The Effect of Task Technology Fit and Self-Efficacy on E-Learning Adoption: Empirical Evidence from Indonesian's Higher Education Sector

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ABSTRACT

The present study aims to determine factors influencing e-learning adoption in Indonesia. Using an online questionnaire, data was gathered from students enrolled in four universities in Indonesia. The final sample consisted of 753 students selected by the purposive sampling method. Data obtained were analysed using Statistical Package for the Social Sciences (SPSS) software. The findings indicate that task technology fit and self-efficacy were positively related to E-learning adoption. Theoretical and practical implications are discussed as well as recommendations for future research.

Keywords: E-Learning Adoption, Higher Education, Self-Efficacy, Task-Technology Fit.

1. INTRODUCTION

COVID-19 is a serious global infectious disease that has caused millions of deaths around the world. As the number of cases of COVID-19 started to rise in March 2020, all educational institutions including schools, colleges and universities were forced to close their operations. The crisis has triggered a sudden shift to remote or online learning. In Indonesia, the closure of schools due to COVID-19 has affected the education and well-being of 68 million students (The Jakarta Post, April 7, 2020). Students and educators were not prepared for this sudden transformation. Poor internet connection and lack of digital device accessibility pose challenges for students to study online. In 2020, the Indonesia University of Education conducted a survey on 1,045 Indonesian students and the findings revealed that 53.7 percent of respondents claimed that weak internet connection, slow internet connectivity in remote areas, and mobile data quota restrictions were the main challenges that prevent them from accessing online learning (University World News, May 14, 2020).

Online learning requires a reliable internet connection and broadband access. Slow internet connections and limited access in rural areas are causing some students to have a harder time joining online classes. According to Speedtest Global Index (2022), Indonesia is ranked 109th out of 142 nations for its mobile internet speed, and 122th out of 180 nations for its fixed broadband speed. With an average download speed of 24.32 Mbit/second, Indonesia records the third slowest fixed broadband speed in ASEAN. This problem becomes a constraint in maximising the use of online learning platforms in Indonesia.
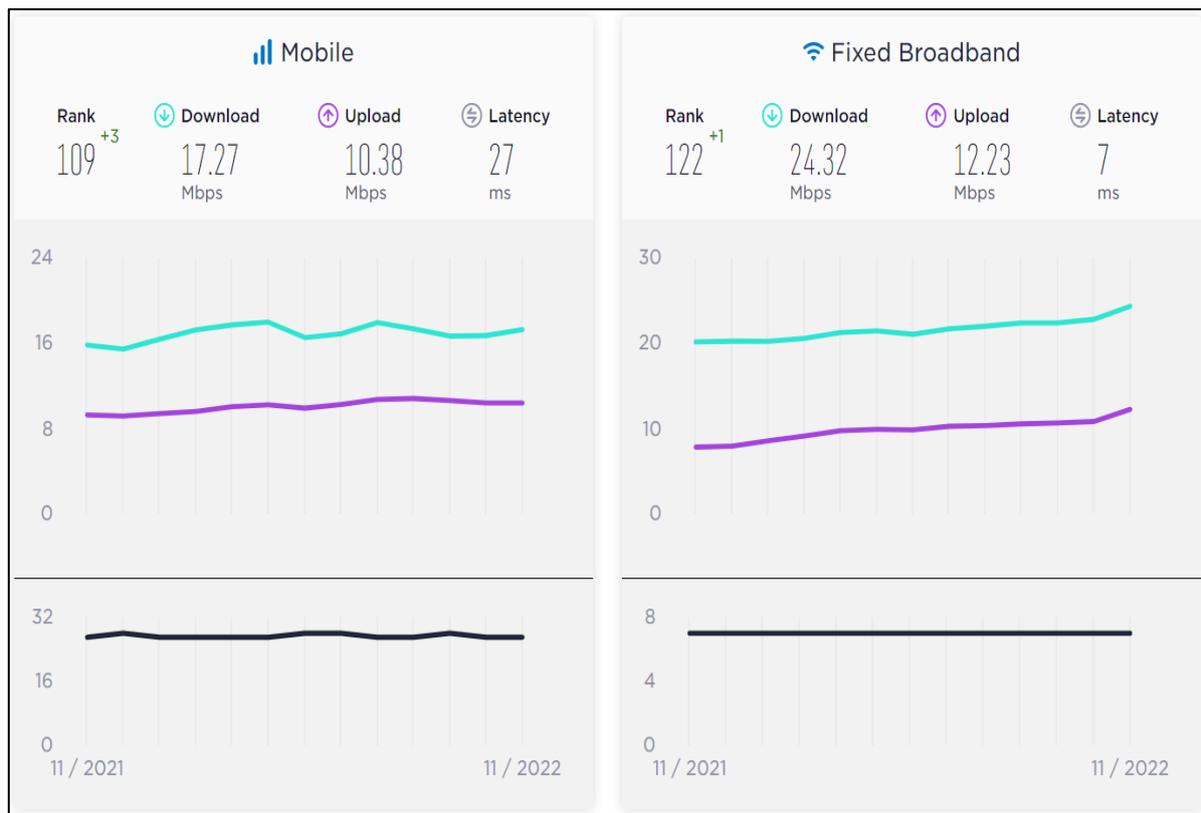
The successful implementation of e-learning tools depends on the support of technology. Task-technology fit (TTF) theory postulates that the effective utilisation of a particular technology depends on its ability to support users in performing their tasks. (Goodhue, 1988). A good integration between technology and learning practices implies that the technology is well aligned with the tasks. In the context of e-learning, well-designed educational applications and software can support and facilitate teaching and learning activities. Besides, e-learning provides educators

