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A Study on Awareness, Exposure and Attitude towards Digital Citizenship among University Students in Malaysia

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Abstract: Digital citizenship has received considerable huge attention from numerous researchers in recent years. Due to the tremendous work put forth by the scholars, the researchers aimed to explore in-depth the relationship between students' aptitude towards digital citizenship in the Malaysian educational context. This survey gathered 256 responses from 17 public universities from the central region, north region, south region, and east region as well as East Malaysia. Three independent variables namely students' awareness, students' exposure, and students' attitude and their relationships with digital citizenship (digital security, digital etiquette, and digital rights and responsibilities) as dependent variables were examined. This study relied on Partial Least Square Modeling (PLS-SEM) to probe the relationship between the IV and DV. A higher-order construct was studied with a focus on the reflective model. The internal consistency, factor loading, convergent validity, and discriminant validity of the constructs with their indicators were all tested using the measurement model. The structural model was applied to measure the relationship between the constructs. This research reported that there was a substantial relationship between students' awareness, exposure, and attitude toward digital citizenship. In conclusion, public university students in Malaysia were well informed, exposed, and had a meticulous attitude towards digital citizenship; however, proper training and well guidelines have to be emphasized in a certain area, especially from the spectrum of digital security. Further study is encouraged, and further recommendations were also discussed in this paper.

Keywords: *Digital Citizenship, Digital Awareness, Digital Exposure, Digital Attitude, Malaysian University.*

1. Introduction and Background

Digital citizenship covers a broad range of topics such as responsibilities, ethics and etiquette, privacy and security with a main focus on responsible participation by digital citizens when using the Internet (Ribble and Bailey, 2007). The International Society for Technology in Education (ISTE) defines digital citizenship as appropriate behavioral standards when using technology. ISTE believes that one of the key qualities of good citizenship is supporting global digital equality, such as treating others with respect in the digital sphere to protect their physical and mental health (ISTE, 2016). Another definition of digital citizenship is teaching students to secure online collaboration and communication Öztürk (2021). Based on research among students and teachers, Ribble et al. (2015) perceived digital citizenship as the adoption of digital standards of behavior to be responsible online users and exhibit moral guidance in the online environment. Malaysia has been significantly impacted by the technology and internet. The country has seen improved communication, access to extensive information, and new opportunities for advancement in education, business, and lifestyle.

According to the Department of Statistics Malaysia (DOSM), there has been an increase in the percentage of Malaysians using the Internet and related technology from 2013 to 2021. In 2017, individuals aged 15 and above used the Internet at a rate of 80 percent, demonstrating that a majority of people now rely on the Internet for digital activities (DOSM, 2018). The growth in ICT usage and household survey results had a significant impact on social network usage, reaching 97.1 percent in 2019 (DOSM, 2019). The Malaysian Communications & Multimedia Commission (MCMC) reported that Internet access was the highest percentage among all ICT and device surveys in 2020 due to the work-from-home (WFH) and online learning phenomena (MCMC, 2020). In 2021, the majority of users participated in digital social activities 95.5 percent (DOSM, 2020). Therefore, technology and the internet have created new challenges, particularly for university students who need to learn proper digital citizenship. Studies by Kant (2016), Sung et al. (2016), and Jusoh & Al Fawareh (2017) highlight the increasing reliance of university students on mobile phones for various purposes. However, this reliance on technology and the Internet also presents new challenges for students in terms of digital citizenship.

To address these challenges, Theis et al. (2022) suggest that a common online platform used by lecturers could assist students in developing proficiency in using applications for their studies and improve their overall experience with technology. A report by Class Central (2021) shows that 40 million new learners signed up for at least one MOOC among the top providers in 2021. These providers include Coursera (97 million), edX (42 million), Future Learn (17 million), and Swayam (22 million). This demonstrates the growing demand for MOOCs and the need for students to develop the skills and knowledge necessary to navigate the digital landscape in proper digital citizenship. This research aims to study the impact of the scarcity of digital citizenship curricula on public university students in Malaysia, in terms of their awareness, exposure, and attitude toward proper digital citizenship practices such as avoiding digital vulnerability, improper netiquette, and digital bullying. The theory of digital citizenship will be used as a guide in examining the students' understanding of good digital citizenship practices.

