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Path Model on Facebook Usage, Personality and Mathematics Performance of Students: Basis in Learning Material Development

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ABSTRACT

This study formulated a path model on the use of Facebook, personality, and mathematics performance of students which served as the basis in the development of a learning material. It utilized the descriptive-developmental research design and was conducted in three state universities and colleges (SUCs) of Ilocos Sur, Philippines. The data were gathered using the Big Five Inventory (BFI). Data on personality were analyzed and evaluated online through the Personality Assessor site while the other data were analyzed using SPSS and AMOS. There were 210 student-respondents to answer the survey questionnaires and tests. Findings revealed that students spent 1-2 hours accessing their Facebook account for more than three times a day using their smartphones mostly at home, classroom, and library. They are engaged in Facebook activities like chatting, group discussion with friends and posting photos during their vacant time and before sleeping at night. Findings revealed that majority of the students are extravert and agreeable people while a great number of them are highly neurotic, but are open and conscientious. Developed path models revealed that the Facebook use of the students positively correlates to their openness to experience, extraversion and agreeableness personality while it negatively correlates to their conscientiousness and neuroticism personality. Open and conscientious students perform better in Mathematics while agreeable and neurotic students have lower mathematics performance. The content of the developed learning material in Mathematics enhanced the personality of the students. It positively affected their Mathematics performance, through their Facebook activities.

Keywords*: big five inventory, Facebook engagement, personality assessor*

INTRODUCTION

Mathematics is considered a vital foundation for technological and scientific knowledge that is essential towards the socio-economic development of the world. In order for one nation to survive the millennial challenge, it is important that the citizens be equipped with mathematical knowledge in order to become scientific thinkers and cope with the challenges of the era where technology mandates everything. However, the Philippines lags behind other countries as far as

mathematics performance of students is concerned. In 1999 and 2003, the Philippines subjected itself for evaluation by the Trends in International Mathematics and Science Study (TIMSS). This resulted in the findings that the mathematics performance of Filipino students is significantly below the average and even placed third from the bottom (Martin and Mullis, 2011).

Considering the importance of Mathematics for the country to successfully get through the technology era, there is a need to design a tool that could help in the improvement of the students' performance in Mathematics. To do so, educators must become active and sensitive to their students' needs in order to provide the necessary assistance and guidance. Responding to the challenges of this era could help in elevating the status of the country's mathematics performance.

Social networking sites have mushroomed and have taken most of the study time of students. Facebook usage has been found out to have been invading millions of students engaged or addicted to it. People have been spending lots of their time uploading, downloading, or getting information concerning their career or academic works (Napoleon, 2013). The unstoppable growth of the internet makes a big impact on the development of the students' personality and academic performance. The latest Global Web Index summary in January 2015 showed that almost 40% of Facebook users are 16 to 24 years old and about 35 percent are 25 to 34 years of age. Data imply that Facebook users are students who are active in socializing and interacting in the website. Studies have also shown that Facebook has been a part of their daily activities and serves as avenue for them to communicate, share information, build and preserve relationships, and meet new friends. Students and teachers alike have established their comfort zones in Facebook. It serves not only as a place where they can relax and strengthen their acquaintances but it has become a place for interaction and discussion. Evidently, it plays a great role in motivation, teaching, learning, and in the personality and academic performance of students.

The rise of Facebook is tremendously bringing changes in the nature of social activities and relationships as well as in all aspects of a student's life. For the millennials, overall use of the Facebook site is already an integral part of their life. Student's use of social networking continues to create challenges and issues for higher education professionals and keeping abreast of these challenges has proved to be difficult because of the speed at which new technologies are being introduced (Mehmood & Taswir, 2013).

On the other hand, students who are using Facebook all over the world exhibit different personality types with differing personal values and characteristics. Several studies show that these varied personality types of students create an impact on their academic achievements as personality has been recognized to be a determining factor on how people prefer to learn. The type of personality of the

students has a great tendency of affecting positively or negatively their academic performances.

Studies conducted outside the Philippines have reported that personality traits influence academic achievement. Furnham (2003) found out that conscientiousness has consistently emerged as a stable predictor of exam performance. Paunonen (2001) also revealed that the combinations of Big Five traits was found out to predict various educational outcomes. These findings confirm the general significance of personality traits to academic performance.

