

Investigating The Correlation between The Five Major Personality Traits and a Student's Online Habits

Menyiasat Korelasi Antara Lima Ciri Utama Personaliti dan Tabiat Dalam Talian Pelajar

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ABSTRACT

The increasingly widespread use of e-learning and the internet, in general, has reached the point where it should become a cause of concern towards a student's online habits. By having bad habits online, students could risk the occurrence of data lost or a data breach occurring. Hence, this study was done in order to further investigate this potential factor. The objective of this study is to be able to identify which personality traits could potentially cause an effect on a student's online habits and what must be done in order to improve said student's online habits. This study has deployed surveys within a primary and secondary education grade within Al-Noor International School. These surveys serve as a measuring tool to evaluate a student's personality traits and online habits. The results of this survey are then used to observe the relationship between the two variables and draw a conclusion on the investigation. This study is done in hopes to bring more attention towards the personality traits of students and how moderation can be done to further help protect the students as well as the educational institutions as a whole in order to preserve such data.

Keywords: Cybersecurity Awareness; Online Habits; 5 Personality Traits

ABSTRAK

Penggunaan e-pembelajaran dan internet secara meluas, telah mencapai tahap yang memerlukan perhatian terhadap tabiat dalam talian pelajar. Tabiat buruk dalam talian berisiko menyebabkan kehilangan data atau pelanggaran data. Kajian ini dilakukan untuk menyiasat faktor potensi ini. Objektif kajian ini adalah untuk mengenal pasti ciri-ciri personaliti yang berpotensi memberi kesan terhadap tabiat dalam talian pelajar dan bagaimana untuk

memperbaiki tabiat tersebut. Kajian ini menggunakan soal selidik di kalangan pelajar sekolah rendah dan menengah di Al-Noor International School. Soal selidik ini digunakan sebagai alat pengukur untuk menilai ciri-ciri personaliti dan tabiat dalam talian pelajar. Keputusan soal selidik ini kemudiannya digunakan untuk mengenal pasti hubungan antara dua pemboleh ubah tersebut dan untuk membuat kesimpulan dalam kajian ini. Kajian ini dilakukan dengan harapan memberi lebih banyak perhatian terhadap ciri-ciri personaliti pelajar dan bagaimana pengurangan dapat membantu melindungi pelajar serta institusi pendidikan secara keseluruhannya untuk menjaga data.

Kata kunci: Kesedaran Keselamatan Siber; Tabiat dalam Talian; 5 Ciri Personaliti

INTRODUCTION

As many are aware, due to the COVID-19 pandemic that took the world by storm in 2019, the education system has changed drastically with the incorporation of e-learning, also known as electronic learning. By adopting this new method of teaching, this leaves the education system susceptible to numerous vulnerabilities which heinous individuals commonly exploit. Hence, it could be done through social engineering or by exploiting one of the many platforms that are used for e-learning. This causes the educational institutions to become a prominent target for hackers who could potentially steal data and use it for nefarious reasons. The severity of a data breach occurring in an educational institution would lead to a substantial loss to not only the institutions, but the students and employees involved as well (Albladi & Weir 2018).

However, it cannot be ignored that the human factor plays a big role in the breach of information security within the education system. Social engineering is one of the easiest methods for attackers to get access to your data. This method of attack utilizes the behaviour of people by manipulating them into performing actions which would make the victim disclose confidential information (Alnaemi 2021). The threat of social engineering originates from the inescapable fact that humans themselves are a point of vulnerability towards a system (Alturki, Alshwihi, & Algarni 2020). No matter how well implemented security measures are made within a system to prevent potential attacks, it still can't fully cover up any possible human errors. It is nearly impossible to monitor not only all the students, but also all the staff under an educational institution, especially off-school hours (Hajiyev & Thomas 2020).

Since the human factor plays such a notable role in the effectiveness of social engineering, it can be directly correlated that a person's personality trait would influence their online habits. It could potentially lead to being a victim of social engineering and becoming the root of a data breach. Certain personality traits may make someone be much more susceptible in regards to these attacks (Kenny 2021).

With the rise of e-learning, there is no doubt that students and staff members with such personality traits should be focused more attentively to protect the sanctity of data within the educational institution.