2. Literature Review

The Evolution of Digital Age Malaysia: The telecommunication sector in Malaysia has taken measures to digitize traditional business transactions to enhance customer experience (Zimmer, 2018). The Malaysian government established the National 5G Taskforce in 2018 to deploy 5G technology in the country (MCMC, 2019). The country's ICT infrastructure has evolved from 1G to 5G, referred to as the Connected Generation, which is comfortable with technology and driven by the growth of telecommunication (Kusá & Piatrov, 2020). This technology includes features such as industrial automation, IoT, cloud services, augmented reality, smart homes and cities, and self-driving vehicles. The National Policy on Industry 4.0 (Industry4WRD) was introduced in 2018 to prepare the manufacturing industry for Industry 4.0. The government is promoting upskilling and reskilling to ensure the successful transformation of the workforce (MITI, 2018). In response to the growth of technology, government agencies such as the Malaysia Digital Economy Corporation (MDEC) have taken initiatives to promote technology adoption through programs like Global Online Workforce (GLOW), eRezeki, and eUsahawan, aimed at improving quality of life (MDEC, 2019). The Malaysia Digital Economy Corporation (MDEC) launched a digital adoption strategy that involves both the public and private sectors.

To keep up with changing technologies and avoid business decline, companies are urged to invest in digital technology and increase their employees' digital skills. Former Prime Minister Tun Mahathir Mohammad also emphasized the importance of innovation and research and development (R&D) to improve products and services (MDEC, 2019). According to McKinsey Global Institute, automation in the industry could lead to the displacement of 800 million workers globally by 2030. This means that 75 to 375 million people may need to change jobs and learn new skills (Manyika et al. 2017). In 2018, Dr. Mazlee Malik, a former Education Minister in Malaysia, said that many new fields related to Industry 4.0 are coming and education institutions aren't preparing students with the right skills. As a result, up to 60% of graduates are unemployed because there's a mismatch between what they learned and what the market needs (The Star, 2020). Shahroom and Hussin (2018) highlight the challenges faced by parents in preparing their children for the job market through education in an era of rapid technological advancements. They emphasize the need for new teaching methods to help students not only stay up-to-date with emerging technologies, such as artificial intelligence, IoT, predictive analytics, virtual reality, and augmented reality but also cultivate ethical values and responsibilities.

Digital Citizenship: The concept of digital citizenship, as defined by Ribble and Miller (2013) and further developed by Ribble (2015, 2017), comprises the standard behavior and ethical codes of conduct in the digital world. It involves being responsible and accountable for one's actions and decisions in the digital space and contributing positively to the digital society. Several studies have explored the concept of digital citizenship from different perspectives (Al-Zahrani, 2015; Nordin, 2015; Choi et al., 2017; Erdem & Koçyigit, 2019). For instance, Al-Zahrani (2015) conducted a quantitative study in Jeddah, Saudi Arabia of 174 faculties of education students from King Abdul Aziz University using survey questionnaires to examine the factors that influence digital citizenship. The findings revealed a positive correlation between computer self-efficacy and digital citizenship and concluded that students with more computer experience tend to participate better, connect with others, and have a higher level of online safety for themselves and others. Nordin (2015) used a survey to assess the impact of self-regulated behaviors on digital citizenship among students and found that

online self-regulated behaviors were the most contributing factor.

Choi et al. (2017) provided a comprehensive theoretical framework for digital citizenship. Cooney et al. (2018) conducted a study in Ireland where they initiated workshops to raise awareness of digital citizenship in higher education institutions. In another study, Erdem & Koçyigit (2019) found a positive correlation between digital technology skills and the level of digital citizenship among undergraduates across eight universities in Turkey. The rapid development of digital technology has significantly transformed lifestyles, but with it also come risks that need to be addressed. To fully embrace and effectively navigate the digital world, digital citizenship skills are essential (Erdem & Koçyigit, 2019). Manzuoli et al. (2019) conducted a systematic review of digital citizenship research over the past decade and found that scholars have investigated the concept of digital citizenship, digital citizenship skills, as well as other criteria such as digital citizenship topics, instruments, programs, and technology that promote digital citizenship.

Awareness: Awareness refers to the knowledge or understanding of something important. It is characterized as knowledge in the educational context and is linked to a greater understanding of public and scientific issues (Gafoor, 2012). A study by Alqahtani & Alqurashi (2017) found high levels of digital citizenship awareness among university students in the U.S. The Ribble Four-Stage Technology Framework highlights the importance of digital literacy in the first stage of technology awareness (Jwaifell, 2018).