As established by results of various studies and putting them together, it is evident that the use of Facebook is being influenced by one's personality and both variables can positively or negatively affect the mathematics performance of the students. A study conducted by Mahmudova (2014) revealed that students spending time on networking sites affect their grades negatively. The study highlighted the networking sites such as Facebook, Twitter, Instagram that take a lot of time from students, thus limiting their time spent on studying and therefore negatively influencing their academic performance.

On the other hand, a study conducted by Jwaifell (2013) showed that the intensity of usage of social networking sites among Jordanian university students offered that these sites could be used as tools for interaction and communication between students and professors. Students further mentioned that they are engaged in social networking sites for academic purposes such as communicating with teachers, discussing new subject with classmates, and chatting about the general topics of their interest which have positive effect on their academic performance.

These varying effects of using social networking sites on students' academic performance lead to new studies and research activities as Mahmudova (2014) concluded that there is a little logical correlation highlighting that the time spent in social networking sites influences students' grade and that there is a third variable that affects students' overall grade point average.

The relationship of the use of Facebook, personality, and academic performance can be established through a path model. This model predicts the mathematics performance of the students using Facebook and personality as the independent variables or predictors. This model also explains the patterns of correlation between the three variables through path analysis.

It is with high hopes that through the findings of this study, mathematics educators will be able to trace the advantages and disadvantages of using this social networking site on the student's mathematics achievement making it as a basis for designing a learning material. The pattern of relationship between the three

variables used in this study will be the determinants in the activities that will be included in the learning material to be developed. Also, findings determine the personality traits that could predict the academic performance of the students and the extent of use of Facebook that contributes positive effect. Knowing the personality traits of students will help the teacher design appropriate teaching tools and techniques while the "Facebook" fever of the students could be utilized by educators to reach out to the 21st Century learners and realize the vision of today's educational quest.

This study was then conducted to determine the path model establishing the interrelationship between the Facebook usage, personality and mathematics performance of students which then served as basis in the development of a learning material, particularly in the field of Mathematics.

METHODOLOGY

This study made use of the descriptive-developmental research design. The descriptive part deals with the results of the Facebook usage survey and the academic performance of the students. The result of the analysis of the relationship between the three variables under study was the basis for the developmental part of the research. The developmental part was the making of the learning material with interactive learning activities.

There were 210 first year education student-respondents. This study covered the three state universities and colleges (SUCs) situated in the province of Ilocos Sur, Philippines. GPower 3.1 was utilized in determining the sample size using a medium effect size with 0.01 level of significance.

Prior to the conduct of the study, the researcher sought permission from the presidents and deans of the three state colleges and universities. The students were also informed that their grades in Mathematics will be used for the purpose of this study. No students were forced to become part of this research and both parties agreed that strict confidentiality of the data to be used in the study will be kept intact and safe.

The data needed were gathered during the Second Semester of School Year 2016-2017. A standardized inventory and instruments, the Big Five Inventory (BFI) developed by Oliver P. John and another psychologist, which emerged from the preliminary lexical work of Galton in 1884 was used to gather the data needed for this study. The Big Five Inventory (BFI) has gone through several reviews and critiquing by Oliver John, Laura Naumann, Srivastava, Goldberg and other well-known psychologists. This consists of a 44-item test developed by Oliver P. John and V. Benet-Martinez in 1998.

The percentile rank of the personality scores of the respondents was evaluated online through the Personality Assessor which was launched on June 24, 2011. This free online test for personality is designed, owned, and operated by Nathan W. Hudson, a social-personality psychologist at Southern Methodist University who studied adult attachment and personality development.

Documentary analysis was employed in determining the level of mathematics performance of the students. This level was evaluated using the grading system used by the three state universities and colleges of Ilocos Sur. The relationship between and among the variables was evaluated and described using the computed correlation coefficient.

Data were collated, organized, and subjected to the following statistical tools; frequency count and percentage to describe the level of engagement on Facebook usage, personality traits of the students, and their level of mathematics performance; mean to determine the score level of the students' responses on the BFI; pearson r to determine the relationship between the use of Facebook and personality traits, use of Facebook and academic performance, and personality and academic performance; and path analysis using AMOS to determine the pattern of relationship and degree of interaction between the variables being studied so as to establish the path model.

