics, and so decided to undergo this study.

Generally, this study aimed to ascertain the relationship between personality traits and the performance in Mathematics of CAPSU Sigma Satellite College students. Specifically, this study sought answers to the following questions: 1.) What are the personality traits of students in CAPSU Sigma Satellite College? 2.) What is the performance in Mathematics of CAPSU Sigma students? 3.) Does the personality traits of CAPSU Sigma students differ when they are classified in terms of sex and academic department? 4.) Does the performance in Mathematics of CAPSU Sigma students differ when they are classified in terms of sex and academic department? 5.) Are the personality traits of CAPSUSigma students related to their performance in Mathematics?

Theoretical Framework

This study finds its foundation on the Trait Theories of Personality. Many researchers have been attracted to find out why people behave the way they do. To answer these questions, the Trait Theory model of personality has been developed by psychologists. Daminabo (2008) discussed that trait can be considered to be a continuous dimension on which individual differences may be arranged quantitatively in terms of the amount of the characteristics the individual has. Chowdhury (2006), described trait as a property within the individual that can be considered as his unique but relatively stable reactions to the environment. It was also taken into consideration that biological, cognitive and environmental forces have roles in shaping personality. The objective of the Trait Theory model of personality is to clarify and give details of personality and behavior in terms of their underlying causes. As indicated by Hockenbugh and Hockenbugh (1997), the trait theory of personality focuses on individual differences specifically in their identification, description and measurement. It was asserted that trait theories suggest that all people possess a certain trait; these theories do not presuppose a trait is acquired only by some people while others do not have it. However, it was further suggested that the level to which the trait a particular person varied and can be determined and measured. As an example, a person might be extremely friendly, somewhat friendly, or not friendly at all. Therefore, a trait can be characteristically explained by a set of values from one extreme to its opposite.

Conceptual Framework

The conceptual framework of the study is represented by Figure 1 below where the personality traits of the students, sex and the academic department where they belong are regarded as the independent variables while their performance in Mathematics is assigned as the dependent variable.

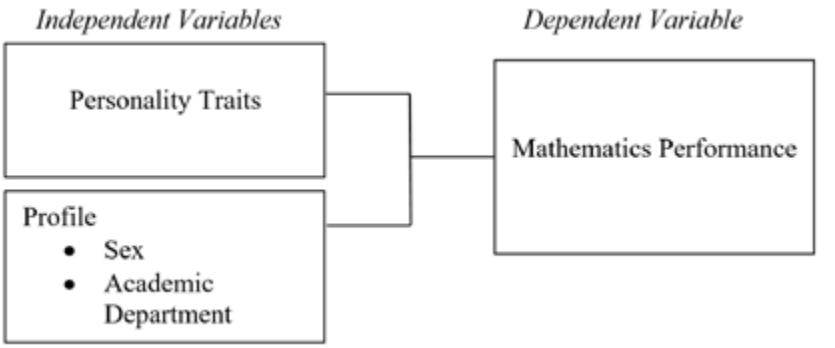

Figure 1. Personality traits of students, their sex and academic department in relation to their performance in Mathematics.

Methodology

This study utilized the survey-correlational method of research. Data gathered were computer-processed using the Statistical Package for the Social Science (SPSS) software. For descriptive analysis, frequency count, percentage, mean, and standard deviation were used. Meanwhile, t-test for independent samples and Pearson's r were utilized for inferential analysis and was set at .05 alpha level.

Respondents

The study randomly selected 261 students of Capiz State University Sigma Satellite College from a population of 751 for school year 2016-2017. Lottery technique was used in selecting the respondents. The number of students per academic department were written on pieces of paper where each number corresponded to a student in that department. The papers were then rolled and put in a box. The required number of the sample from each year level for every department was drawn from the box to select the respondents. Stratified proportional random sampling was employed in determining the required number of students per department.

The respondents were then categorized in terms of their sex and academic department. The distribution of the respondents according to sex and academic department is shown in Table 1.