RELATED WORK

According to a study presented by Sven et al., on the susceptibility of certain personality traits to social engineering attacks using Cialdini's principle of influence (Albladi & Weir 2018). They conducted an extensive literature review on social engineering, psychology of persuasion and the influence of personality traits on the success of social engineering attacks. A new

framework and a preventive approach were proposed based on the analysis and discussion of said review. Based on the results, it was shown that the traits of conscientiousness, extraversion, and openness were revealed to have both increase and decrease in susceptibility to social engineering, depending on the context and sub-traits of each individual. However, agreeableness was found to have shown an increase in susceptibility to social engineering but neuroticism was found to have a decrease. Regardless, the research had its limitations, which was that the research that was done was purely theoretical work. Hence, there is a need for further evaluation for the more specified relations that were proposed within the framework.

However, we can also review James et al. study on the relationships between personality traits and the susceptibility towards social engineering (Alnaemi 2021). The research that was done was a quantitative study which was done by deploying questionnaires that had close-ended questions. The surveys were to measure an individual's susceptibility towards social engineering. Three hypotheses were tested to see if certain criteria were related to an individual's susceptibility towards social engineering. Their first hypothesis tested continuance commitment which showed that the value of susceptibility is increased for each point increase in reactance. However, their second hypothesis, which was to test the criteria of affective commitments, showed that no variables could be noteworthy enough to be related to susceptibility. Lastly, their final hypothesis was to test reactance and it was shown that the value of susceptibility is increased for each point increase in reactance. As for the limitation, since the survey was primarily focused on individuals within the healthcare and pharmaceutical industries, the sample may not reflect the actual views of the general population.

In the work that was done by Samar et al, they had done a study on discerning a user's characteristics that would influence the process of threat detection in social networks (Alturki, Alshwihi, & Algarni 2020). The research was done with a mixed-method approach. In the quantitative study, a number of experts were presented with the proposed framework and were asked to rate the importance of the framework's factors in terms of their effects on users' judgments of social engineering attacks in social networks. The qualitative part however, involved the experts being asked open-ended questions to improve the proposed framework. This resulted in a number of attributes highlighted by the experts of the conducted study that needed to be considered when designing the framework. The first being, the most highly regarded was computer knowledge. However, when answering the qualitative aspect of the survey, experts mentioned that measuring the social network literacy of an individual is much more important than measuring their computer knowledge. Habitual factors were also a trait that had to be considered in the proposed framework. This was supported by prior research, where the user's level of involvement was shown to have a crucial role in the phishing vulnerability. Besides from that, the factor that experts regard most likely to contribute to users' poor judgement of social engineering-based attacks is the act of trusting other users of the social network. Lastly, perceptual factors were generally counted as an important trait for creating the framework. Nonetheless, they acknowledged that the method of expert review employed in this study may not have been the most accurate for predicting user vulnerability.

Basil et al., had investigated the correlation between a student's personality traits towards the possibility of a data breach within the education system through task-related compulsive technology use, specifically focused on the perspective of M-Learning (Hajiyev & Thomas 2020). The research conducted an online survey with questions that measured instruments such as the five big personality traits, locus of control, task-related compulsive technology use and the likelihood of an individual causing a data breach. From the research that was carried out, it was found that the traits Agreeableness, Conscientiousness and Openness were to positively

affect task-related compulsive technology use. However, Extraversion and Neuroticism were the only traits that affected it negatively. Besides from that, it was found that task-related compulsive technology use positively affects the likelihood of a data breach. Next, the five traits were tested to affect the likelihood of a data breach: Agreeableness, Conscientiousness, Extraversion, and Neuroticism were shown positively affect the likelihood of a data breach, but Openness did not. Lastly, it was noted that the medium of access used for m-learning has a strong relationship between task-related compulsive technology usage and the likelihood of a data breach. Despite the extensive testing of various aspects of the students, the survey participants were not tested for the inclusion of their awareness level, which potentially would bring out negative outcomes due to the extra reliance of the internet and mobile devices.

Furthermore, Hashim H. Alneami et al had also created a framework to identify the susceptibility of employees towards social engineering attacks (Kenny 2021). In his research, a theoretical approach was done to create a framework that would identify the relationship between the three-layered factors that were used and psychological triggers for social engineering. However, to validate said framework a statistical analysis based on the context of Hofstede's cultural framework was conducted. The result of the statistical analysis was that between victim and non-victim countries, there were consistently noticeable disparities in the Power Distance, Individualism versus Collectivism, and Long-Term vs. Short-Term Orientation dimensions. The contrast between the victim group and the non-victims shrank over time, giving the impression that the victim group was expanding to include the entire Hofstede population, but the correlation between victim group in individualist societies and non-victim group in collectivist societies persisted in being consistent. This statistical analysis was then used to validate the proposed framework and to use it as a vision for future practitioners to collect useful data for the rest of the framework. Due to the nature of the study, the theoretical framework suggested is still in its early stages of development. Before being implemented and useful to a security practitioner, this proposed framework needs to undergo an extensive, multi-year study to make it fully autonomous.