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with the ability to explore new educational tools and techniques to support students in their learning process.

Ensuring success in online learning requires strong motivation and active involvement of the learners. Self-efficacy plays a vital role in students' engagement in learning. Learners with high self-efficacy are more intrinsically motivated and willing to participate in difficult tasks (Bruning & Horn, 2000). Based on Bandura's self-efficacy theory, self-efficacy is conceptualised as personal judgements of how well one can succeed in specific situations or accomplish a task (Bandura 1977, 1997). People with high self-efficacy view challenging problems as tasks to be mastered rather than threatening situations that should be avoided. Prior research has documented that self-efficacy is a key factor contributing to learners' success in online learning (Kundu, 2020; Corry & Stella, 2018; Sun & Chen, 2016). According to McCoy (2010), individuals who are proficient with online technology are likely to possess a higher level of self-efficacy and can adjust to an online learning environment more easily. Efficacious learners have greater confidence in their skills and ability, which makes them more capable of completing online tasks.

Research on e-learning adoption in Indonesia has been carried out in various contexts. For instance, researchers had investigated e-learning adoption among secondary school students (Saputra et al., 2020), lecturers (Yudiatmaja et al., 2022; Kustono, 2021), and high school teachers (Amrullah, Pratikto & Churiyah, 2021). However, studies investigating determinants of e-learning adoption among university students in Indonesia are still scarce. Hence, the current study used the Task-Technology Fit theory as the theoretical basis to examine whether task-technology fit and self-efficacy could serve as predictors of e-learning adoption in the context of higher education institutions in Indonesia.

Source: Speedtest Global Index (2022)

Figure 1 Indonesia Mobile and Fixed Broadband Speeds

2. LITERATURE REVIEW

2.1   Task-Technology Fit

Task-technology fit (TTF) "is the degree to which a technology assists an individual in performing his or her portfolio of tasks" (Goodhue & Thompson, 1995, p. 216). More specifically, it designates the interdependence between three components: user capabilities, task requirements, and technology functionality. The task-technology fit model postulates that a higher match between technology and task will lead to greater use of information systems (Narman et al., 2012).