RESULTS AND DISCUSSION

The following are the salient findings of this study:

Table 1 presents that a great number of students (54 or 26%) spend more than three hours to access their FB account while 15 of them (7%) spent more than six hours. More than 50 percent of the students visit the Facebook site for more than three times a day. There are about 21 percent and more accessing their accounts for even more than five times a day. Almost all (96.67%) student-respondents have direct access to their Facebook account through their upgraded smartphones. Some are also using their laptop, tablets, iPad, and personal computers. All the student-respondents access their Facebook account at home. Results further show that majority of the respondents are engaged in their Facebook activities inside their classroom (133 or 63.33%) and at the computer shops (117 or 55.71%), respectively. Some also use the library internet facilities (25 or 11.90%) for this purpose. The student-respondents spend most of their free time in accessing and engaging in Facebook sites. The free time and break time are utilized by most (186 or 88.57%) and majority (141 or 67.14%) of them, respectively, in Facebook. The primary purpose of accessing Facebook where most of the respondents answered are for group discussion with friends (185 or 88.10%) and (181 or 86.19%) for both – chatting and posting photos. Also, majority (123 or 58.57%) of the respondents access the Facebook site to upload music/video while a great percentage (102 or 48.57%) want to communicate with their teachers.

Extent of Facebook Usage

Table 1
Extent of Facebook usage of the respondents

FACEBOOK USAGE	F	(%)
Length of Time Spent on FB per Day		
Less than an hour	47	22.38
1-2 hours	54	25.71
3-4 hours	48	22.86
5-6 hours	46	21.90
more than 6 hours	15	7.14
Frequency of Visiting Facebook per Day		
Once	29	13.81
Twice	60	28.57
Thrice	43	20.48
four times	19	9.05
5 times	14	6.67
more than five times	45	21.43
Gadgets Used in Accessing FB		
Smartphone	203	96.67
Tablet	48	22.86
Ipad	12	5.71
Laptop	75	35.71
Personal Computer	26	12.38
Place of Accessing FB		
Home	210	100.00
Classroom	133	63.33
Library	25	11.90
Computer shop	117	55.71
ICT Laboratory	4	1.90
Time of Accessing FB		
during break time	141	67.14
during free time	186	88.57
before sleeping at night	171	81.43
after waking up in the morning	87	41.43
during class hours	15	7.14
during meal time	33	15.71
Purpose of Accessing FB		
download music/video	33	15.71
upload music/video	123	58.57
posting photos	181	86.19
Blogging	22	10.48
creating polls/quizzes/surveys	8	3.81
Chatting	181	86.19
submitting articles to website	38	18.10
communicating with teachers	102	48.57
group discussion with friends	185	88.10

The fear when in front of the teacher is lessened when they communicate through the social networking sites. Group chat has been popularized and the interaction between a teacher and a student has even been made possible through Facebook.

The above findings reveal that the engagement of millennial learners in social media is now globally growing as supported by the research results of Pew Research Center posted by Duggan (2015) reporting that 82 percent of online adults with ages 18-29 use Facebook.

Level of Personality of the Students

Every individual has a unique personality that may change over a period of time. Figure 1 shows the level of personality of the students along the five areas as follows:

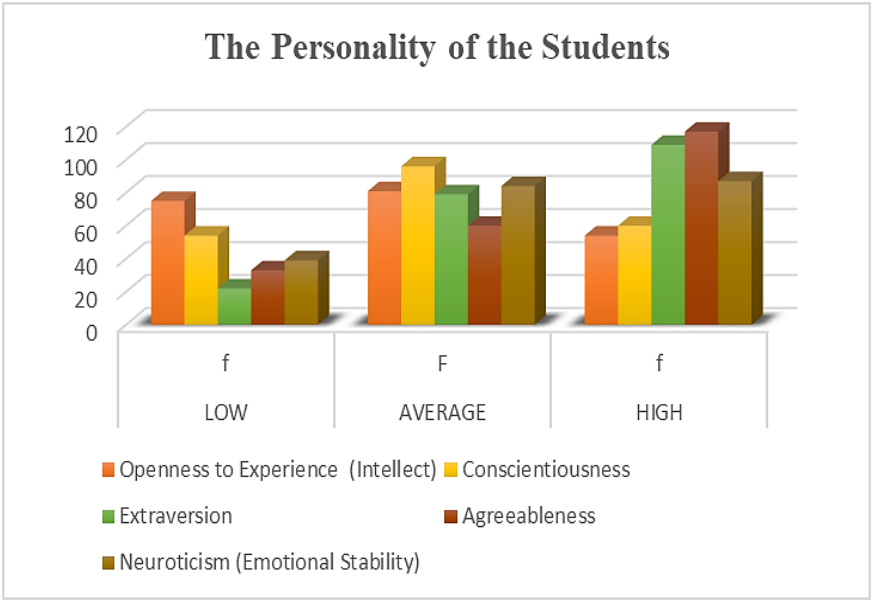

Figure 1. The Personality of the Students

A great number of the students (81 or 38.57%) have "Average" level of openness to experience type of personality, a great percentage (96 or 45.71%) of them fall under "Average" level of conscientiousness type of personality while, majority of them are "Highly" extravert (109 or 51.90 %) and (117 or 55.71%) have "Average" level of agreeableness type of personality. Meanwhile, a marked percentage (81 or 41.43%) showed a high level of neuroticism personality.

