Digital Tools Acceptance in Open Distance Learning (ODL) among Computer Science Students during COVID-19 Pandemic: A Comparative Study

Rajeswari Raju[1*], Nur Hidayah Md Noh[2], Siti Nurul Hayatie Ishak[3], Zeti Darleena Eri[4]

[1 2 3 4] Universiti Teknologi MARA Cawangan Terengganu
Faculty of Computer and Mathematical Sciences, UiTM Kuala Terengganu, Malaysia
rajes332@uitm.edu.my
nurhidayah0738@uitm.edu.my
sitinurul@uitm.edu.my
zetid415@uitm.edu.my
[*]Corresponding Author

https://doi.org/10.24191/ajue.v17i4.16194

Received: 20 July 2021
Accepted: 27 September 2021
Date Published Online: 31 October 2021
Published: 31 October 2021

Abstract: The present new norm driven by the COVID-19 pandemic has taught us to remain at home and carry our everyday activities. This pandemic has seriously made a radical shift to the Malaysian education sector as well. Educators instantly begin to adopt Open and Distance Learning (ODL). However, issues arise in courses that need a conventional setting. In ODL, students and lecturers rely on digital tools, social media, pre-recorded video, and video conference to assist the learning process. Nonetheless, there are some concerns about how successful digital tools are among students in an online learning environment, particularly among computer science students. Thus, a study is being conducted to compare the acceptance of digital tools among computer science (CS) and non-computer science (NoNCS) students by adapting the Technology Acceptance Model (TAM). A quantitative research method of convenient sampling was undertaken. Questionnaires were distributed through an online survey among UiTM Terengganu students at three campuses in Dungun, Bukit Besi and Kuala Terengganu. A sample of 367 students who responded from different diploma and degree programs was collected. Findings of the study revealed that all relationships in TAM are significant for both CS and NoNCS students, where both acquire positive perceived usefulness, attitude, and use intention. Thus, the acceptance of digital tools in ODL are justified. However, it appears that NoNCS students had a more positive attitude than CS students, contradicting the study's initial general assumption. More study is needed to discover why NoNCS students have a better attitude than CS students in the acceptance of digital tools during ODL.

Keywords: Computer Science, COVID-19, Digital Tools, ODL, TAM

1. Introduction

The COVID-19 pandemic and the lockdown has taken the world and Malaysia by storm. Higher education institutions are confronted with instructional challenges, particularly in courses that require physical contact. The Coronavirus wreaked havoc on employment, education, energy, agriculture, and various other areas of the economy, including people's mental well-being (Banks et al., 2020). According to UNESCO, this epidemic has affected more than half of the world's student population in more than 160 nations (UNESCO, 2020). Despite the challenging situations amid the pandemic, educational institutions' services must continue to run as learning processes should never be stopped.

Many researchers study the physiological impact, other on learning approach, but little study focuses on the specific field of student's background. A study on the psychological effects of COVID-19 by Sundarasen et al. (2020) proved that students pursuing management-related degrees seem to have a higher level of anxiety than healthcare and medical students. However, Al-Rabiaah et al. (2020) findings had a contrary view which conjectured that medical and healthcare students experience a higher level of anxiety during times of epidemic. Zalat et.al (2021) reported that the e-learning system was implemented with a high acceptance level. The researcher quoted that "The user adoption and acceptance of e-learning were influenced by readiness to use e-learning, interpersonal and instructor influence, technological facilities, financial and infrastructure factors within a specific culture, in addition to the perceived benefit and ease of use of e-learning systems" unquote (Zalat, 2021). As a result, one cannot expect students to encounter the same difficulties and challenges in open and distance learning (ODL).

By knowing what the students liked and disliked, an educator can reduce obstacles to their learning experience and further improve the activities and features they liked to enhance the teaching and learning process. This study also can helps the faculty and educators in computer science to have a well-planned strategy in designing the curriculum for computer science subjects and to ensure the appropriate digital tools preferred by computer science students in teaching and learning process as well as the appropriate approach for the assessment during ODL. As a result, the quality of remote learning in this pandemic could be enhanced, and student's ability to study in any circumstances could be increased (Rahiem, 2021). Hence, this study explored the effect of the pandemic on computer science (CS) student's vs non-computer science (NoNCS) students' acceptability of using digital tools in ODL as measured by the Technology Acceptance Model (TAM).