In this study, task-technology fit refers to the degree to which online learning systems can support students to carry out their learning activities. Researchers have applied the TTF in predicting and explaining the utilisation of a particular technology. A study conducted by McGill and Klobas (2009) revealed that task–technology fit had a strong influence on the perceived impact of learning management systems (LMS). Meanwhile, Ma, Chao and Weng (2013) found that task–technology fit correlated positively with the perceived usefulness of a blended E-Learning system. The findings from D'ambra, Wilson and Akter's (2012) study show that task–technology fit has a significant impact on E-books adoption in academic settings. However, studies that explore the role of task-technology fit in online learning contexts are limited.

The sudden transformation into online learning has posed substantial challenges to students in Indonesia. Technology can pose the biggest hurdle to online learning if users are not digitally competent due to inexperience or inadequate training. If students find that e-learning tools and software can help them to execute their tasks more smoothly, they will feel more motivated to use the online learning platform.

This paper posits that task-technology fit is likely to be a predictor for e-learning usage. So, it is hypothesised that:

H1: Task technology fit has a significant and positive effect on e-learning adoption.

2.2   Self-Efficacy

The concept of self-efficacy was originally proposed by psychologist Albert Bandura in his Social Cognitive theory. Bandura (1986, p.391) viewed self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performance" (p. 391). In the e-learning setting, self-efficacy has been defined by Pituch and Lee (2006) as an individual's belief about his or her ability to perform certain learning tasks using an e-learning system. Self-efficacy can drive students to exert greater effort to deploy technology in learning environments, which leads to better learning outcomes.

Previous empirical studies have demonstrated that self-efficacy was able to predict a range of results in online learning settings. Some examples of these studies are the effect of self-efficacy on academic achievement (McGhee, 2010; Ergul, 2004), learning satisfaction (Aldhahi et al., 2022; Shen, Cho, Tsai & Marra, 2013), and learning engagement (Zhang & Li, 2021). However, the impact of self-efficacy on online learning usage has not been adequately addressed in the literature. Therefore, this research aims to fill this gap by investigating the association between self-efficacy and e-learning adoption, specifically among students who are pursuing tertiary education in Indonesia.

Hence, this study hypothesizes:

H2: Self-efficacy has a significant and positive effect on e-learning adoption.
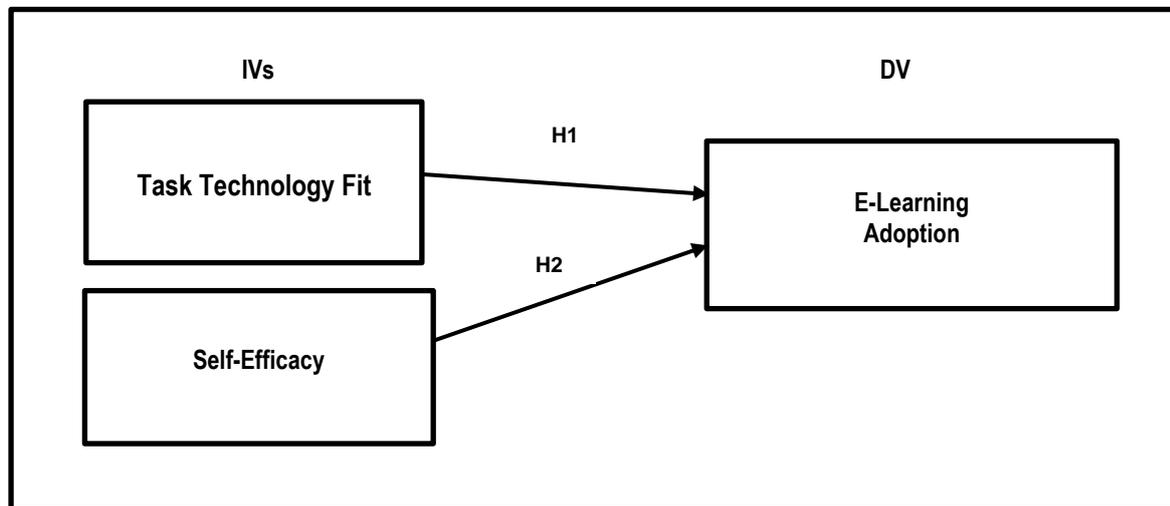Figure 2 below depicts the research framework of the study.