Students are not only different in terms of personality characteristics, age, gender, religion, family backgrounds etc., they also exhibit varied attitudes and emotional responses in the school. Students have distinctive personality

characteristics which make them unique in their own ways. They too have different views in any topic, therefore, behaving differently in various education and social settings (Hakimi, Hejazi & Lavasani, 2011).

Level of Mathematics Performance of the Students

Table 2
Level of mathematics performance of the students

Numerical Ratings	F	(%)	Level of Performance
1.0	2	0.95	Excellent
1.25 – 1.50	32	15.24	Very Good
1.75 – 2.00	67	31.90	Good
2.25 – 2.50	70	33.33	Fair
2.75 – 3.00	39	18.57	Passing
TOTAL	210	100	
Mean Grade	**2.14 – Fair**		

The mathematics performance of the students in general is "Fair" as reflected by the Mean Grade of 2.14. In addition, a great number of students have "Fair" (33%) and "Good" level of mathematics performance while two (about 1%) have a rating of 1.0 (Excellent).

Jameel & Ali (2016) stated that despite that mathematics plays an important role in students' life, most of them find it to be a difficult subject. They are hard up to pass and continue it at graduate levels and one of the main reasons behind why they garner low performance in mathematics is due to the poor mathematical background during their secondary level education.

Relationship between the Facebook Use of the Students and their Personality and Math Performance

On Openness

Among the variables, the gadgets used (Personal Computer; r = 0.16), place of accessing FB (ICT Laboratory; r=0.15), and purpose of accessing the Facebook site (posting photos; r=0.17, upload music/video; r = 0.16, group discussion with friends; r=0.15, blogging; r=0.15 and download music video; r=0.14) showed significant positive correlation with the openness personality of the students. This result is in consonance with the findings of Marshall, et.al (2015) stating that people with openness personality post more status updates relating to "intellectual topics". They found out that people high in openness may write updates about current events, research, or their political views for the purpose of sharing impersonal information rather than for socializing.

On Conscientiousness

Among the different variables, only the gadget used (iPad; r = - 0.14)) was found to be significantly (negative) correlated to the level of conscientiousness of

the students. The result implies that the more gadgets used (iPad) the lesser conscientious the students are. Conscientious individuals tend to use gadgets that could help them in doing their tasks and school activities while the less conscientious students used their iPad for activities other than their school and academic-related activities.

Table 3

Correlation coefficients showing the relationship between the students' use of Facebook (FB) and their personality and mathematics performance

EXTENT OF FACEBOOK USE	Computed r					
	PERSONALITY					Mathematics Performance
	O	C	E	A	N	
A. Length of Time Spent on FB per day	-0.08	-0.12	-0.01	-0.19	0.06	0.07
B. Frequeny of Visiting Facebook	0.03	-0.05	-0.07	-0.11	0.08	0.09
C. Gadgets Used in Accessing FB						
Smartphone	-0.10	0.05	0.03	-0.07	-0.02	0.05
Tablet	0.12	-0.03	-0.01	-0.01	0.05	0.03
IPad	-0.11	-0.14*	-0.10	-0.10	0.01	-0.03
Laptop	0.04	0.12	0.02	0.04	-0.03	-0.02
Personal Computer	0.16*	0.03	0.11	0.01	-0.18*	-0.02
D. Place of Accessing FB						
Home	0.02	0.01	-0.07	0.01	0.06	-0.01
Classroom	0.02	0.03	-0.07	0.04	-0.15	0.08
Library	0.10	0.03	-0.13	0.06	-0.06	-0.21**
Computer shop	-0.07	0.02	0.11	0.04	-0.16*	-0.10
ICT Laboratory	0.15*	-0.07	0.07	-0.05	0.18**	-0.16
E. Time of Accessing FB						
During break time	0.03	-0.07	0.07	-0.02	-0.17*	0.02
During free time	-0.06	-0.03	-0.03	0.03	-0.12	0.08
Before sleeping at night	0.05	-0.08	-0.01	-0.03	0.11	0.19**
After waking up in the morning	0.04	0.06	0.01	-0.02	0.08	-0.01
During class hours	-0.02	-0.05	-0.01	-0.05	0.01	-0.02
During meal time	0.05	-0.08	-0.07	-0.09	0.05	0.11
F. Purpose of Accessing FB						
Download music/video	0.14*	0.11	0.13	0.03	-0.04	-0.05
Upload music video	0.16*	-0.01	0.18**	0.06	-0.10	-0.05
Posting photos	0.17*	0.10	0.15*	0.18**	-0.10	-0.01
Blogging	0.15*	0.05	0.08	-0.09	-0.07	-0.06
Creating polls quizzes/surveys	-0.12	-0.08	-0.10	-0.14	-0.05	-0.13
Chatting	0.09	0.09	0.22**	0.09	-0.15*	-0.10
Submitting articles to website	-0.02	-0.06	0.08	0.04	-0.19**	0.02
Communicating with teachers	0.11	-0.08	0.002	-0.03	-0.07	-0.01
Group discussions with friends	0.15*	0.10	0.06	0.07	-0.04	-0.03