Exposure: The second stage of Ribble's Four Stage Technology Framework suggests guided practice for students, where they can safely use technology under teacher supervision and learn to probe, discover and take risks. In the third stage, teachers and parents serve as role models for good digital citizenship. The final stage involves feedback and reflection, allowing students to continually improve their digital citizenship. A workshop on digital citizenship at the University of Macerata in Italy has been incorporated into the education science syllabus, providing students with valuable exposure to communication about digital citizenship through media (Fedeli, 2020).

Attitude: The study by Çiftci & Aladag (2018) showed a strong relationship between attitudes towards digital technology and digital citizenship. They found that attitudes have a significant impact on digital citizenship. The relationship between the two was found to be significant in their analysis. (Nourinezhad & Kashefian-Naeeini, 2020)

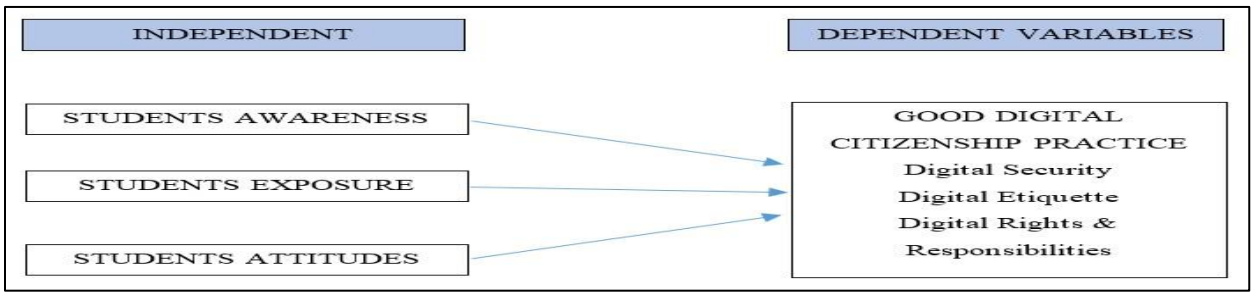
The Digital Connectivism Theory by George Siemens: The 8 principles of connectivism, developed by George Siemens, emphasize the importance of diversity of opinions in learning, connecting information sources, utilizing technology in learning, valuing the ability to learn over current knowledge, maintaining connections, recognizing connections between fields and concepts, seeking accurate and up-to-date knowledge, and viewing decision-making as a learning process (Siemens, 2005). According to Holland (2017), this theory addresses the demands of 21st-century education that have been impacted by technological changes in learning and communication. This theory integrates technology and the digital edge into learning activities and supersedes previous theories such as cognitivism, constructivism and behaviorism. The study by Utecht & Keller, (2019) revealed this theory has been integrated into learning activities, including the creation of learning websites like MOOCs. The eight principles of connectivism have also been used as a framework for studying the use of technology in education.

The Digital Literacy Theory by Eshet Alkalai: The study of digital literacy was established by Eshet Alkalai (2004) and he believed that having clear-cut digital skills is important for learners to be able to effectively navigate the digital environment. He presented a framework for digital literacy that includes five skill sets: photo-visual literacy, reproduction literacy, branching literacy, information literacy, and social-emotional literacy. A study by Eshet-Alkalai & Chajut (2009) found that there were significant changes in digital literacy over 5 years but no significant changes in critical and creative skills. Eshet later added the six skills of real-time thinking to the previous five digital literacy skills, emphasizing the need for fast processing of fluid information in the digital age. These skills involve motoric, emotional and cognitive abilities to effectively operate in the digital environment (Eshet, 2012).