1.1 Technology, Digital Tools and Pandemic

These 21st century kids have been surrounded by digital technology since they were little. The development of technology has remarkably benefited many industries, including the educational sector. The evolution of internet technology has complemented the delivery of lessons, regardless of primary, secondary, or tertiary levels of education. However, according to Iivari et al. (2020), today's children are not equally equipped for their technology-rich future: various kinds of digital divides still prevail in society and affect the young generation and their digital futures (Godhe et al., 2019). The COVID-19 epidemic triggered dramatic changes in the school sector that drove it to engage in extensive digital transformation (Vial, 2019), and all the possible barriers are reported along the way (Iivari et al., 2020). A recent study among nursing students suggests that only one-third of them preferred distance learning using digital tools (Langegård et al., 2021). Lee et al. (2016) identified some factors that affect technology usage for learning in Hong Kong University, including students' skill with computers, their attitude towards technology, learning styles, and teachers and peers' support. Furthermore, it was found that students' increased willingness to complete research work effectively was associated with digital platforms for education and learning (Likhachev et al., 2020).

1.2 Open and Distance Learning

UNESCO defined open and distance learning (ODL) as a teaching process administered by someone remotely and separated from their learner which; the goal is to enable students to have a more comprehensive degree of flexibility and accommodations and its programme or other structure elements (Moore et al., 2002). During open and distance learning (ODL), students and lecturers rely on technology to assist the learning process. Online learning delivery has allowed instructors and learners to incorporate flexibility into their lesson plans (Md Noh et al., 2021). Mathew & Chung (2021), investigate the university students' perspectives on ODL amidst COVID-19 and the findings show that most students have positive perceptions of ODL implementation.

1.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) is a popular model to measure technology acceptance specifically on how user accepts and use technology. Introduced by Davis (Davis, 1989), this model proposed that perceived usefulness (PU) refers to the perception that using the technology will improve the user's work performance and perceived ease of use (PEOU) of technology predict user attitude (ATT) towards using the technology, subsequent behavioural intentions (UI), and actual usage (Weng et al., 2018). Among is a study by Md Noh et al. (2021) which found that digital tools' use intention was more affected by perceived usefulness than attitude, though both are a significant contributor

This study investigates the major variables in TAM to discover the relationship and impact of attitudinal belief, such as perceived ease of use and perceived usefulness towards the ODL adoption. PU in this study is measured by CS and NoNCS students' response towards using digital tools in completing tasks during ODL. PEOU in this study is measured by CS and NoNCS students' response towards how easy and simple using digital tools in online learning. ATT in this study measures CS and NoNCS students' attitude in using digital tools and their intention to use (UI) of digital tools will also be measured in completing the task during ODL. Figure 1 illustrates the theoretical framework for this study.