RESEARCH METHODOLOGY

The research approach that was undertaken is a quantitative study that has utilized the distribution of survey questions aimed to measure the participant's five major personality traits as well as their online habits. There were several stages that were undergone during the research process as shown in figure 1. The first is the planning stage, where research journals and other literature works were examined to assist in finding out more information regarding the study at hand. The research problems, research gaps and research objectives are identified during this stage.

The next stage is the data collection stage. Before the survey was given to the students, the questionnaires were distributed and evaluated by the staff members of Al-Noor International School to ensure its reliability and to ensure that it would be understood by the students of the school. A total of 40 students from Al-Noor International School participated. However, only 36 of the responses were complete. The other four were discarded due to incompleteness. Two separate surveys were distributed, the first was a survey to test the student's five major personality traits. The five traits evaluated were extraversion, agreeableness, neuroticism, conscientiousness and openness. These traits were chosen due to them being known as being part of a psychological trait theory that was developed from 1980 and onwards. Each trait was given ten questions where the students had to rate how likely they are to relate a certain statement based on the Likert Scale format. The scale of the survey responses ranged from

Never (1) to Always (5). A total of 50 questions relating to the student's personality were given out. The second survey however, was to evaluate a student's online habits. Since there were two different education levels that were involved, two different versions of the online habit survey were created to ensure each participant was able to have a proper understanding of each question. The online habits survey aimed towards primary students had 10 questions in. However, the online habits survey that was aimed towards the secondary students had a total of 15 questions in total. Both versions of the surveys had a rating system similarly to the personality survey. The reason behind separating the primary and secondary students in the evaluation of their online habits was due to the difference in understanding for their age. As primary students are less likely to be familiar with certain terms. Hence, the survey was made to be more suited for kids of that age group.



FIGURE 1. The flowchart of the research methodology

Once the data had been collected, the process of data cleaning had to be done. Data cleaning is specifically done to improve the data's reliability after analysis. Due to the survey being distributed through paper, the data had to be transferred into an excel file. During this process, each submitted survey is checked to ensure it was completely answered thoroughly. Any survey that is found to be incomplete is discarded. As the surveys were all conducted on a scale basis, no structural errors needed to be corrected.

Following the data cleaning stage, the data is then analyzed through SPSS (Statistical Packages for Social Science). The collected data are then entered into SPSS to generate multiple line graphs which are used to show the relationships between each personality trait and the online habits score. These data are important to be able to clearly observe the relationship between the five personality traits and a user's online habits and draw our conclusion from it.

The last stage is the creation of the report. Within the report, it can be seen as a clear overview of the research process that highlights findings and suggestions.

RESULTS & DISCUSSION

A total of 40 surveys were distributed towards the students of Al-Noor International School. Four of which were discarded due to not completing the entire survey. 50% of the valid surveys were male and the other 50% were female. The participating students were between the ages of 10 to 16. The majority between the age range of 10-12 (55.55%) and the education grade primary (55.55%). The survey was created to evaluate the five major personality traits of each student as well as their evaluation of their online habits. Table 1 shows the full profile of all the respondents.

TABLE 1. Respondent's profiles

Demographic Variable (N=36)	Items	Frequency	Percentage
Gender	Male	18	50%
	Female	18	50%
Age	10-12	20	55.55%
	13-14	6	16.67%
	15-16	10	27.78%
Education Grade	Primary	20	55.55%
	Secondary	16	44.45%

The questions within the survey were done in a Likert Scale, for every answer of Never (1), it is weighted as 0 point and so on, with Always (5) weighted as 4 points. The maximum amount of points a student could possibly get for each personality trait is 40 and the minimum is 0. The scores were then normalized into percentages to make it comparable with the online habits score. Since the total points between the primary and secondary students differ, the scores have been calculated into a percentage form based on their maximum points which are 40 and 60 respectively.