Table 1. Distribution of respondents according to sex and academic department

Department	Male	Female	Total N	%	Sample n
THM Department	221	301	522	69.51	181
Technology Department	126	103	229	30.49	80
Total	347	404	751	100	261

Data-Gathering Instruments

To determine the personality traits of the respondents, the researchers utilized the Big Five Personality Test adopted from Open-Source Psychometrics Project. This test is designed to find out why people act the way they do and how a person's personality is structured. The fifty (50) items in the Big Five Personality Test is designed to measure the personality traits in terms of extroversion, agreeableness, conscientiousness, neuroticism, and openness to experience (The big five personality test, 2018).

The 50 items are in a five-point Likert-type scale:1=disagree, 2=slightly disagree, 3=neutral, 4=slightly agree and 5=agree. To determine the level of personality traits of the students based on the score obtained, the researchers used

5-point Likert Scales

Data Gathering Procedure

The researchers sought permission from the Satellite College Director of CAPSU Sigma Satellite College to allow them to distribute the questionnaires to the students of CAPSU Sigma. After the permit was granted, the researchers personally managed the distribution of the questionnaires to the respondents. The data gathered were coded, tallied, tabulated and readied for computer analysis.

Results and Discussions

Personality Traits of Students of CapSU Sigma Satellite Campus

In general, the most dominant personality trait of students of CAPSU Sigma is Conscientiousness which is described as "high" (M = 3.56, SD = .20), followed by Agreeableness (M = 3.49, SD = .16), Neuroticism (M = 3.31, SD = .20), Openness to Experience (M = 2.83, SD = .32) and Extroversion (M = 2.36, SD = .26). The high level of conscientiousness of the students means that the college students of CAPSU Sigma perceived themselves to be honest and hardworking. They were willing to go and act as directed and allow themselves to be held accountable. They werev willing to continue despite encountering problems and difficulties. They also regard themselves to be reliable and were determined in achieving their goals. This is presented in Table 2.

Table 2. Personality traits of CAPSU Sigma students.

Personality Trait	Mean	Description	Std. Deviation
Extroversion	2.36	Low	.26
Agreeableness	3.49	High	.16
Conscientiousness	3.56	High	.20
Neuroticism	3.31	Moderate	.20
Openness to Experience	2.83	Moderate	.32

Agreeableness was also high for CAPSU Sigma students. This personality trait implies that the students of CapSU Sigma know how to adapt to new circumstances when dealing with people and is an indicator that these students possess good manners and show common courtesy and like to mingle with other people. They also have the inclination to be helpful and show compassion to others.

Meanwhile, the students seemed to have a moderate level of neuroticism and openness to experience. The moderate level of neuroticism may mean that the CAPSU Sigma students in general do not easily express their emotion or are not easily affected by their emotion as they are more generally inclined not to possess negative

feelings like guilt and pessimism. Moderate level of openness to experience means that the students were generally inclined to be more conservative in their decisions and were not too open-minded.

On the other hand, the students got low scores in extroversion. This indicates that the students were not too talkative or assertive when in front of other people. They would rather focus more on their studies and projects rather than socialize and pursue other activities.

Mathematics Performance of Students

The data in Table 3 reveals that in general, the Mathematics performance of students was "low" (M = 2.55, SD = .36). Also, when the students were classified according to sex: male (M = 2.49, SD = .43), female (M = 2.60, SD = .28); and academic department: THM (M = 2.53, SD = .39), Technology (M = 2.60, SD = .27), all had "low" level of Mathematics performance.

Table 3. Mathematics Performance of Students of CapSU Sigma

Profile	Mean	Description	SD
Entire Group	2.55	Low	.36
Sex			
Male	2.49	Low	.43
Female	2.60	Low	.28
Department			
THM	2.53	Low	.39
Technology	2.60	Low	.27

The low level of Mathematics performance of the students may imply that although they may have the capability to perform basic mathematical processes, compute simple mathematical problems and were equipped with elementary skills to succeed in Mathematics, they may, however, find it difficult when they are dealing with more complex mathematical processes and calculations. Their ability to solve higher mathematical problems may be lacking and may not possess strategies on how to determine answers, evaluate mathematical arguments and formulate generalizations.