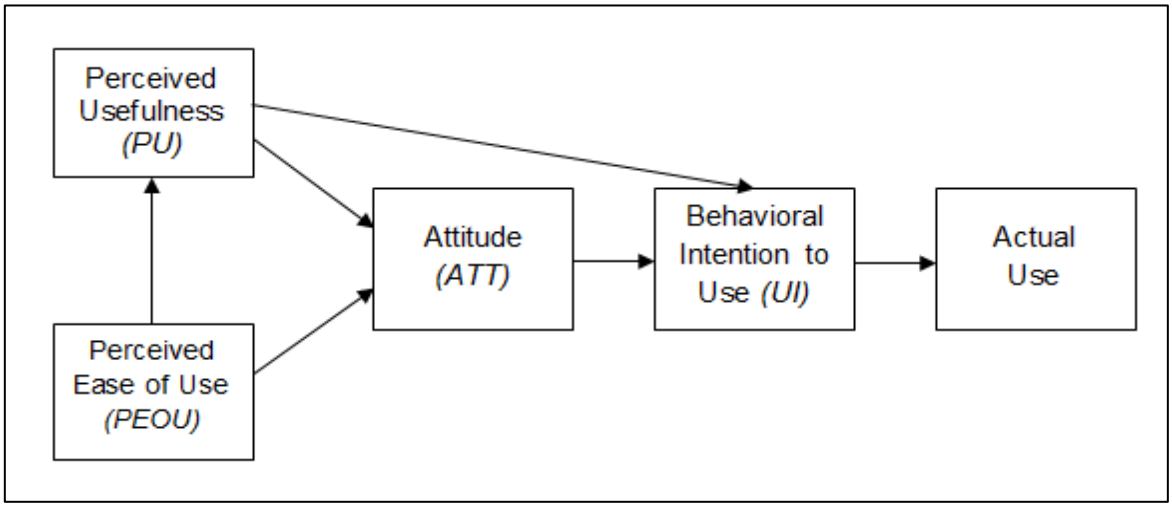

Fig. 1. Technology Acceptance Model (TAM) as a theoretical framework (Davis, 1989)

2. Methodology

Convenience sampling is frequently used in quantitative research, where the researcher selects subjects that are more readily accessible. The questionnaires were distributed through an online survey among UiTM Terengganu students at three campuses in Dungun, Bukit Besi and Kuala Terengganu. Three hundred seventy students from various background participated in this study.

The questionnaire developed was based on six (6) constructs which consist of thirty (30 items. The hypotheses of this research are as the following:

H1: PEOU is positively related to PU among computer science (CS) students to use digital tools for online learning.
H2: PEOU is positively related to the ATT among computer science (CS) students to use digital tools for online learning.
H3: PU is positively related to the ATT among computer science (CS) students to use digital tools for online learning.
H4: PU is positively related to the UI among computer science (CS) students to use digital tools for online learning.

H5: ATT is positively related to the UI among computer science (CS) students to use digital tools for online learning.
H6: PEOU is positively related to PU among non-computer science (NoNCS) students to use digital tools for online learning.
H7: PEOU is positively related to the ATT among non-computer science (NoNCS) students to use digital tools for online learning.
H8: PU is positively related to the ATT among non-computer science (NoNCS) students to use digital tools for online learning.
H9: PU is positively related to the UI among non-computer science (NoNCS) students to use digital tools for online learning.
H10: ATT is positively related to the UI among non-computer science (NoNCS) students to use digital tools for online learning.

3. Results and Discussion

3.1 Descriptive Analysis

As seen in Table 1, 74.40% male students and 25.60% female students participated. Among them are 134 bachelor and 233 diploma students, accounting for 36.50% and 63.50%, respectively. 56.90% are from students who are currently taking a Diploma in Computer Science, whereas 43.10% are students from other programs, namely Diploma in Accountancy and Diploma in Muamalat. 48.00% are from the rural area, while the remaining 52.00% are from the urban area.

Table 1. Descriptive Analysis

Variables	Items	Frequency (Percentage, %)
Gender	Male	273 (74.40)
	Female	94 (25.60)
Education Level	Bachelor	134(36.50)
	Diploma	233 (63.50)
Program	CS	209 (56.90)
	NoNCS	158 (43.10)
Area	Rural	176 (48.00)
	Urban	191 (52.00)

3.2 Reliability

Cronbach's alpha is a widely used measure for determining a composite score's reliability or internal consistency. In other words, Cronbach's alpha measures how closely related a set of items are as a construct. Cronbach's alpha of more than 0.7 is considered good, 0.8 and above is considered better, and 0.9 and above is considered excellent (Sekaran & Bougie, 2013). Table 2 shows the value of Cronbach Alpha for CS students which shows that all constructs (PEOU = 0.938, PU = 0.954, ATT = 0.934, UI = 0.920) have excellent internal consistency (Cronbach's Alpha >0.9). Table 2 shows the Cronbach Alpha for NoNCS students and it is found that all constructs (PEOU = 0.943, PU = 0.957, ATT = 0.928, UI = 0.933) also have very good internal consistency (Cronbach's Alpha >0.9). This indicates that the items measured for each construct are closely related and reliable for CS and NoNCS students.

