

Digital Literacy and Growth Mindset To Predict Technology Acceptance During Learning Processes

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Abstract

The Covid-19 pandemic has impacted the urgency of using digital learning technology. Literature studies showed teachers needed Digital Literacy and Growth Mindset to accept the new technology. This study examined the contribution of Digital Literacy and Growth Mindset in predicting the usage of Learning Management Systems (LMS). Respondents of this study were 60 lecturers in one university, where the LMS has been developed to be used in their learning and teaching processes. They have consented to become subjects of the study. Data were collected using a questionnaire and analyzed by multiple regression. Results of this study indicated that Digital Literacy and Growth Mindset simultaneously had a significant small contribution to the practical usage of LMS ($R^2=0.419$, $F(2, 57) = 20.545$, $p<0.05$). This research also showed that Digital Literacy had contributed more than the Growth Mindset ($\beta=0.406 > \beta=0.295$). In facing the digital learning transformation during the pandemic, collaboration is needed from all essential parties in the education sector, such as lecturers, universities, and students, to support the development of a better digital learning ecosystem. It is suggested to upscale the study to generate the hypothesis that Digital Literacy is a critical aspect to study in this digital learning technology acceleration era.

Keywords: Digital Literacy, Growth Mindset, Learning Management System

INTRODUCTION

The Covid-19 pandemic has made significant disruptions in educational processes. The policy to restrict people's mobility has affected regulations for studying at home (Kemdikbud, 2020). This massive abrupt change happened when the current national curriculum, "Merdeka Belajar, Kampus Merdeka" (MBKM), was still newly applied. Therefore, these changes created some challenges for people who work in educational settings.

Teachers and students could use Learning Management System (LMS) as one of the tools for studying at home. Additionally, many other tools could be utilized, such as a platform to organize teleconferences and various uses of communication media (Aji et al., 2020). LMS was software to automatize learning activities, from managing the

distribution of the materials and recording the learners' data to facilitating the compilation of the learning tasks (Hall & Khan, 2003).

The sudden change required educators to learn a system they had not mastered quickly. They had to be skilful in using the technology to manage the learning processes at home. The problem was that not so many educators have the same digital literacy, that not all of them could adapt to the advanced technology in online learning processes (Hamdani et al., 2020).

In order to gain a better understanding of the learning situation, we can refer to the Technology Acceptance Model (TAM) coined by Davis in 1986. This model has been developed over many years by experts in various fields of study and produced more comprehensive models such as the Unified Theory of

Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), and Multi-Level Framework of Technology Acceptance and Use (MFTAU) (Venkatesh et al., 2012) as the recent model. The TAM could be modified and expanded into different types of technology used (Granić & Marangunić, 2019). The examples were e-commerce, online banking, e-learning, augmented reality, e-government, and other similar things (Al-Emran & Granić, 2021). Specifically in the educational context, a systematic review by Rosli et al. (2022) revealed LMS as the most popular technology that TAM analyzed.

According to this model, at least two things affect someone to adopt new technology such as a) perceived ease of use – the degree to which using a particular technology is effortless, and b) perceived usefulness – the degree to which using a particular technology enhances their job performance or facilitates achieving their goals (Davis, 1986; Venkatesh et al., 2003). The question then is, what factors affect the educator that can easily accept the use of the new technology in the learning processes?

Various studies found that at least two things were affecting the acceptance of new technology, which are digital literacy (Gie & Chung, 2019; Kanthawongs et al., 2016) and the openness of someone's Growth Mindset (Tang et al., 2021; Paula et al., 2020). In the education sector, *digital literacy* refers to the skills required for developing self-learning abilities when information and communication are presented in digital formats (Littlejohn & Foss, 2014), while a *growth mindset* refers to a belief that an individual's abilities and mental qualities can be improved through diligent effort and hard work (Dweck, 2017).

A different question to consider is which of the two factors has a more significant role in the educators' acceptance of the use of technology in the learning processes? According to the previous study, the researcher had not found a study that simultaneously directly regresses digital literacy and growth mindset in the TAM. These were the primary reasons for conducting the study and its motives.