Differences in the Personality Traits of Students When Grouped in Terms of Sex

Table 4 shows the differences in the personality traits of students when they were classified in terms of sex. The level of extroversion between male and female students significantly differs in favor of the male students, [$t(259) = 6.734$, $p < .05$]. This implies that male students were more extrovert than females. The male students

tend more on excitement-seeking and tend to socialize more compared to females.

Similarly, the level of conscientiousness between male and female students also differs, [t (259) = -2.593, p < .05]. This indicates that female students of CAPSU Sigma were more responsible, diligent and persistent in comparison to the male students. The female students of CAPSU Sigma tend to be more law-abiding, disciplined and strive harder than the male students.

Furthermore, the level of openness to experience also vary between male and female students, [t (259) = 3.484, p < .05], with the males getting higher scores. This may imply that male students are more likely to seek new experiences and pursuits compared to female students. In comparison to females, male students may also be more prone to daydreaming.

On the other hand, the level of agreeableness between the male and female students of CAPSU Sigma does not differ significantly, [t (259) = -1.908, p > .05]. This implies that the students of CAPSU Sigma regardless of sex were polite and helpful when dealing with other people in their surroundings. The male and female students of CAPSU Sigma behaved similarly when it comes to cooperating and showing sympathy to others.

Finally, findings of the study also show that the level of neuroticism of the male students are the same with that of the female, [t (259) = -.590, p > .05].This may indicate that there was not much difference when it comes to the emotional stability between male and female students.

Table 4. Differences in the personality traits of students when grouped in terms of sex

Category	Mean		t-value	df	Sig.(2-tailed)
	Male	Female			
Extroversion	2.47	2.27	6.734*	259	.000
Agreeableness	3.47	3.51	-1.908^{ns}	259	.057
Conscientiousness	3.52	3.59	-2.593*	259	.010
Neuroticism	3.30	3.31	-.590ns	259	.555
Openness to Experience	2.89	2.76	3.484*	259	.001

Differences in the Personality Traits of Students when Grouped in terms of department

Table 5 shows that in terms of academic department, the level of extroversion of students from the THM Department differs when compared to the level of extroversion of students coming from the Technology Department, [t (259) = 2.693, p < .05].This implies that THM students were more extrovert than Technology students, given that THM students were into programs involving tourism and hospitality management. In

their chosen field, being social and outgoing is compulsory or necessary since they would be dealing and interacting with people all the time.

Similarly, the level of agreeableness between students coming from the two departments also differ significantly in favor of Technology students, [t (259) = -2.072, p < .05]. This means that Technology students exhibited more politeness and helpfulness to others compared to those students in the THM Department.

In addition, there was also a significant difference in the level of conscientiousness between THM and Technology students to the advantage of THM students, t (259) = 3.102, p < .05. This indicates that THM students, when compared to Technology students, show more diligence and persistence. This may somewhat show that THM students are more reliable, thorough and organized.

Furthermore, there was also a significant difference in the level of openness to experience between the THM and Technology students, t (259) = -2.174, p < .05, with the Technology students getting higher scores. This may imply that Technology students were more curious and insightful compared to THM students.

On the contrary, no significant difference was found in the level of neuroticism between the THM and Technology students, [t (259) = -.564, p > .05]. This suggests that both students in the THM and Technology Departments can control their impulses and behavior in a similar manner.

Table 5. Differences in the personality traits of students when grouped in terms of department.

Category	Mean		t-value	df	Sig.(2-tailed)
	THM	Technology			
Extroversion	2.39	2.30	2.693*	259	.008
Agreeableness	3.48	3.52	-2.072*	259	.039
Conscientiousness	3.58	3.50	3.102*	259	.002
Neuroticism	3.30	3.32	-.564^{ns}	259	.573
Openness to Experience	2.80	2.89	-2.174*	259	.031

Differences in the Performance of Students in Mathematics

Table 6 shows that the performance of students in Mathematics differ significantly when they were classified in terms sex in favor of female students, [t (259), = -2.576, p < .05]. This means that sex had an effect in Mathematics performance and that female students had a better performance in Mathematics when compared to male students.