Table 2. Reliability Analysis for CS and NoNCS students

Group	Construct	Number of Items	Cronbach's Alpha
CS	PEOU	6	0.938
	PU	6	0.954
	ATT	4	0.934
	UI	3	0.920
NoNCS	PEOU	6	0.943
	PU	6	0.957
	ATT	4	0.928
	UI	3	0.933

3.3 Correlation

The correlation coefficient measures the strength of a relationship between two variables. Cronbach Alpha ≤ 0.35 are indicated as weak correlations, 0.36 to 0.67 is categorised as moderate correlations, 0.68 to 1.0 shows strong correlations (Taylor, 1990). The result in Table 3 shows the correlation analysis of two variables measured for CS and NoNCS students. It is found that all the relationships studied are significant (p-value <0.05).

For CS students, the relationship between PEOU -> PU (0.824), PU -> UI (0.830) and ATT -> UI (0.698) exhibit strong positive relationship whereas PEOU -> ATT (0.653) and PU -> ATT (0.646) shows moderate positive relationship. On the contrary, for NoNCS students, the relationship between PEOU -> PU (0.810), PU -> ATT (0.760), PU -> UI (0.768) and ATT -> UI (0.695) exhibit strong positive relationship whereas PEOU -> ATT (0.653) shows moderate positive relationship. All the relationships are significant (p-value <0.05).

These results suggest that the degree to which computer science students think that using digital tools during ODL will be effortless has a strong significant positive relationship with how they think that using digital tools during ODL will be useful in completing tasks. The results also imply that the degree to which computer science students think that using digital tools during ODL will be useful in completing tasks has a strong significant positive relationship with their intention to use digital tools during ODL. Moreover, the degree to which computer science students' positive attitude in using digital tools during ODL also exhibit a strong significant positive relationship with its intention to use.

On the other hand, the result suggests that the degree to which NoNCS students think that using digital tools during ODL will be effortless has a strong significant positive relationship with the degree to which they think using digital tools during ODL will be useful in completing tasks. Furthermore, the degree to which NoNCS students think that using digital tools during ODL will be useful in completing tasks has a strong significant positive relationship with their attitude and intention to use digital tools during ODL.

Table 3. Correlation Analysis for CS and NoNCS students

Group	Hypothesis	Correlation Coefficient	Sig. (2-tail)	Strength
CS	PEOU -> PU	.824**	0.000	Strong Positive
	PEOU -> ATT	.653**	0.000	Moderate Positive
	PU -> ATT	.646**	0.000	Moderate Positive
	PU -> UI	.830**	0.000	Strong Positive
	ATT -> UI	.698**	0.000	Strong Positive
NoNCS	PEOU -> PU	.810**	0.000	Strong Positive
	PEOU -> ATT	.653**	0.000	Moderate Positive
	PU -> ATT	.760**	0.000	Strong Positive
	PU -> UI	.768**	0.000	Strong Positive
	ATT -> UI	.695**	0.000	Strong Positive

3.4 Regression

Regression analysis is a statistical technique for studying linear relationships between a dependent variable and one or more independent variables. It is usually performed after the correlation between variables are established. It predicts the dependant variable (outcome variable) based on one or more independent variables. Since all the relationship, as shown in Table 3, are significant (p-value <0.05), the regression analysis can be carried out.

As shown in Table 4, the impact of PEOU on UI for both CS and NoNCS are significant (p-value <0.05). For CS students, when PEOU increased by 1 unit, the UI will increase by 0.805. Meanwhile, for NonCS students, when PEOU increased by 1 unit, the UI will increase by 0.850.

Table 4. Regression analysis of perceived ease of use vs perceived usefulness for CS and NoNCS students

Dependent Variable	Group	Independent Variable	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
			B	Std. Error	Beta		
Perceived Usefulness	CS	(Constant)	0.001	0.04		0.032	0.974
		Perceived Ease of Use	0.805	0.04	0.814	20.163	0.000
	NoNCS	(Constant)	-0.003	0.044		-0.073	0.942
		Perceived Ease of Use	0.850	0.045	0.836	19.042	0.000

Table 5 shows that the impact of PEOU on ATT for both CS and NoNCS are significant (p-value <0.05). For CS students, when PEOU increased by 1 unit, the ATT will increase by 0.664. Meanwhile, for NoNCS students, when PEOU increased by 1 unit, the UI will increase by 0.729.