Legends: *-significance at 0.05 level
**- significance at 0.01 level

Personality

Openness - O Conscientiousness - C Extraversion - E
Agreeableness - A Neuroticism - N

On Extraversion

The level of extraversion personality of the students was significantly correlated to the purposes of accessing Facebook which include: chatting (r = 0.22), uploading music/video (r = 0.18), and posting photos (r= 0.15).

Along this line, Marshall (2015) found that people with the sociable, outgoing tendencies associated with extraversion use Facebook primarily as a communication tool, and tend to post "more frequently about social activities and everyday life".

Accordingly, the students who are averagely extravert are comfortable in some social situations and conversations. Meanwhile, those who have "low" level of extraversion prefer to withdraw and spend time alone. They are also shy and quiet at most time. However, they are able to enjoy activities that provide lower levels of stimulation and prefer social situations that allow close conversation with a few friends rather than high-energy situations with many people. They always play safe and are afraid to take risks (Hudson, 2011).

On Agreeableness

Posting photos (r = 0.18) had a direct significant relationship to the agreeableness personality of the students while creating polls/quizzes/surveys(r=-0.14) showed an indirect significant correlation. This was further supported by the results of the evaluation given by the Personal Assessor website (where their personality were evaluated online), revealing that the students place a huge emphasis on maintaining positive relationships with others and may hide their emotions in order to get along better with others. These data explain why the students prioritize chatting with their friends over their assignments and other responsibilities and duties in school.

On Neuroticism

Four variables (gadget used, place of accessing, time of accessing and purpose of accessing) were found to be significantly correlated to the neuroticism personality of the students. Results revealed that the gadget used (personal computer), place of accessing (classroom, computer shop, and ICT Laboratory), time of accessing (during break time), and purpose of accessing (chatting and submitting articles to website) are significantly correlated to the students' level of neuroticism personality.

This result conforms with what Hudson (2011) found out that neurotic students are likely to experience frequent negative emotions, including stress, anxiety and feelings of low self-worth. However, individuals high in neuroticism may experience a richer array of emotions and are more vigilant in detecting dangers in their surroundings-both real and imagined. This implies that the students at this age are more prone to depression and anxiety because they have a rich array of

emotions and cannot have full control of their emotions. This explains why the usage of Facebook is significantly related to their neuroticism personality

Mathematics Performance

Results revealed that among all the variables, only two (2) were found to be significantly correlated to the students' mathematics performance. Findings revealed that the place (library; r = -0.21) and time (before sleeping at night; r = 0.19) of accessing and engaging in Facebook affect the mathematics performance of the students. This finding conforms with the study conducted by Moghavvemi, et al. (2017) which showed that students use Facebook for entertainment, relaxing/escaping, and passing time, but not for socializing and social information. Spending time on Facebook has a positive effect on their academic performance, which indicated that the time spent on Facebook did not affect their education or academic achievement. Also, Wang and Mark (2018) found out in their study that the grades of frequent Facebook users do not suffer. Their findings reveal that students with high GPA's spend shorter time in each Facebook session which follows schoolwork.

Relationship between the Personality of the Students and their Mathematics Performance

Among the five personality traits, only extraversion was not significantly related to the mathematics performance of the students. Vedel (2017) cited the findings of Poropat (2009) and Richardson et al. (2012) stating that extraversion has only modest correlations with overall academic performance.