The descriptive statistics for each personality were calculated using SPSS. Table 2 and 3 show the minimum values, maximum values, mean values and standard deviation for each personality trait and online habits based on the student's scores.

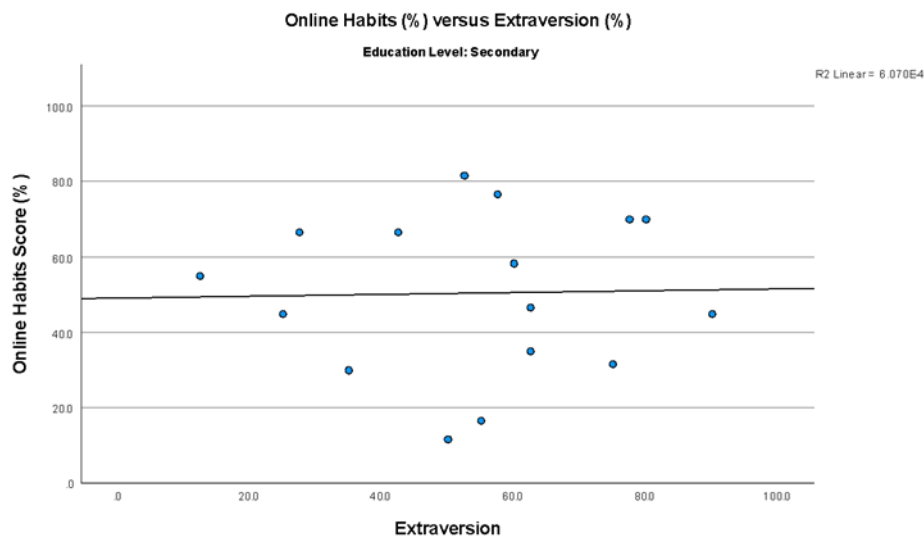
TABLE 2. Descriptive statistics of each personality trait and their online habit scores for primary students

Personality Trait	N	Minimum	Maximum	Mean	Std. Deviation
Extraversion	20	12.5	72.5	51.125	16.4532
Neuroticism	20	7.5	87.5	56.375	19.3220
Conscientiousness	20	37.5	95.0	67.875	18.6427
Openness to Experience	20	50.0	95.0	69.250	14.4436
Agreeableness	20	45.0	87.5	66.750	13.4818
Online Habits	20	25.0	90.0	66.750	16.6643

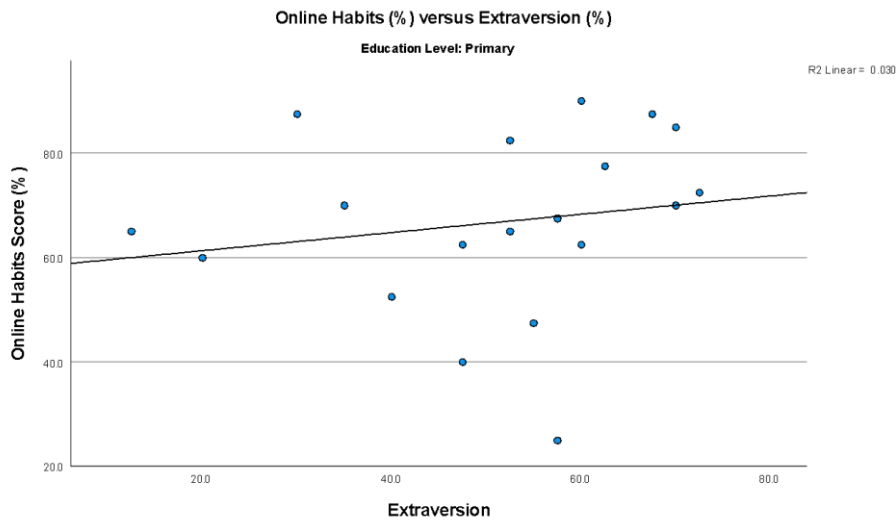
TABLE 3. Descriptive statistics of each personality trait and their online habit scores for secondary students

Personality Trait	N	Minimum	Maximum	Mean	Std. Deviation
Extraversion	16	12.5	90.0	54.063	21.5034
Neuroticism	16	7.5	97.5	53.438	22.8560
Conscientiousness	16	20.0	90.0	55.938	17.2452
Openness to Experience	16	10.0	87.5	56.406	20.9756
Agreeableness	16	27.5	85.0	56.250	17.3205
Online Habits	16	11.7	81.7	50.417	21.2350