Table 5. Regression analysis of perceived ease of use vs attitude for CS and NoNCS students

Dependent Variable	Group	Independent Variable	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
			B	Std. Error	Beta		
Attitude	CS	(Constant)	0.024	0.055		0.43	0.667
		Perceived Ease of Use	0.664	0.054	0.647	12.223	0.000
	NoNCS	(Constant)	-0.033	0.05		-0.665	0.507
		Perceived Ease of Use	0.729	0.05	0.757	14.464	0.000

Table 6 shows that the impact of PU on ATT for both CS and NoNCS are significant (p-value <0.05). For CS students, when PU increased by 1 unit, the ATT will increase by 0.635. Meanwhile, for NonCS students, when PU increased by 1 unit, the UI will increase by 0.760.

Table 6. Regression analysis of perceived usefulness vs attitude for CS and NoNCS students

Dependent Variable	Group	Independent Variable	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
			B	Std. Error	Beta		
Attitude	CS	(Constant)	0.02	0.057		0.344	0.731
		Perceived Usefulness	0.635	0.057	0.612	11.12	0.000
	NoNCS	(Constant)	-0.028	0.045		-0.622	0.535
		Perceived Usefulness	0.760	0.045	0.801	16.733	0.000

Table 7 shows that the impact of ATT on UI for both CS and NoNCS are significant (p-value <0.05). For CS students, when ATT increased by 1 unit, the UI will increase by 0.653. Meanwhile, for NoNCS students, when ATT increased by 1 unit, the UI will increase by 0.733.

Table 7. Regression analysis of attitude vs use intention for CS and NoNCS students

Dependent Variable	Group	Independent Variable	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
			B	Std. Error	Beta		
Use Intention	CS	(Constant)	-0.034	0.053		-0.652	0.515
		Attitude	0.653	0.051	0.665	12.812	0.000
	NoNCS	(Constant)	0.046	0.055		0.84	0.402
		Attitude	0.733	0.058	0.713	12.716	0.000

Table 8 shows that the impact of PU on UI for both CS and NoNCS are significant (p-value <0.05). For CS students, when PU increased by 1 unit, the UI will increase by 0.848. Meanwhile, for NonCS students, when PU increased by 1 unit, the UI will increase by 0.765.

Table 8. Regression analysis of use intention vs perceived usefulness for CS and NoNCS students.

Dependent Variable	Group	Independent Variable	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
			B	Std. Error	Beta		
Use Intention	CS	(Constant)	-0.015	0.039		-0.381	0.704
		Perceived Usefulness	0.848	0.039	0.832	21.588	0.000
	NoNCS	(Constant)	0.021	0.048		0.435	0.664
		Perceived Usefulness	0.765	0.048	0.786	15.894	0.000

As observed in Table 4-8, it is seen that the beta value is significantly different between CS and NoNCS students for all regression analysis performed. Hence, it is appropriate to investigate the significant difference between these two beta values. To continue, the test for the difference between two linear regression slopes were performed to compare the regression coefficients of CS with NoNCS students using the Stats Tools Package (Gaskin, 2016). The alternative hypothesis to measure the difference between regression coefficients of CS and NoNCS students are as follow.

H_1: $\beta_{CS} \neq \beta_{NoNCS}$ for the regression PEOU -> PU
H_2: $\beta_{CS} \neq \beta_{NoNCS}$ for the regression PEOU -> ATT

H_3: $\beta_{CS} \neq \beta_{NoNCS}$ for the regression PU -> ATT
H_4: $\beta_{CS} \neq \beta_{NoNCS}$ for the regression PU -> UI
H_5: $\beta_{CS} \neq \beta_{NoNCS}$ for the regression ATT -> UI

Table 4 (page 6) shows that the impact of PEOU on PU for NoNCS students (0.836) is different and higher than CS students (0.814), but it is evident that both beta's are not significantly different (Table 8; $\beta_{CS} = \beta_{NoNCS}$; p-value =0.715 > 0.05). Table 5 shows that the impact of PEOU on ATT for NoNCS students (0.757) is different and higher than CS students (0.647), but it is not significantly different (Table 8; $\beta_{CS} = \beta_{NoNCS}$; p-value =0.147 > 0.05). Table 6 shows that the impact of PU on ATT for NoNCS students (0.801) is different and higher than CS students (0.8612), and that it is significantly different (Table 8; $\beta_{CS} \neq \beta_{NoNCS}$; p-value =0.014 < 0.05). Table 7 shows that the impact of ATT on UI for NoNCS students (0.713) is higher than CS students (0.665), but it is not significantly (Table 8; $\beta_{CS} = \beta_{NoNCS}$; p-value =0.534 > 0.05). Table 8 shows that the impact of PU on UI for CS students (0.832) is higher than NoNCS students (0.786), but it is not statistically different (Table 8; $\beta_{CS} = \beta_{NoNCS}$; p-value =0.452 > 0.05).