Figure 2 Research Framework

3. RESEARCH METHODOLOGY

3.1 Sample and Data Collection

The population for this study consisted of students who are pursuing tertiary education in Indonesia. This study was conducted in four universities, namely Universitas Medan Area (Medan), Universitas Indonesia (Jakarta), Universitas Airlangga (Surabaya), and Universitas Hasanuddin (Makasar).

The questionnaire was administered through an online survey platform. The link to the online survey was sent by email and instant messaging. The data was collected from 28 March to 18 July 2021. In this study, we used purposive sampling to obtain the sample. Purposive sampling was used to ensure that only undergraduate and postgraduate students who were users of E-learning can participate in the survey. The initial number of responses was 905. To ensure that the responses were reliable for testing the research aims, a screening question 'Have you ever used E-learning?' was asked. Those who never used E-learning were excluded. After the screening process, 197 questionnaires were discarded resulting in 753 valid responses for the statistical analysis. 459 (61 percent) students were female, and 294 (39 percent) students were male. Most respondents (72.8 percent) were within the 18-22 age range. More than 81.5 percent of participants were pursuing bachelor's degrees. The largest proportion of surveyed students (60.8 percent) was from Jakarta followed by Medan (15.4 percent) and Surabaya (13.9 percent). Students from Makkasar formed the smallest groups with 9.8 percent. See Table 1 for detailed demographic information.

Table 1 Respondent's Demographic Profile

Demographic Information		Frequency	Percentage (%)
Gender	Male	294	39.0
	Female	459	61.0
Age	18-22 years	548	72.8
	23-27 years	83	11.0
	28-32 years	52	6.9
	33-37 years	35	4.6
	Above 38 tahun	35	4.6
Location	Medan	116	15.4
	Jakarta	458	60.8
	Surabaya	105	13.9
	Makassar	74	9.8
Programme	Bachelor's Degree	614	81.5
	Master's Degree	139	18.5
Education level	First Year	227	30.1
	Second Year	244	32.4
	Third Year	141	18.7
	Fourth Year	141	18.7
Field of study	Business Administration	292	38.8
	Accountancy	99	13.1
	Economics	70	9.3
	Politics	21	2.8
	Psychology	17	2.3
	Information Technology	42	5.6
	Education	70	9.3
	Agriculture	18	2.4
	Medical	115	15.3
	Language	9	1.2

3.2 Measures

All measures for each construct were taken from previously validated instruments. The scales of task-technology fit were measured by the items derived from Isaac et al. (2019). The measurement of self-efficacy was adopted from Tsai et al. (2020). Finally, the measures for e-learning adoption are based on Mohammadi (2015). All items were rated on a seven-point Likert scale (1 = Strongly disagree, 7 = Strongly agree).

4. DATA ANALYSIS AND RESULTS

In analysing the data, we used the Statistical Package for Social Sciences (SPSS) software. Before testing the hypotheses, we performed a series of tests which includes the normality test, reliability test, and Kaiser-Meyer-Olkin (KMO) test.

4.1 Test of Sampling Adequacy (Kaiser-Meyer-Olkin Test)

Kaiser-Meyer-Olkin (KMO) test was performed on the data to measure sampling adequacy. KMO value must be at least 0.5 to be considered acceptable (Hair et al., 2019).

Table 2 Test of Sampling Adequacy

Construct(s)	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
		Approx. Chi-Square	*Df*	Sig.
Task Technology Fit	0.757	2141.688	3	.000
Self-Efficacy	0.922	5328.303	15	.000
E-Learning Adoption	0.768	2305.558	3	.000

As depicted in Table 2, KMO values for all constructs exceed the cut-off of 0.5, which indicates that the sampling is sufficient.

4.2 Normality Test

Kurtosis and skewness measurements are used to assess whether the indicators meet the normality assumption (Kline, 2016). Kurtosis values that fall between -7 to 7 and skewness in the range of − 2 to 2 demonstrate a normal univariate distribution (Hair et al., 2010).