The Nine Elements of Digital Citizenship by Ribble: This study focuses on three aspects of the nine elements of digital citizenship defined by Ribble (2017): digital security, digital etiquette, and digital rights and responsibilities. Digital access refers to the fair dissemination of online resources for all and should be made available in school and at home (Ribble, 2017; Walters et al., 2019). Digital commerce involves performing online business transactions with the use of appropriate digital tools and safety measures (Ribble, 2017; Logan, 2016). Digital communication and collaboration refer to the way people interact and exchange information online (Ribble, 2017). Digital etiquette is the code of conduct in the digital space to ensure harmony in the community (Walters et al., 2019; Ribble, 2017). Digital fluency is the ability to use technology effectively and make informed decisions while online (Ribble, 2017; Sparrow, 2018). Digital health and welfare are the impacts of technology on physical and psychological health, and students should maintain a balanced online and offline life (Ribble, 2017). Digital law is the knowledge of digital acts, rules and regulations, and not breaking the law to protect one and others (Ribble, 2017). Digital rights and responsibilities include acting responsibly and being accountable when accessing online resources, and good parenting practices such as monitoring children's online activities (Ribble, 2017; Walters et al., 2019). Digital security and privacy are precautions taken to protect against digital threats such as viruses and data breaches (Ribble, 2017; Walters et al., 2019).

Development of Conceptual Framework: The researcher adopted three elements of digital citizenship by Ribble (2015) to develop the conceptual framework. This study aims to examine the relationship between students' attributes and their outcomes in the good practice of digital citizenship. The three factors being studied are students' awareness of digital security, their exposure to digital etiquette, and their attitudes toward rights and responsibilities. Figure 1 depicts the conceptual framework for the study.

Figure 1: Conceptual Framework Guided by the Nine Elements Framework for Digital Citizenship by Ribble (2015)



Hypothesis Development

Relationship between Awareness and Digital Security: Researchers have used questionnaires to gauge digital security awareness among university students. They often adapt existing questionnaires or design their own based on prior literature (Subramaniam, 2017; Moallem, 2019; Muniandy et al., 2017). Subramaniam (2017) found average awareness and no significant gender differences, with IT-literate students having better awareness. Muniandy et al. (2017) found low levels of digital security awareness and vulnerability to digital threats. Moallem (2019) found a surprisingly low concern for digital security among technically savvy students in Silicon Valley. It is therefore hypothesized that;
H1: There is a relationship between students' awareness and digital citizenship among public university students in Malaysia.

Relationship between Exposure and Digital Etiquette: Nor Hidayah et al. (2014) found in their study that students only practiced digital etiquette at school, under the supervision of their teachers, but not at home. Sabariah (2019) echoed these findings and also raises concerns about the limited exposure students receive to internet etiquette and managing social media, as this lack of exposure can lead to negative consequences such as digital abuse. YouTube also plays an important role in educating people about digital etiquette. Many YouTubers (Tarver Academy, 2020; Karon, 2014; Rivera, 2016) shared valuable tips on digital etiquette and their videos have gained thousands of viewers. The interactive nature of YouTube has

made it a better learning platform for students and has led to a more satisfying and committed learning experience (Orús et al., 2016; Roodt et al., 2017). Thus, it is therefore hypothesized that;
H2: There is a relationship between students' exposure and digital citizenship among public university students in Malaysia.

Relationship between Attitude and Rights & Responsibility: Plagiarism has been a major concern in education, for many years. It is defined as copying the work of others and is considered academic dishonesty or misconduct (Jones, 2011; Ramos et al., 2019; Bretag, 2016; Uzun & Kilis, 2020). In the digital age, students are becoming more prone to plagiarism due to easy access to information. There have been instances of students using content from websites without giving proper credit (TheStar 2019; NST, 2019). This includes written text, pictures, images, audio, and video files. The materials that tend to plagiarize come from various sources of academic documents such as a thesis and project papers (Karim, 2019). Laziness and ignorance have been identified as reasons for plagiarism in universities (Rajaendram, 2019). However, Naicker (2019) argues that poor training by educational institutions is a more significant issue, as students have not been taught about the technical challenges of plagiarism. Therefore, it is hypothesized that;
H3: There is a relationship between students' attitudes and digital citizenship among public university students in Malaysia.

3. Research Methodology

The researcher utilized the Statistical Package for the Social Science Software (SPSS) to analyze demographic data. The data analysis was conducted through the Partial Least Squares Structural Equation Modeling (PLS-SEM), which encompassed both the measurement model and structural model assessments to examine the relationship between students' competency in digital citizenship (security, etiquette, rights and responsibilities) and their awareness, exposure, and attitude among public university students in Malaysia. The total population was 528,654 public university students in Malaysia as of December 31, 2018. The sampling frame was taken from 20 public universities divided into 5 regions (northern, central, southern, east coast, and East Malaysia). The study used a disproportionate stratified sampling technique, with the accessible population being undergraduate students based on their regions. The sample size was calculated using G*Power and was initially estimated to be 119 undergraduate students, but was increased to 200 to avoid sampling issues. The unit of analysis was the individual undergraduate students from public universities in Malaysia. A pilot study was carried out with 30 participants to ascertain the validity and reliability of the constructs utilized in the study. The reliability of the instrument was checked using Cronbach's alpha, a common method for measuring consistency. A reliability result of greater than 0.7 is considered standard.