Meanwhile, the results also show that performance of students in Mathematics did not differ significantly when the students are classified according

to their academic department, t (259) = -1.443, p > .05. This indicates that the overall Mathematics performance of students coming from the THM and Technology Departments are more or less similar.

Table 6. Differences in the mathematics performance of Students When Classified According to Sex and Department

Category		Mean	SD	t-value	df	Sig.(2-tailed)
Sex						
	Male	2.49	.43	-2.576*	259	.011
	Female	2.60	.28			
Department						
	THM	2.53	.40	-1.443^{ns}	259	.150
	Technology	2.60	.27			

Relationship between Personality Traits and Mathematics Performance

Table 7 indicates that extroversion is significantly related to the performance in Mathematics, [r = -.158, p < .05]. The negative correlation suggests a high level of extroversion may lead to a lower performance in Mathematics and that a lower level of extroversion may result to a better performance in Mathematics.

Furthermore, a significant relationship was also found between performance in Mathematics and conscientiousness [r = .690, p < .05]. This means that conscientiousness could be associated with performance of students in Mathematics. The positive correlation signifies that as the level of conscientiousness increases, the Mathematics performance of the students also increases.

On the other hand, findings show that performance in Mathematics is not significantly related with agreeableness [r = -.042, p > .05]; with neuroticism, [r = -.018, p > .05]; and with openness to experience, r = .018, p > .05. These may imply that agreeableness, neuroticism, and openness to experience do not affect Mathematics performance.

Table 7. Result of Pearson's in the relationship between personality traits and Mathematics performance

Variables	r	Sig. (2-tailed)
Extroversion and Mathematics Performance	-.158*	.011
Agreeableness and Mathematics Performance	-.042^{ns}	.502
Conscientiousness and Mathematics performance	.690*	.017
Neuroticism and Mathematics Performance	-.018^{ns}	.772
Openness to Experience and Mathematics Performance	.018^{ns}	.777

Conclusions

Conscientiousness was shown to be the most dominant personality trait of CAPSU Sigma students. This may be due to several factors like the quality of students and how they were brought up by their parents, the friendly environment offered by the school, the guidance of the teachers, and the proper upbringing of the parents. For the students, their view of having a bright future is by showing industriousness in carrying out a task or role and by living in accordance with one's sense of right and wrong.

The low Mathematics performance of the students may be attributed to their lack of exposure and preparedness in Mathematical activities that could enhance their skills in the subject. They may be college students but they may not have the sufficient ability to arrive at a concept or generalization when dealing with problems involving Mathematical facts, their ability may still not sufficient enough to use reason, especially when forming conclusions, inferences, or judgments in answering more complex mathematical problems. The pupils may have a poor understanding of mathematical operations and their foundation in Mathematics may need to be improved.

The significant difference in the personality traits of CAPSU Sigma students when they were classified in terms of sex and academic department indicates that personality traits are diverse and could depend on many factors. The personality of an individual is the result of one's interaction with all the things around him or her and how that individual was brought up by the people around him.

The performance of female students in Mathematics was better when compared to male students. This may indicate that female students of CAPSU Sigma might be less worried when it comes to mathematical concepts and are more devoted to their studies when compared to their male counterparts.

The negative relationship between performance in Mathematics and extroversion means that the more extroverted is the student, the less he could perform in Mathematics since when a student is an extrovert, the greater the chance that he would be distracted. On the other hand, the significant relationship between performance in Mathematics and conscientiousness may point out that a more conscientious a student is, the better would be his performance in Mathematics since when a student is conscientious, he would be able to adapt his learning strategies to different circumstances.

Recommendations

The students are encouraged to behave and study well in school. Students should develop, polish and refine their personality in order to improve their performance in Mathematics and in other subjects as well as to prepare them to be responsible citizens.

The result of the study should be presented to the respondents so they may be aware of their personality traits and Mathematics performance and be more motivated on in studying their lessons. In addition, results may also be shared with the higher education leaders so they may gain insights as to the healthy practices of members of the academe and share it with other units.

The result should be made available to curriculum planners specifically in the field of Mathematics education as baseline data in curriculum designing and curriculum enrichment for learning activities that can promote active participants.

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