Table 3 Normality Test Results

Variables	Skewness Statistics	*(S.E-skew)2*	Kurtosis Statistics	*(S.E- kurt)2*
TTF	-0.623	0.089	-0.290	0.178
SE	-1.002	0.089	0.786	0.178
EA	-0.780	0.089	0.124	0.178

Note: TTF = Task Technology Fit, SE= Self Efficacy, EA = E-Learning Adoption

As shown in Table 3, skewness and kurtosis values fell within the acceptable limit, which indicates data was normally distributed.

4.3 Reliability Test

Cronbach's alpha determines the internal consistency of measurements. The acceptable range of Cronbach's alpha is a value of 0.70 or above (Sekaran & Bougie, 2016). Table 4 presents the reliability test results.

Table 4 Reliability Test Results

Construct (s)	Cronbach's Alpha Statistics	N of Items
Task Technology Fit	0.944	3
Self-Efficacy	0.963	6
E-Learning Adoption	0.951	3

The Cronbach's alpha values ranging from 0.944 to 0.963 indicates that the model's constructs met the criteria for reliability.

4.4 Hypothesis Testing

Table 4 Hypothesis Testing Results

Hypothesis	Relationship	Beta	S.E.	T	Sig.	Results
H1	TTF ➤ EA	0.278	0.067	4.139	0.000*	**Supported**
H2	SE ➤ EA	0.305	0.074	4.099	0.000*	**Supported**

(*) Significant at p<0.05, at one-tailed T statistics value of 1.65
TTF = Task Technology Fit, SE= Self Efficacy, EA = E-Learning Adoption

As depicted in Table 4, the results show that both task technology fit and self-efficacy have a positive impact on purchase intention, with a T value of 4.139, and 4.099 respectively. Thus, findings support H1 and H2.

5. DISCUSSION

Results indicated that there is a positive relationship between task technology fit and e-learning adoption. Prior research has highlighted that task technology fit plays an important role in determining information system (IS) usage or adoption. For instance, Tan et al. (2018) reported that task technology fit significantly affects the willingness of students to continue using online learning. Meanwhile, a study by Ammenwerth, Iller and Mahler (2006) emphasises that a higher fit between technology, task requirements, and individual abilities will contribute to greater use of IT systems. Recent studies by Afshan and Sharif (2015) and Changchun, Haider and Akram (2017) demonstrated that task technology fit has a positive impact on mobile banking adoption. Task-Technology Fit (TTF) model suggests that users will be more willing to utilise new technology when the functions of the technology correspond with the tasks to be performed (Goodhue & Thompson, 1995). In the context of this study, it is believed that e-learning has features that can help students to perform their tasks. E-learning platforms utilise various digital technologies and tools which are developed specifically to complement the learning process. The integration of suitable digital technologies in teaching and learning is essential to enhance students' engagement in online learning.

The findings of the current study have proven that self-efficacy has a significant positive influence on e-learning adoption. Scholars have acknowledged that students with high self-efficacy are more likely to become effective learners in an online environment (Zimmerman & Kulikowich, 2016; Artino & McCoach, 2008). Students with high self-efficacy will be in a position to apply self-regulated learning strategies to facilitate their learning (Agustiani, Cahyad & Musa, 2016). Self-regulated learning requires learners to plan, monitor, and evaluate their learning activities. As

students who embrace online learning are responsible for their learning, the use of self-regulated learning strategies can assist them in performing tasks more effectively and independently.

6. CONCLUSION

The Task-Technology Fit model was used as the framework for this study to evaluate the adoption of E-learning among Indonesian university students. The results demonstrated the critical importance of task-technology fit and self-efficacy in predicting e-learning adoption in Indonesia.

This research offers several managerial and practical implications. Online learning is a necessity, particularly in a state of crisis like the COVID-19 pandemic. Efforts are needed to maximise the progress of online education in Indonesia. Higher education institutions should pay attention to equipping educators and learners with adequate computer and digital skills so they can quickly adapt to the new learning environment. Gathering information and understanding how university students utilise the online learning platform is essential so that e-learning developers can create online course designs, user interfaces and learning content that satisfy the needs of the learners.