Both conscientiousness and openness have a highly significant direct relationship to the mathematics achievement of the students while agreeableness and neuroticism are negatively correlated with their mathematics performance.

A study conducted by Poropat in 2009 and 2016 as cited by Vedel (2017) has a similarity with these research findings stating that conscientiousness is consistently associated with academic performance across primary, secondary, and tertiary education. Openness, agreeableness, emotional stability, and extraversion

Table 4
Correlation coefficients between the personality of the students and their mathematics performance

PERSONALITY	Computed r
Openness	0.152*
Conscientiousness	0.236**
Extraversion	-0.079
Agreeableness	-0.253**
Neuroticism	-0.135*

all have lower correlations with academic performance in secondary and tertiary education

These results yield to the realization that type of personality plays an important role in a students' understanding of the lesson and got great implications for teaching (Chowdhury, 2006). Furthermore, personality traits are expressed through learning styles and in turn are reflected in learning strategies that produce learning outcomes. It is important therefore to have an understanding of the students' personality in which students gather and process information in order to design more effective pedagogies that will benefit both students and teachers.

The Path Models

Four models were developed showing the strength of relationship and the causal effects between and among the variables of this study.

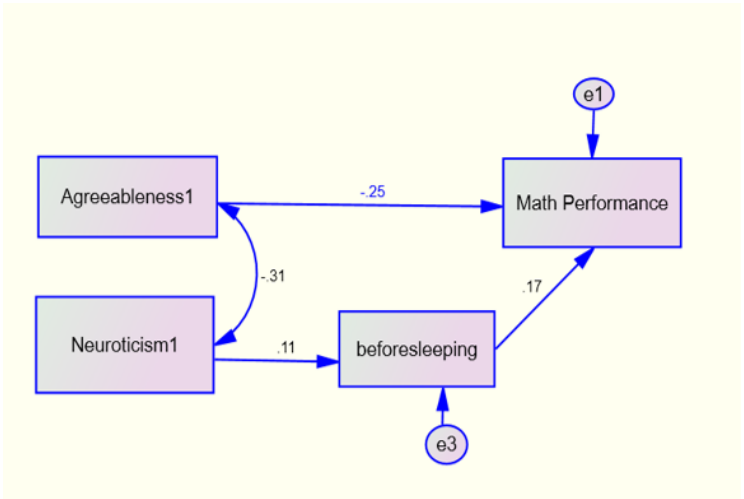

Figure 2. Model 1

Model 1 presents the strength of relationship between the personality traits, neuroticism and agreeableness, to the time in accessing Facebook. The model also shows that neuroticism can have an indirect effect on the mathematics performance of the students through the time of accessing Facebook. Agreeableness personality also has a direct negative effect on the mathematics performance of the students.

The above result reveals that the higher the extraversion score of the student, the more time that he or she spends on Facebook. This supports the findings of several studies cited by Glass, et al. (2013) which present a positive relationship between extraversion and Facebook use. This finding lends support to the proposition that people with higher score on extraversion use social networking

as a means of social extension to communicate with friends, contacts and relatives. This finding will also support the idea that extravert individuals tend to be more sociable and neglect time for school activities, thus leading to lower academic performance.