4. Results

This section is to report on the analysis of the data collected for this study. 20 public universities in Malaysia to understand the relationship between students' awareness, exposure, and attitude toward digital citizenship. PLS-SEM was used to examine the quality of variables by using a measurement model. The calculation was done through an algorithm and some items were discarded. The structural model was run with bootstrapping to find the path coefficient between constructs.

The Measurement Model: The measurement model in PLS-SEM signified the relations between the constructs and indicators. The procedure of the measurement model includes Internal Consistency Reliability (Composite Reliability), Indicator Reliability (the outer loading), Convergent Validity (AVE), and Discriminant Validity (Cross Loading, Fornell & Lacker's Criterion and HTMT Criterion. A path model that comprises constructs and indicators was created. The first-order constructs in this study are awareness (AW), exposure (EX) and attitude (AT) while the second-order constructs are digital security, digital etiquette and digital rights and responsibility (Digital citizenship – DC).

The Indicator Loading: The primary step in the measurement model was to observe the indicator loadings. The overall sample was tested. 0.708 and a higher value were considered to have 50% more variance for the indicators (Hair et al., 2019). The reading exhibited some constructs scored less than 0.708. Since some

constructs reliability and validity did not meet the minimum indices requirement, 20% of samples were deleted from 55 samples due to the low level of acceptance for factor loading.

Convergent Validity: Variables were tested with Cronbach's Alpha, Composite Reliability (CR) and Average Variance Extracted (AVE). The Cronbach alpha values and the CR had more than the suggested values of 0.700 for all the constructs. The validity of the construct was also tested with Average Variance Extracted (AVE) to determine the construct accuracy. AVE was measured, guided by its rules of thumb where all the AVE scored > 0.500.