The current study has several limitations which would provide directions for future research. Firstly, the data collection in this study was confined to universities in Indonesia. The fact that the participants come from one country limits the generalisability of the results. Therefore, we suggest that future researchers can extend the scope by collecting the data in other nations (e.g. Asian and Western countries). Second, the current study was a cross-sectional study in which information is gathered for a specific point in time. It would be beneficial to explore the relationships among the identified research variables by using a longitudinal research design. Finally, this research empirically investigated the direct relationship between task-technology fit, self-efficacy and e-learning adoption. Future studies endeavour to examine the mediating or moderating effects of other variables to validate the model.

REFERENCES

[1] Afshan, S., & Sharif, A. (2016). Acceptance of mobile banking framework in Pakistan. *Telematics and Informatics*, 33(2), 370-387.

[2] Agustiani, H., Cahyadi, S., & Musa, M. (2016). Self-efficacy and self-regulated learning as predictors of students' academic performance. *The Open Psychology Journal*, 9, 1–6.

[3] Aldhahi, M.I., Alqahtani, A.S., Baattaiah, B.A. & Al-Mohammed, H.I. (2022). Exploring the relationship between students' learning satisfaction and self-efficacy during the emergency transition to remote learning amid the coronavirus pandemic: A cross-sectional study. *Education and Information Technologies*, 27, 1323–1340.

[4] Ammenwerth, E., Iller, C. & Mahler, C. (2006). IT-adoption and the interaction of task, technology and individuals: a fit framework and a case study. *BMC Medical Informatics and Decision Making*, 6 (3), 1-13.

[5] Amrullah, H. Pratikto, H. & Churiyah, M. (2021). Implementation of e-learning viewing from teacher readiness and learning evaluation during the COVID-19 pandemic era (Study on high school economics teacher in Malang city). *Journal of Education and Social Sciences, 17* (1), 115-122.

[6] Artino, A. R., Jr., & McCoach, D. B. (2008). Development and initial validation of the online learning value and self-efficacy scale. *Journal of Educational Computing Research*, 38(3), 279–303.

[7] Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review,* 84, 191-215.

[8]   Bandura, A. (1986). Social Foundations of Thought and Action: A Social Cognitive Theory. Englewood Cliffs, NJ: Prentice Hall.

[9]   Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.

[10]   Bruning, R., & Horn, C. (2000). Developing motivation to write. *Educational Psychologist*, 35, 25–37.

[11]   Changchun, G., Haider, M.J., & Akram, T. (2017). Investigation of the effects of task technology fit, attitude and trust on intention to adopt mobile banking: Placing the mediating role of trialability. *International Business Research*, 10(4), 77-91.

[12]   Corry, M., & Stella, J. (2018). Teacher self-efficacy in online education: a review of the literature. *Research in Learning Technology*, 26, 1-12.

[13]   D'Ambra, J., Wilson, C. & Akter, S. (2013). Application of the task-technology fit model to structure and evaluate the adoption of E-books by academics. Journal of the American *Society for Information Science and Technology,* 64 (1), 48-64.

[14]   Jalilvand, M. R., & Samiei, N. (2012). The effect of electronic word of mouth on brand image and purchase intention: An empirical study in the automobile industry in Iran. *Marketing Intelligence & Planning*, 30(4), 460-476.

[15]   Ergul, H. (2004). Relationship between student characteristics and academic achievement in distance education and application on students of Anadolu University. *Turkish Online Journal of Distance Education*, 5(2) 81-90.

[16]   Goodhue, D.L. (1988). IS attitudes: toward theoretical and definition clarity. *DataBase*, 19(3/4), 6-15.

[17]   Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS Quarterly*, 19(2), 213–236.

[18]   Nunnally, J. C. (1978). Psychometric theory (2nd ed.). New York: McGraw-Hill.