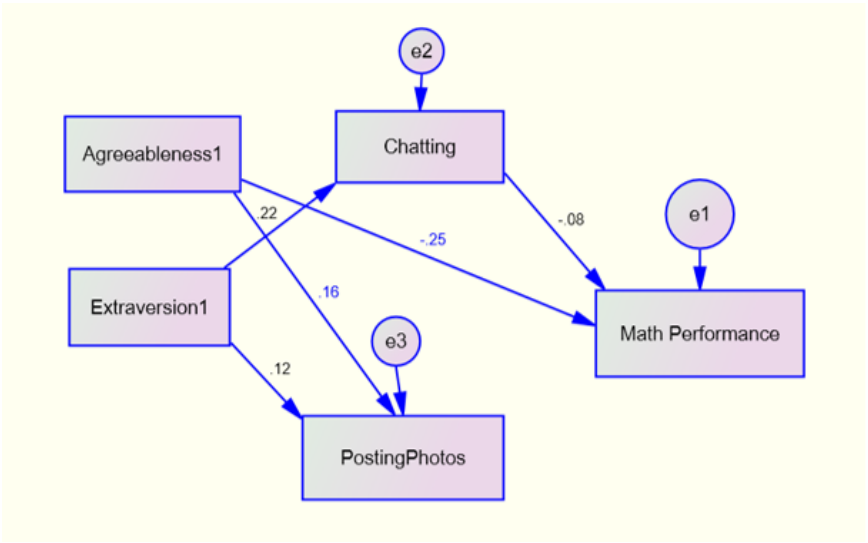

Figure 3. Model 2

Model 2 shows that there is a direct effect of the agreeableness personality of the students to their mathematics performance. It also shows that extravert students access their Facebook account to chat with their friends. The model shows that neuroticism personality has an indirect effect on the mathematics performance of the students through the mediating effect of the place of accessing Facebook. It was also noted in the model that when the students access their Facebook accounts inside the classroom, there is a positive effect on their mathematics performance.

The values in the model shows that there is a direct negative effect of the agreeableness personality of the students to their mathematics performance. In this second model, it can be said that agreeable individuals access their Facebook accounts to post their photos. And oftentimes, these photos include tagged pictures of friends, relatives and acquaintances. Amy Morin, a blogger highlighted in her blog posted on June 20, 2015 that agreeable people are tagged in other people's photos most often. And since, agreeable people tend to be warm and friendly and less competitive, they more often appear in pictures with other users, as expressed by a higher number of tags (Bachrach et al., 2012).

The above findings are in consonance to the findings of Glass (2013) stating that students extraversion, conscientiousness and openness to experience are positively correlated to student engagement of academic achievement.

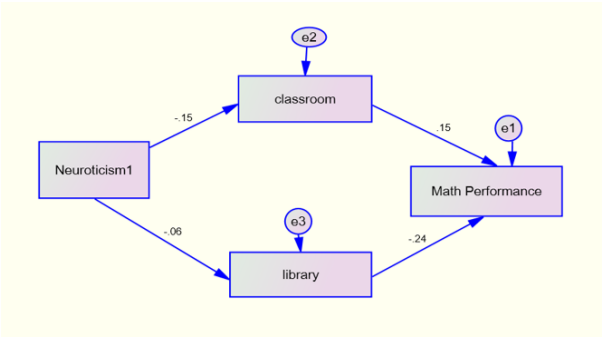

Figure 4. Model 3

Model 3 suggests that neuroticism personality has an indirect effect on the mathematics performance of the students through the mediating effect of the place (classroom; r = 0.15 and library; r = -0.24) of accessing Facebook. The model also shows that neuroticism has a negative and positive effect on the mathematics performance of the students when it is accessed in the library and classroom, respectively.

The model explains further the findings that neuroticism personality is not significantly correlated to the library as a place of accessing Facebook. The model suggests that any individual with personality other than neuroticism who is accessing Facebook in the library will experience a significant effect in his mathematics performance. The computed value on the arrows in the model shows a significant negative correlation between the two variables. The library is a place where students need to study and not to engage in Facebook activities.

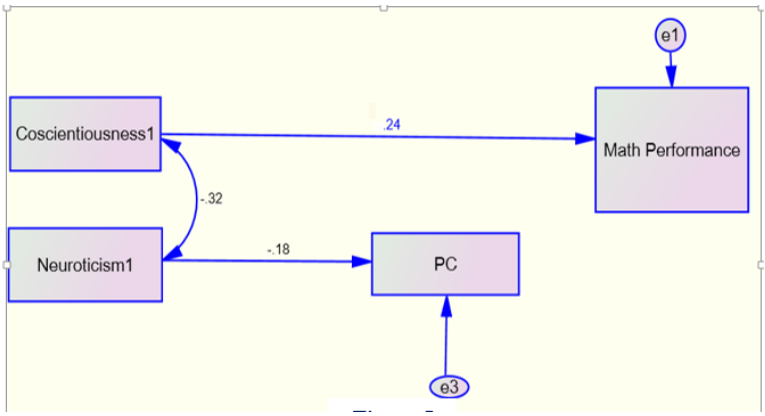

Figure 5. Model 4

Model 4 shows how the gadgets used affect the personality of students and the personality that has a direct effect on the mathematics performance of the students. This model presents that conscientious personality has a direct effect on the mathematics performance of the students. However, the gadgets used show no significant connection with their mathematics performance.

This finding is consistent with the findings of the study conducted by Conrad and Patry (2012) asserting the fact that there is a consistency of findings of previously conducted researches with theirs showing that there is a strong positive relationship between conscientiousness and academic performance as measured by final grades.