Figure 2: Measurement Model Analysis using Smart PLS

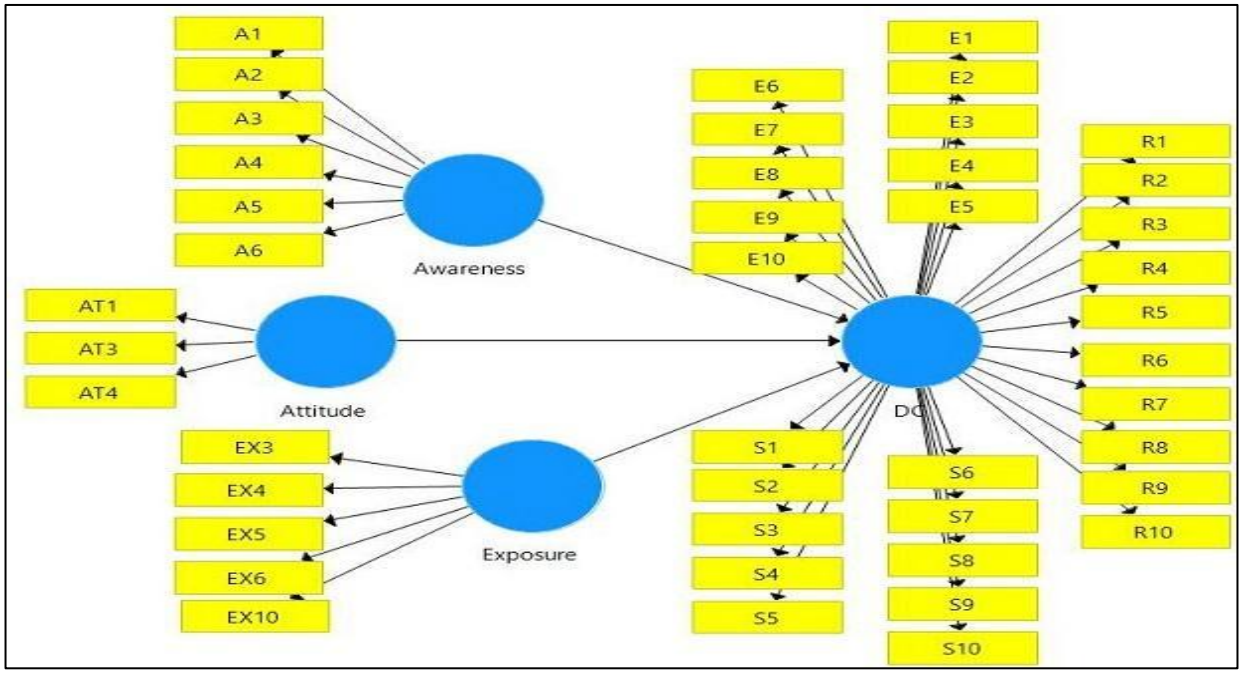


Table 1: Initial Cronbach's Alpha, Composite Reliability and AVE

	Cronbach's Alpha (> 0.700)	Composite Reliability (> 0.700)	AVE (> 0.500)
Attitude	0.791	0.876	0.702
Awareness	0.814	0.864	0.515
DC	0.841	0.852	0.219
Exposure	0.779	0.849	0.53

Cronbach's alpha, CR and AVE values are shown in Table 1. The findings disclosed that all constructs had fulfilled the minimal indices, which implied that measurements were valid and reliable except for DC. A different calculation was made to measure the composite reliability (CR) and average variance extraction (AVE) for DC – higher order. Based on the results, it was shown the CR was 0.750 and the AVE was 0.898 which both indices were above the acceptable value. The results are shown in Table 2;

Table 2: Improved CR and AVE

	Std Loading	STD Loading Squared	Error Variance = 1- loadings squared
Item1	0.695	0.483025	0.516975
Item 2	0.957	0.915849	0.084151
Item 3	0.922	0.850084	0.149916
Total Loadings	2.574	2.248958	0.751042
Total Loadings Squared	6.625476		

	Std Loading	STD Loading Squared	Error Variance = 1- loadings squared
			7.376518
	AVE	0.750	
	Composite Reliability		0.898

Table 3: Result of Measurement Model

Constructs	Items	Factor Loadings	CR	AVE
Awareness	A1	0.764	0.864	0.515
	A2	0.735		
	A3	0.765		
	A4	0.728		
	A5	0.689		
	A6	0.615		
Exposure	EX3	0.684	0.849	0.53
	EX4	0.74		
	EX5	0.779		
	EX6	0.71		
	EX10	0.725		
Attitude	AT1	0.767	0.876	0.702
	AT3	0.884		
	AT4	0.859		
Digital Citizenship	S1	0.453	0.852	0.75
	S2	0.49		
	S3	0.517		
	S4	0.01		
	S5	0.177		
	S6	0.129		
	S7	0.325		
	S8	0.477		
	S9	0.54		
	S10	0.168		
	E1	0.047		
	E2	-0.023		
	E3	-0.052		
	E4	-0.075		
	E5	-0.166		
	E6	0.599		
	E7	0.595		
	E8	0.644		
	E9	0.476		
	E10	0.702		
	R1	0.548		
	R2	0.45		
	R3	0.292		
	R4	0.465		
	R5	0.695		
	R6	0.712		
	R7	0.746		
	R8	0.623		
	R9	0.526		
	R10	0.513		

Discriminant Validity: Researchers used discriminant validity to see if the observed variables in the constructs were different from one another in the path model. The indicator Cross-loading, Fornell & Larcker and Heterotrait-Monotrait Ratio (HTMT) can all be used to measure discriminant validity.

Fornell-Larcker (FL) Criterion: The FL criteria determined the square root of the construct of the AVE. To establish discriminant validity, the correlations between the construct and the other constructs in the model should be higher than the result of the underneath construct.

Table 4: Fornell-Larcker (FL) Criterion

	Attitude	Awareness	DC	Exposure
Attitude	0.838			
Awareness	-0.011	0.718		
DC	-0.277	0.538	0.468	
Exposure	-0.31	0.197	0.578	0.728

Based on the results, when AVE was higher than its associated construct Attitude, Awareness and Exposure met the requirement for discriminant validity. However, DC did not meet the requirements of discriminant validity when it scored lower than its associated construct. Thus the discriminant validity was not established for DC.