[19]   Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate data analysis: A global perspective. New Jersey: Pearson Education International.

[20]   Hair, J.F., Risher, J.J., Sarstedt, M. & Ringle, C.M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review,* 31(1), 2-24.

[21]   Kline, R. B. (2016). Principles and practice of structural equation modeling (4th ed.). New York, NY The Guilford Press.

[22]   Kundu, A. (2020). Toward a framework for strengthening participants' self-efficacy in online education. *Asian Association of Open Universities Journal*, 15 (3), 351-370.

[23]   Kustono, A.S. (2021). Improving Actual E-Learning Usage: Evidence from Indonesia. *Journal of Hunan University Natural Sciences*, 48(1), 1-11.

[24]   Ma, C-M., Chao, C-M., & Cheng, B-W. (2013). Integrating technology acceptance model and task-technology fit into blended e-learning system. *Journal of Applied Sciences*, 13, 736-742.

[25]   McGhee, R. H. (2010). Asynchronous interaction, online technologies self-efficacy and self regulated learning as predictors of academic achievement in an online class. (Accession No. 3453755) [Doctoral dissertation, Southern University and Agricultural and Mechanical College]. ProQuest Dissertations and Theses Global.

[26]   McGill, T.J. & Klobas, J.E. (2009). A task–technology fit view of learning management system impact. *Computers & Education*, 522, 496-508.

[27]   Narman, P., Holm, H., Hook, D., Honeth, N. & Johnson, P. (2012). Using enterprise architecture and technology adoption models to predict application usage. *Journal of Systems and Software*, 85, 1953-1967.

[28]   Pituch, K.A. & Lee, Y-K. (2006). The influence of system characteristics on e-learning use. *Computer and Education*, 47(2), 222–244.

[29] Saputra,R., Isnaini, N., Adhy, S., Bahtiar, N., Abidin, Z. & Suharto, E. (2020). Factors influencing student's adoption of e-learning in Indonesian secondary schools. *4th International Conference on Informatics and Computational Sciences (ICICoS)*, 1- 6.

[30] Sekaran, U. & Bougie, R. (2016). Research methods for business: A skill-building approach. (7th ed.). Wiley & Sons.

[31] Shen, D., Cho, M.-H., Tsai, C.-L., & Marra, R. (2013). Unpacking online learning experiences: Online learning self-efficacy and learning satisfaction. *The Internet and Higher Education*, 19, 10 –17.

[32] Speedtest Global Index (2022). Retrieved from: https://www.speedtest.net/global-index/indonesia#fixed

[33] Sun, A. and Chen, X. (2016). Online education and its effective practice: a research review. *Journal of Information Technology Education: Research*, 15, 157-190.

[34] Tan, S.Z., Hassim, N., Jayasainan, S.Y., & Gan, P.C.K. (2018). Effects of task-technology fit and learning styles on continuance intention to use e-learning app. *European Conference on e-Learning*, 539-546.

[35] The Jakarta Post (May 21, 2020). Transforming Indonesia's education through online learning. Retrieved from: https://www.thejakartapost.com/academia/2020/05/21/transforming-indonesias-education-through-online-learning.html

[36] University World News (May 14, 2020). Mixed response but online classes to stay post COVID-19. Retrieved from: https://www.universityworldnews.com/post.php?story=20200514121749886

[37] Yudiatmaja, W.E., Yoserizal, Y., Edison, Kristanti, D., Tovalini, K. , Samnuzulsari, T. & Malek, J.A. (2022). Adoption of Online Learning in Indonesian Higher Education during the COVID19 Pandemic. *Journal of Behavioural Science*, 17, 73-89.

[38] Zhang, T., & Li, F. (2021). The influence of online learning self-efficacy on learning engagement among middle school students: The mediating role of learning motivation. *16th International Conference on Computer Science & Education (ICCSE)*, 2021, 61-65.

[39] Zimmerman, W., & Kulikowich, J.M. (2016). Online learning self-efficacy in students with and without online learning experience. *American Journal of Distance Education*, 30(3), 180-191.