As shown in the model, the two personalities neuroticism and conscientiousness are significantly correlated. The value r = -0.32 implies that the Neurotic individual is a low conscientious person and vice versa. Also, the model presents the fact that conscientious personality has a direct effect on the mathematics performance of the students.

Lastly, the model shows that a less neurotic individual uses personal computer in accessing Facebook. This finding implies that an individual using his/her "personal computer" in accessing his/her Facebook account is more stable and poised than those who access and do their Facebook activities using other gadgets other than their own.

The Learning Material

The developed learning material was designed and written based on the requirements of the K-12 curriculum. Furthermore, the activities included were based on the path models. Activities to be done and accomplished in the Facebook site were included in the beginning, middle, or at the end of the topics. The topics and exercises were carefully selected and made in order to suit the personality and needs of the millennial learners.

The topics covered in the book are divided into units. Each unit contains the following:

Logging In will give the reader an idea of what is to be learned in the given unit. Each unit contains several lessons with every lesson containing the following:

Getting to Know You Part provides the basic information, details, and concepts in order to learn and understand the lesson.

Throwback deals with the review of the past lessons or topics that are needed in the discussion of the present lesson.

Knowing You Better provides series of examples that will make the understanding of the lesson easier and faster.

Getting Engaged is the part where the students perform tasks and activities that are parallel with the examples and starting exercises for the lesson.

More Acquaintances, found on the last part of every lesson is provided to help the students master and practice more what they have learned.

Reflection Part is designed for the integration of values in every unit of the book.

Real life applications are also provided in the examples and exercises to relate the concepts and lessons to the experiences of the students/learners.

The activities aimed to enhance the conscientious personality of the students through active participation in the discussion online. Also, the activities were designed to make use of the agreeableness and openness personality of the students to a more productive and rewarding output. Chatting and posting activities of the students become their outputs in the different Facebook exercises provided in the learning material.

The Facebook exercises and learning activities with friends are designed to increase further the emotional stability of the students by encouraging them to share their ideas and opinions and open up with their friends and classmates as they accomplish their tasks over the Facebook site.

CONCLUSIONS

A great number of the students are engaged in accessing their Facebook accounts anytime and anywhere inside and outside the school premises. It already forms part of their daily activities most especially along their social acquaintances. Majority of the students are friendly and they spend most of their time with their peers, exerting their best efforts to please and do things that make them acceptable to their friends. Using iPad in accessing Facebook makes the student lazy and less conscientious, while the purpose of accessing FB can determine their agreeableness and extraversion types of personality. The more they chat and upload and post their photos, the higher is their level of agreeableness and extraversion personality. Also, the students feel more emotionally stable when they access FB to share their ideas and opinions. Students perform better in mathematics when they access their FB account before sleeping at night, implying that they have done all their assignments and other activities before logging into their accounts. Open and conscientious students perform better in mathematics while the more agreeable and more emotionally unstable the students are, the lower is their mathematics performance. Path Models can determine the strength of relationship between and among Facebook use, personality and mathematics performance of the students. A learning material in mathematics using the Facebook site can help in enhancing the personality of the students and can affect their mathematics performance.

RECOMMENDATIONS

Students may be given guidance on the proper place to access their Facebook accounts and the time of engaging in this activity. Their subject teacher may provide classroom policies to discourage students doing their Facebook activities inside the classroom or in the library. Activities may also be provided by their teachers in order to make the chatting and group discussion activities of the students in Facebook more productive. Teachers may be made aware of the student's kind of personality so that they will be able to provide the necessary strategy that suits the needs of each type of personality. The Guidance Office may design student activities that will help the students become "Average" in their agreeableness, extraversion and neuroticism and "High" in conscientiousness personality. Interventions may be done in order to uplift the deteriorating mathematics performance of students such as development of a learning material that suits the personality and needs of the students. Teachers may provide teaching interventions using the Facebook site taking into consideration how the use of Facebook can affect one's personality and vice versa. Students may be given activities at night using the Facebook site to ensure that they make first their assignments with their friends, thus making their chatting activities more productive and rewarding. Since the type of personality of an individual has a direct or indirect effect on his/her mathematics performance, the activities inside the classroom may be carried over to the Facebook site with the aim of enhancing the personality that positively correlates to the mathematics performance. The relationship of the variables in the developed path model may be considered as basis for the development of teaching interventions and actions. The developed learning material may be validated and evaluated by experts for better results and be utilized in the teaching and learning of Mathematics.

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