The purpose of the study was to 1) find the contributions of digital literacy and growth mindset simultaneously in the acceptance of new technology in the specific learning processes to the use of LMS and 2) find which factor has a more significant contribution to the acceptance of the new technology.

METHODS

Participants of this study had criteria such as being a lecturer with a minimum education of Masters (S2); they were using an LMS in the learning and teaching processes during the pandemic. The participants of this study were 60 lecturers who worked at one university. The lecturers at this university were obligated to use a specific LMS in their learning and teaching processes. This regulation aligned with the required criteria for participants in this research. They were willing to be part of this study by accepting and signing the informed consent provided by the first author.

This study used three measuring instruments: The Technology Acceptance Scale, The Digital Literacy Scale, and The Growth Mindset Scale. The Technology Acceptance Scale in this study was a translation of Davis's (1986) Technology Acceptance Model (TAM) instrument that had been used by Saputra's (2019) research. The measurement items loaded significantly onto their respective constructs with loadings ranging between 0.584 and 0.876 with Cronbach's Alpha coefficient of 0.853. The Digital Literacy Scale was an adaptation of a questionnaire from a measuring instrument compiled by Stefany & Nurbani (2017) consisting of 25 items with a validity range between 0.302-0.358 and Cronbach's Alpha coefficient of 0.658. The Growth Mindset Scale in this study adopted a questionnaire from research conducted by (Setiawan, 2020) consisting of 10 items with a validity range between 0.422 – 0.847 and Cronbach's Alpha coefficient of 0,858. Those scales were Likert-type with four alternative answers.

All measures were emailed to all lecturers in the university, and they were asked to use Google Forms to answer all questions in the form. They had

consented to become study subjects by signing the digital informed consent form that was sent simultaneously with the questionnaire. Two hundred fifty-three emails were sent, and only 64 lecturers were willing to complete the questionnaires. Four of the 64 respondents needed to meet the inclusion criteria. Two were only educational staff, and the others did not use LMS. Although the total number of eligible respondents was only 60, it reached the 25.9% response rate required in statistical analysis for this study. There were 45% males and 55% females. Almost all of them were from medical and health faculty members. Almost all of them graduated from the magister science program.

All measures had homogeneity of items. The coefficient of item-total correlations was more than 0.3. The reliability of all measures was more than 0.9, except for the Growth mindset ($\alpha = 0.773$).

Table 1. *Data Description*

Variable	Category	<i>n</i>	Percentage (%)
Technology Acceptance	Low	6	10.0
	Medium	41	68.3
	High	13	21.7
Digital Literacy	Low	10	16.7
	Medium	40	66.7
	High	10	16.7
<i>Growth Mindset</i>	Low	3	5.0
	Medium	45	75.0
	High	12	20.0

The results of multiple linear regression analysis showed that Digital Literacy and Growth Mindset simultaneously had a significant contribution of 41.9% to Technology Acceptance ($R^2=0.419$, $F(2, 57)=20,545$, $p<0.05$). The regression (*R*) between Digital Literacy and Growth Mindset towards Technology Acceptance was 0.647. This showed a significant correlation and the higher a person's Digital Literacy and Growth Mindset, the easier it is to accept new technology. Table 2 also shows the coefficient of determination (R^2) of 0.419. It means

Multiple regression analysis was used to draw inferences from the data obtained in this study. This statistical analysis was chosen to see the contributions of every variable simultaneously. From this analysis, the more significant contribution to the acceptance of educators toward the use of the new technology will be found.

RESULTS

Researchers carried out a categorization process on each result of the total score of each variable into three categories, namely High, Medium, and Low, based on the Mean and Standard Deviation values with the formula High ($M+1SD < X$), Medium ($M-1SD < X < M+1SD$), and Low ($X < M-1SD$) (Azwar, 2013). Table 1 shows the details of the frequency of categorization of the three variables.