The results were analyzed using SPSS to create a linear regression graph in order to observe the relationship between each individual trait and its effect on a student's online habit. Figure 1 and 2 show the percentage of extraversion scores versus the student's online habits scores. For both the primary and secondary students, we can observe a positive relationship between the two variables. As we can see, as the extraversion score increases, so does the student's score for their online habits. We can conclude that the extraversion trait positively impacts the student's online habits. However, the strength of the relationship is rather weak, specifically amongst secondary students. This is seen due to the coefficient correlation value being weakly positive as it is a value just above 0.

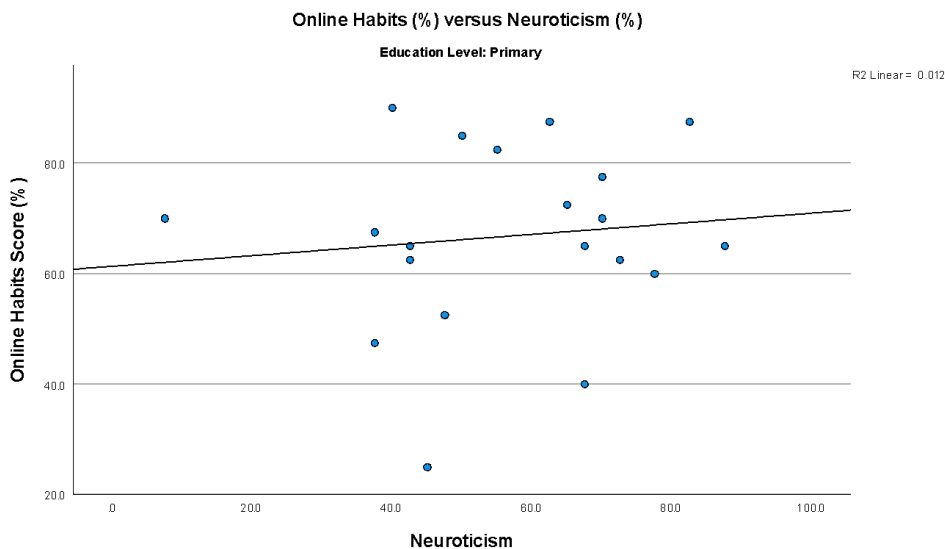


GRAPH 1. Online habits versus extraversion for primary students

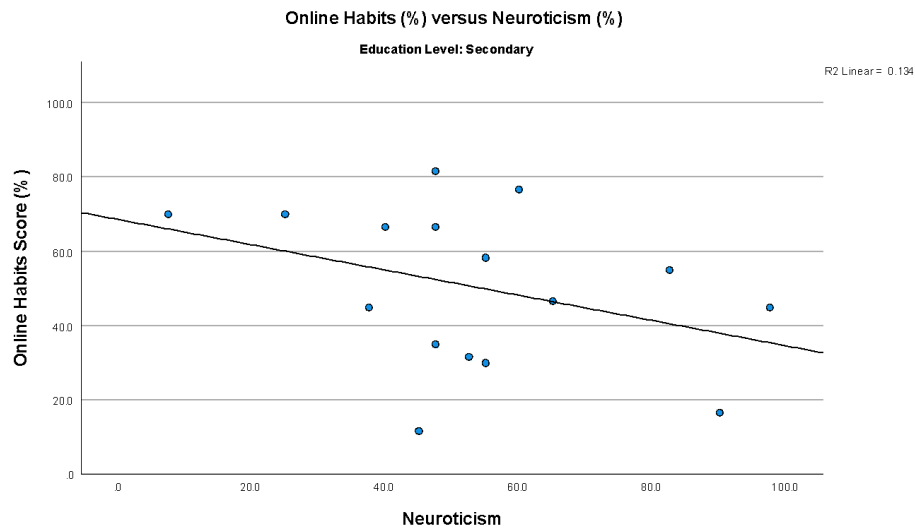


GRAPH 2. Online habits versus extraversion for secondary students

Next, graph 3 and 4 shows the percentage of neuroticism scores versus the student’s online habits scores. It can be observed that the primary and secondary graphs both have different outcomes. For primary students, neuroticism seems to positively affect the student’s online habits but the relationship between the two seems rather weak. This is seen due to the coefficient correlation value being weakly positive as it is a value just above 0. However, for secondary students, neuroticism negatively affects the student’s online habits and the relationship between the two is much stronger. This may be explained due to the primary students still not being able to grasp negative emotions when it comes to being online. For secondary students, they are much more inclined to use the internet for things like self-gratification and validation seeking. This usage of the internet could lead them to ignoring online safety for the sake of validation and attention. Hence, the difference in relationship between the two education grades.