Cross Loading: The cross-loading result shown in Table 5 reported that there were no discriminant validity issues for Awareness, Attitude and Exposure. However, the highlighted items in the table were having validity issues as there were loadings that were highest than their designated construct Therefore the items were not representing their construct well.

Table 5: Cross Loading

	Awareness	Attitude	Exposure	DC
A1	0.764	-0.067	0.156	0.382
A2	0.735	-0.067	0.115	0.354
A3	0.765	0.123	0.034	0.354
A4	0.728	-0.094	0.249	0.46
A5	0.689	0.007	0.204	0.458
A6	0.615	0.13	-0.018	0.216
AT1	-0.054	0.767	-0.264	-0.169
AT3	-0.028	0.884	-0.241	-0.266
AT4	0.041	0.859	-0.285	-0.247
EX3	0.111	-0.126	0.684	0.364
EX4	0.14	-0.198	0.74	0.392
EX5	0.135	-0.221	0.779	0.392
EX6	0.14	-0.249	0.71	0.436
EX10	0.18	-0.304	0.725	0.494
E1	0.001	0.085	0.178	0.047
E2	-0.079	0.125	0.038	-0.023
E3	0.002	0.206	-0.014	-0.052
E4	-0.018	0.309	-0.11	-0.075
E5	0.03	0.458	-0.179	-0.166
E6	0.207	-0.223	0.474	0.599
E7	0.141	-0.132	0.489	0.595

	Awareness	Attitude	Exposure	DC
E8	0.166	-0.25	0.574	0.644
E9	0.092	-0.146	0.394	0.476
E10	0.282	-0.187	0.506	0.702
R1	0.192	-0.216	0.411	0.548
R2	0.395	0.035	0.125	0.45
R3	0.179	-0.015	0.113	0.292
R4	0.233	-0.094	0.334	0.465
R5	0.392	-0.215	0.346	0.695
R6	0.311	-0.288	0.47	0.712
R7	0.319	-0.216	0.446	0.746
R8	0.287	-0.215	0.376	0.623
R9	0.172	-0.202	0.376	0.526
R10	0.275	-0.052	0.218	0.513
S1	0.458	-0.144	0.134	0.453
S2	0.399	-0.076	0.143	0.49
S3	0.44	-0.022	0.199	0.517
S4	0.025	0.232	0.007	0.01
S5	0.034	-0.048	0.089	0.177
S6	0.18	-0.067	-0.04	0.129
S7	0.286	-0.046	0.075	0.325
S8	0.583	0.025	0.022	0.477
S9	0.567	-0.029	0.091	0.54
S10	0.264	0.163	-0.057	0.168

Heterotrait-Monotrait Ratio (HTMT) Criterion: Another method to check on discriminant validity is through HTMT. Kline, (2011) suggested that for any ratio that was less than 0.85, the discriminant validity is established. Therefore, there was no discriminant validity issue arise.

Table 6: Heterotrait-Monotrait Ratio (HTMT) $^{0.85}$ Criterion

	Attitude	Awareness	DC	Exposure
Attitude				
Awareness	0.155			
DC	0.411	0.634		
Exposure	0.388	0.231	0.641	

Structural Model: The structural model was used to find the significant relationship among hypotheses. In this study, the path modal was tested using a bootstrapping method to check if the variables were related to one another by using lateral collinearity (VIF), path coefficients, coefficient determination (R^2), and Effect size (F^2).

Collinearity Statistics: Collinearity describes the relationship between two variables that were associated with a regression model. In this study, the researcher used variance inflator factor (VIF) to investigate multicollinearity issues.

Table 7: Collinearity Statistics Results

	Attitude	Awareness	DC	Exposure
Attitude			1.109	
Awareness			1.043	
DC				
Exposure			1.154	

The result in Table 7 shows that all values for VIF were less than 5.0 for Attitude = 1.109, Awareness 1.043 and Exposure = 1.154. Therefore it indicated that there were no multicollinearity issues in this study (Hair et al., 2017).

Hypothesis Testing: A structural analysis was run to test hypotheses and the results are presented in Table 8.