The impact of PU on ATT for CS and NoNCS students are both significant. But the value of beta for NoNCS students is different and higher than CS students. The degree to which NoNCS students think that using digital tools during ODL will be useful has larger impacts on their positive attitude in using digital tools during ODL compared to computer science students.

Table 9 shows the test for the difference between beta values of CS and NoNCS students for all regression analysis as in Table 4 to 8.

Table 9. Test for the difference between two linear regression slopes

Hypothesis	t-statistics	Sig. (2-tail)	Decision
1	0.365	0.715	Reject
2	1.455	0.147	Reject
3	2.482**	0.014	Accept
4	0.622	0.534	Reject
5	0.753	0.452	Reject

4. Conclusion

Ever since the COVID-19 pandemic and restriction movement continues in more than a year forces education sector to be remotely conducted, with the technology and digital tools, education at all levels has been practising ODL. At this period, many studies have been conducted to investigate students' perceptions to cope with ODL, including at the tertiary level. The generic assumption that CS students may do better during the ODL than NoNCS students was initial assumption that motivated this study. The aim was to examine and comparatively analyse the students' perception of the CS and NoNCS students during the ODL approach using digital tools.

All relationships hypothesised are proved to be valid for both CS and NoNCS students. Consequently, the results shown that both CS and NonCS acquires a positive attitude, perceived usefulness, and behaviour intention. Hence, a further analysis was carried to find the differences between the two significant predictor values. However, comparative analysis findings of the beta values in section 4 indicated that only one hypothesis is significant. NoNCS students' perception of perceived usefulness has a higher impact on their positive attitude in using digital tools during ODL than CS students, despite both being significantly influenced. Thus, this finding contradicts the initial assumption of the study that students' background from CS programs may adopt ODL better than NoNCS students. The learning strategy of CS students are highly engaged with hands-on technical aspects such as programming or web development in the computer lab but no longer able to do so during the COVID-19 pandemic. More research may be done to determine why NoNCS students have a better attitude than CS students from other perspectives, such as psychological ones. The results measured

may help educators in preparing ODL lessons or teaching strategy in delivering the curriculum for students from different background of academic programs.

To conclude, this research showed that CS and NoNCS students from UiTM who participate in this research have a positive intention to use the digital tools in their learning activities during ODL. Even if the COVID-19 epidemic may be gone, ODL still can be employed on a broader scale in tertiary education. As a result, continuing research must be done to ensure that students' learning skills and perspectives during ODL continue to improve and maintain over time.

5. Suggestion for Future Research

Since the convenience sampling, a type of non-random sampling technique was applied in this study, the conclusion must not be made to represent the whole population. Thus, future research can be conducted using random sampling to ensure that the outcome can represent the population.

6. Acknowledgements

The authors would like to express gratitude to all students who were willing to take some time to participate in this study. The authors would also extend their appreciation to Universiti Teknologi Mara (UiTM), Terengganu for helping on the publication of this research.

7. References

Al-Rabiaah, A., Temsah, M.-H., Al-Eyadhy, A. A., Hasan, G. M., Al-Zamil, F., Al-Subaie, S., Alsohime, F., Jamal, A., Alhaboob, A., Al-Saadi, B., & Somily, A. M. (2020). Middle East Respiratory Syndrome-Corona Virus (MERS-CoV) associated stress among medical students at a hospital in Saudi Arabia. *Journal of Infection and Public Health*, *13*(5), 687–691. https://doi.org/10.1016/j.jiph.2020.01.005

Banks, J., Karjalainen, H., & Propper, C. (2020). Recessions and Health: The Long-Term Health Consequences of Responses to the Coronavirus*. *Fiscal Studies*, *41*(2), 337–344. https://doi.org/10.1111/1475-5890.12230

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.1016/j.cell.2017.08.036

Gaskin, J., (2016). Stats tools package. Available at: http://statwiki.kolobkreations.com.