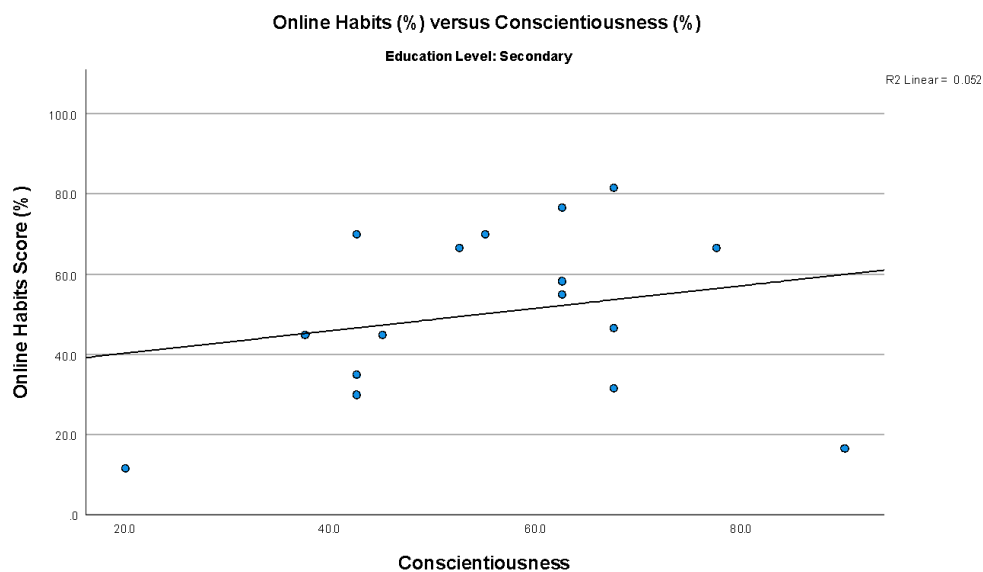


GRAPH 3. Online habits versus neuroticism for primary students

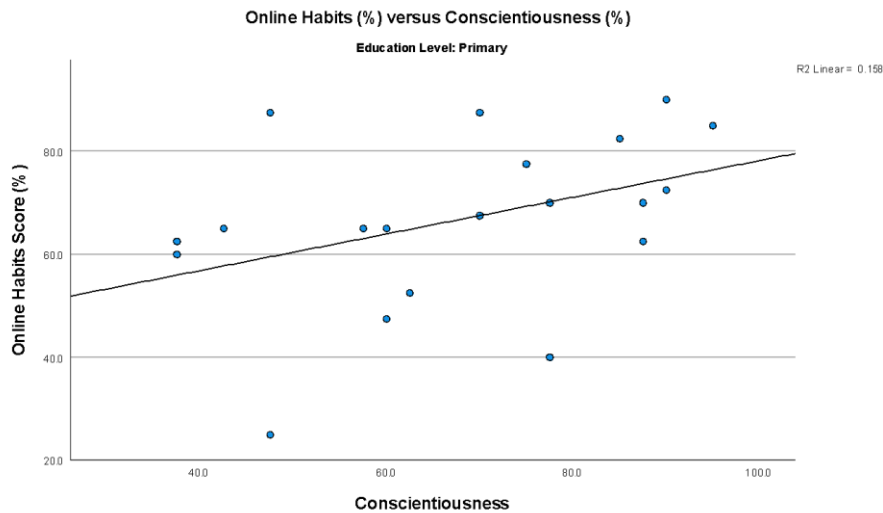


GRAPH 4. Online habits versus neuroticism for secondary students

In graph 5 and 6, conscientiousness is shown to positively affect the online habits score. This could be attributed towards the fact that people with a high score of conscientiousness tend to be cautious, organized and self-disciplined. These traits are more inclined to follow proper online safety guidelines when navigating the internet.