Table 8: Hypothesis Testing

	Beta (β)	Standard Error	T Value	P-Value	CIBC 5.00%	95.00%	Effect Size(f2)
H1 Awareness -> DC	0.448	0.062	7.188	0	0.333	0.539	0.001
H2 Exposure -> DC	0.448	0.059	7.657	0	0.349	0.538	0.001
H3 Attitude -> DC	-0.134	0.072	1.85	0.032	-0.222	0.047	0.122

Based on the Hypothesis testing results, there was a substantial relationship between Awareness and Digital Citizenship ($\beta = 0.448$, $p < 0.01$). The effect size (f2) was 0.001, which suggests a smaller effect size. Hence, H1 is supported. There was also a significant relationship between Exposure and Digital Citizenship ($\beta = 0.448$, $p < 0.01$) with effect size (f2) 0.001, which suggests a smaller effect size. Thus, H2 is also supported. For Attitude and Digital Citizenship, there was a strong relationship between ($\beta = -0.134$, $p < 0.05$). The effect size (f2) was 0.122, which suggests a smaller effect size between Attitude and Digital Citizenship. Therefore, H3 was also supported. The relationship between IV and DV has shown a positive relationship from the survey. Students' awareness, exposure and attitude were influencing good digital citizenship practice. According to this study, public university students in Malaysia were aware of digital security protection for their gadgetry devices and password usage. The study also showed students had a high level of exposure to digital etiquette across media social, video conferencing and cyberbullying. Furthermore, students possessed a positive attitude with concerns about plagiarism, e-waste, and being good digital users.

Discussion: There were 3 research questions developed in the preliminary stage of this study.

Students' Awareness and Digital Citizenship: This study investigated the relationship between students' awareness and digital citizenship in public universities in Malaysia. The study found that most students were not aware of digital threats such as malware, phishing, cloud jacking, password management, training, and digital security. This is supported by previous studies in Nigeria, the USA, and Malaysia that found students have a limited understanding of digital security. SN Maon et al. (2020) highlighted the importance of paying attention to the use of digital technology among youth to protect them from potential digital threats and victimization. According to Negi & Magre (2017), Kaspersky (2020), Zulkifli et al. (2020), Onyema et al. (2021), Bhatnagar et al. (2020), and Hamzah (2021), students need to be educated and trained on how to protect themselves in the digital space. Therefore, there is a need for formal education and training to increase awareness and protect students from digital threats.

Students' Exposure and Digital Citizenship: The purpose of the study was to examine how students' exposure influences good practices in digital citizenship. In the survey, students were asked about media social etiquette and online class (Q1), WhatsApp group procedure (Q2), professionalism (Q3), plagiarism (Q4), and citation (Q5). The results showed that most students had good exposure to digital etiquette with high scores for all questions: Q1 = 82%, Q2 = 87%, Q3 = 81%, Q4 = 88% and Q5 = 86%. However, when it came to using similarity check software on assignments, most students were unsure and confused. Research

by Singh & Ganapathy (2018) found that first-year university students failed to identify plagiarism activities. This was supported by Mahmud (2021) who reported that plagiarism among university students was on the rise despite exposure by educators. Venter & Bouter (2020) highlighted the responsibilities of a group administrator in a WhatsApp group, including the possibility of inappropriate content, legal implications, and other issues that may arise.

Students' Attitude and Digital Citizenship: The survey aimed to explore students' attitudes towards good digital citizenship practices and academic misconduct. Results showed that 78% of students claimed they did not engage in academic misconduct, but research by Gamage et al. (2020) found that the increasing number of misconduct cases may be due to a focus on the labor market and profit-oriented institutions in higher education. Another question in the survey focused on students' understanding of proper citation, with 63% disagreeing with the statement "did not credit the author". However, research by Rezeki (2018) found that poor writing abilities may contribute to suspected plagiarism. The final question in the survey explored students' attitudes towards manipulating internet resources for university tasks, with 77% disagreeing with this behavior. Shahibi & Rusli (2017) found that the use of the Internet by final-year students had a positive impact on their learning but a negative impact on their academic performance.

5. Conclusion

In conclusion, the study on students' awareness, exposure, and attitudes toward digital citizenship in public universities in Malaysia revealed a mix of findings. While most students had good exposure to digital etiquette and a positive attitude toward good digital citizenship practices, there were still areas of improvement such as a limited understanding of digital security, confusion about plagiarism, and a need for proper citation techniques. Research supports the need for formal education and training to increase awareness and protect
Student, from digital threats. Previous studies also found that poor writing abilities and profit-oriented institutions may contribute to academic misconduct. Thus, there is a need for formal education and training to educate students on proper digital citizenship practices and ensure academic integrity.

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