Godhe, A., Lilja, P., & Selwyn, N. (2019). Making sense of making: critical issues in the integration of maker education into schools. *Technology, Pedagogy and Education*, *28*(3), 317–328. https://doi.org/10.1080/1475939X.2019.1610040

Iivari, N., Sharma, S., & Ventä-Olkkonen, L. (2020). Digital transformation of everyday life–How COVID-19 pandemic transformed the basic education of the young generation and why information management research should care? *International Journal of Information Management*, 55, 102183. https://doi.org/10.1016/j.ijinfomgt.2020.102183

Langegård, U., Kiani, K., Nielsen, S. J., & Svensson, P. A. (2021). Nursing students' experiences of a pedagogical transition from campus learning to distance learning using digital tools. *BMC Nursing*, *20*(1), 23. https://doi.org/10.1186/s12912-021-00542-1

Lee, C., Yeung, A. S., & Ip, T. (2016). Use of computer technology for English language learning: do learning styles, gender, and age matter? *Computer Assisted Language Learning*, *29*(5), 1033–1049. https://doi.org/10.1080/09588221.2016.1140655

Likhachev, S., Likhacheva, T., Silchenkova, L., Krivorotova, E., & Plesnik, L. (2020). Controlling Research Activity of Students by Digital Tools. *SHS Web of Conferences*, *79*, 01010. https://doi.org/10.1051/shsconf/20207901010

Mathew, V. N., & Chung, E. (2021). University Students' Perspectives on Open and Distance Learning (ODL) Implementation Amidst COVID-19. *Asian Journal of University Education.* https://doi.org/DOI 10.24191/ajue.v16i4.11964

Md Noh, N. H., Raju, R., Eri, Z. D., & Ishak, S. N. H. (2021). Extending technology acceptance model (TAM) to measure the students' acceptance of using digital tools during open and distance learning (ODL). *International Conference of Emerging Challenges in Engineering and Current*

Technology (ICECT III).

Moore, M. G., Resta, P., Rumble, G., Tait, A., & Zaparovanny, Y. (2002). Open and distance learning: Trends, policy and strategy considerations. UNESCO.

Rahiem, M. D. H. (2021). Indonesian University Students' Likes and Dislikes about Emergency Remote Learning during the COVID-19 Pandemic. *Asian Journal of University Education (AJUE)*, *17*(1), 1–18. https://doi.org/10.24191/ajue.v17i1.11525

Sekaran, U., & Bougie, R. (2013). *Research methods for business: A skill-building approach* (6th ed.). John Wiley & Sons Ltd.

Sundarasen, S., Chinna, K., Kamaludin, K., Nurunnabi, M., Mohammad Baloch, G., Khoshaim, H. B., Far, S., Hossain, A., & Sukayt, A. (2020). Psychological Impact of COVID-19 and Lockdown among University Students in Malaysia: Implications and Policy Recommendations. *International Journal of Environmental Research and Public Health*, *17*(17), 6206. https://doi.org/10.3390/ijerph17176206

Taylor, R. (1990). Interpretation of the Correlation Coefficient: A Basic Review. *Journal of Diagnostic Medical Sonography*, *6*(1), 35–39. https://doi.org/10.1177/875647939000600106

UNESCO, U. (2020). *COVID-19 Educational Disruption and Response*. https://en.unesco.org/covid19/educationresponse

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, *28*(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Weng, F., Yang, R.J., Ho, H.J., & Su, H.M. (2018). A TAM-Based Study of the Attitude towards Use Intention of Multimedia among School Teachers. *Applied System Innovation*, *1*(3), 36. https://doi.org/10.3390/asi1030036

Zalat MM, Hamed MS, Bolbol SA (2021) The experiences, challenges, and acceptance of e-learning as a tool for teaching during the COVID-19 pandemic among university medical staff. PLoS ONE 16(3): e0248758. https://doi.org/10.1371/journal.pone.0248758