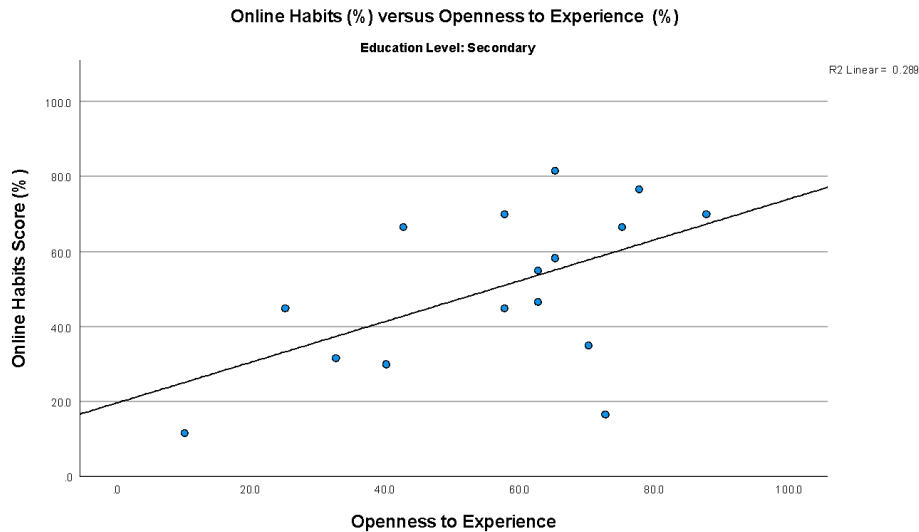


GRAPH 5. Online habits versus conscientiousness for primary students

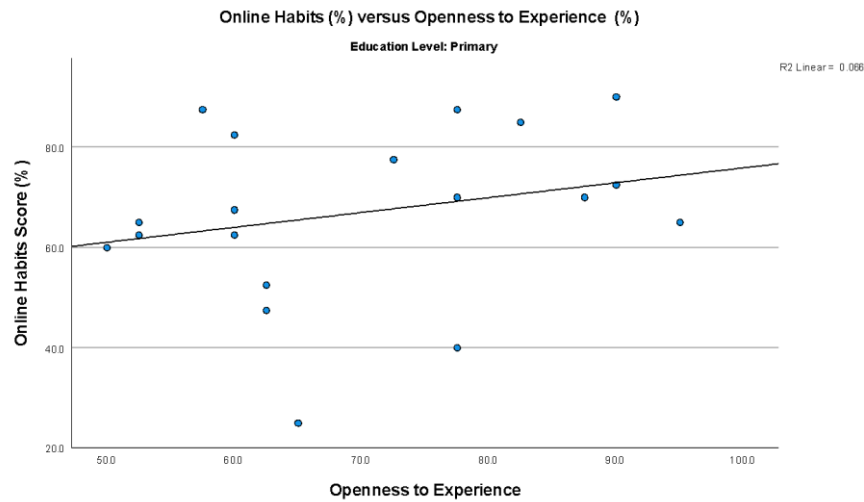


GRAPH 6. Online habits versus conscientiousness for secondary students

When observing the 7 and 8 graphs in this study, openness to experience positively affects a student's online habits. Individuals with this personality trait tend to be adventurous and extremely curious. An assumption that most would make in regards to people with this trait, is their curiosity and need to explore may cause them to not abide towards precautions that would protect them online. However, the results of these graphs seem to prove otherwise. Perhaps, their need to seek out knowledge has allowed them to be much more aware of strange behaviors online. Another trait such as conscientiousness may cause those with high levels of openness, to be more careful while seeking information online.

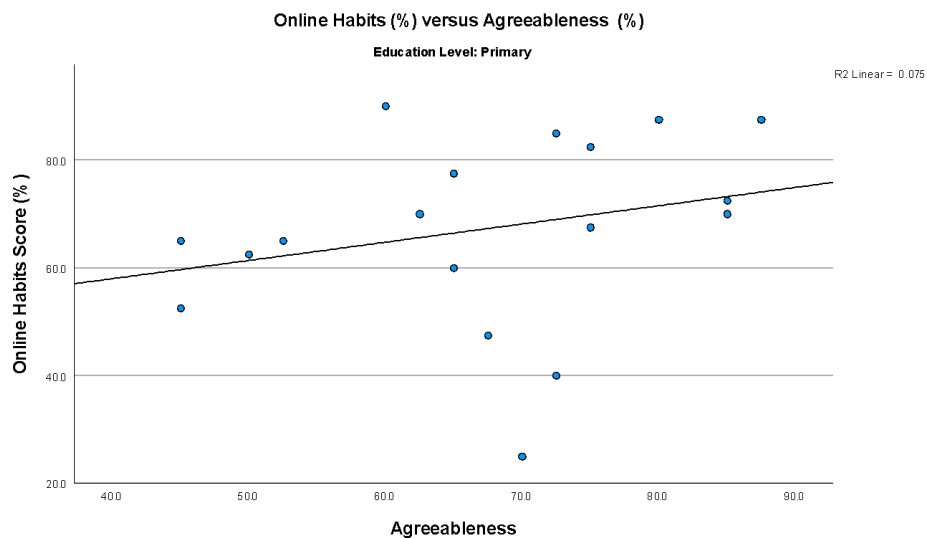


GRAPH 7. Online habits versus openness to experience for primary students

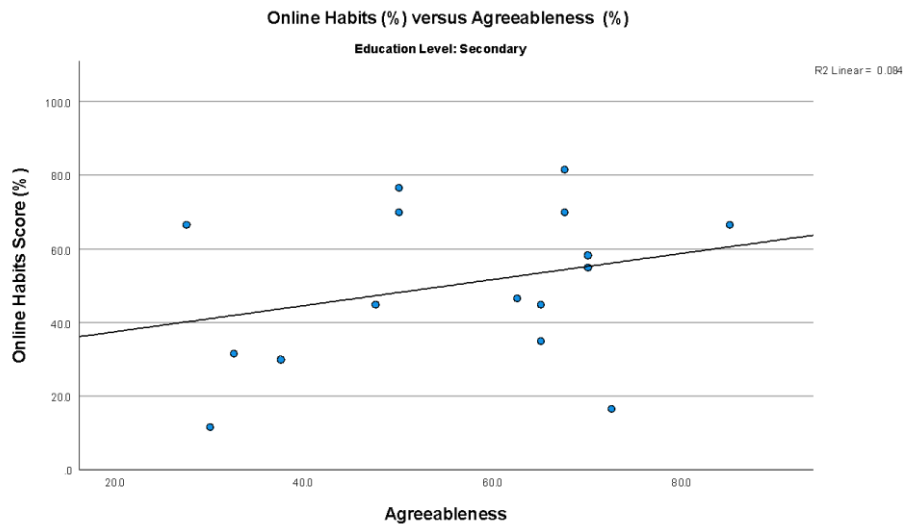


GRAPH 8. Online habits versus openness to experience for secondary students

In graph 9 and 10, agreeableness is shown to positively affect the online habits score. The usual perception of those with the agreeableness trait would be associated with individuals with naivety. However, this could be accounted for by the amount of awareness that students have these days. Individuals with the agreeableness trait are more likely to be more cooperative and accommodating towards following online safety guidelines. This is seen due to the coefficient correlation value being moderately positive.



GRAPH 9. Online habits versus agreeableness for primary students



GRAPH 10. Online habits versus agreeableness for secondary students

CONCLUSION

With the increasingly mainstream use of e-learning in education due to the pandemic, it is by no means a surprise that the importance of a student's online habits should be given more attention to. In order to do so, this study was aimed to focus on the human factor that causes security breaches within an educational institution and correlate it with the five major personality traits which are agreeableness, conscientiousness, extraversion, openness, and neuroticism. This is in order to protect not only the education system's precious data but also to protect a student's safety. By testing the relationship between the big five personality traits and a student's online habits we can establish a strong correlation between the two. Extraversion, conscientiousness, openness to experience and agreeableness positively affect a student's online habits. However, traits such as openness to experience show unexpected results that could be further studied in order to find the reason behind such results. Nonetheless, it shows how important the observation between these personality traits and a student's online habits can be as it can aid teachers and parents to know how to educate and control their student or child's online habits.

The findings of this study could be further improved with more questions requiring more detailed analysis in order to further understand why these personality traits would produce the results that we have already acquired. As of right now, the reasons behind such results are still not concrete. It could be possible that having a higher score in traits such as conscientiousness, would help students with a higher score of openness to experience to be more cautious despite their curiosity when navigating the internet. Yet, we cannot prove this hypothesis with the current analysis that has been done. It is encouraged for those who wish to do more study in this field, to do more in-depth analysis of the results.

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