Digital Literacy and Growth Mindset contribute to a person's Technology Acceptance by 41.9%, while other factors were 58.1%.

Based on the multiple regression analysis, there were significant contributions of Digital Literacy ($\beta=0.406$, $t=2.892$, $p<0.05$) and Growth Mindset ($\beta=0.295$, $t=2.104$, $p<0.05$) on Technology Acceptance. Table 2 also showed that Digital Literacy contributes more significantly to Technology Acceptance than a Growth Mindset ($\beta=0.406 > =0.295$).

Table 2. Multiple Linear Regression

Model	<i>R</i>	<i>R</i> ²			
1	0.64	0.41			
Variable	F-value	p-value	Significance		
Digital Literacy (<i>X</i> ₁)	20.545	.00	.05		
Growth Mindset (<i>X</i> ₂)					
Dependent Variable (<i>Y</i>)	Technology Acceptance				
Model	B	SEB	β	<i>t</i> -value	p-value
<i>Constant</i>	1.724	7.693		0.224	0.82
Digital Literacy (<i>X</i> ₁)	0.33	0.11	0.40	2.892	p<0.05
Growth Mindset (<i>X</i> ₂)	0.65	0.31	0.29	2.104	p<0.05

DISCUSSION

The results of this study found that Digital Literacy and Growth Mindset simultaneously had significant contributions to the Technology Acceptance of the lecturers in the sample site ($R^2=0.419$, $F(2, 57)=20.545$, $p<0.05$). This finding showed that willingness to develop themselves using digital systems in education and a potency mindset that someone could develop his/herself to use the LMS in their teaching and learning processes was significant. It means that, in this disruptive era, educators require both variables to embrace new technology. Digital literacy is needed to learn something new, explicitly growing fast technology (Starcevic, 2018). A growth mindset was also needed to learn the fast-growing technology (Faulkner & Latham, 2016).

This study also found that Digital Literacy significantly contributed to Technology Acceptance ($\beta=0.406$, $t=2.892$, $p<0.05$). This finding showed that a lecturer with higher digital literacy was likelier to adopt LMS in the learning process. Digital Literacy would help individuals to have the ability to use technology (Kanthawongs et al., 2016). This finding was also in line with Gie & Chung (2019).

This study also found that Growth Mindset significantly contributed to Technology Acceptance

($\beta=0.295$, $t=2.104$, $p<0.05$). It means that a lecturer has to have a Growth Mindset that s/he may use many different efforts to accept the use of LMS in the learning process easier. The learner sometimes experiences trial and error in using the new technology, and Growth Mindset has a significant role in overcoming this situation (Dweck, 2017). Similar findings from Tang et al. (2021) in China revealed that the lecturer with a higher Growth Mindset was highly confident in his ability to adopt the new technology.

These findings also suggested that Digital Literacy significantly contributes to Growth Mindset ($\beta=0.406 > \beta=0.295$). Kanthawongs et al. (2016) argued that technical skills in using technology had more power in accepting technology. There was a significant correlation that Digital Literacy with operation skills was needed as Gie & Chung (2019) mentioned that mastering Digital Literacy made someone operate technological wares.

In addition to the main findings, in the qualitative tabulation of the respondents' comments related to the usage of LMS, it was suggested to improve and add the features, user-friendly application, and integrated system up to the supported technical assistance. It was suggested that LMS had to be improved as needed.

The Total sample of this study was limited to only 25.3 % of the supposed to become respondents of this study. Even though we sent many times to the candidates of this study, the response rate remained low. If we approached face to face, which was impossible during the pandemic, the total number of respondents might become more considerable.

CONCLUSIONS

This study indicates at least two essential factors needed by lecturers, namely Digital Literacy and Growth Mindset because they significantly contribute to the acceptance of lecturers to technology in learning.

These two factors do have a significant contribution to technology acceptance. However, the results of this study indicate that Digital Literacy has a more significant contribution to technology acceptance. This result means that increasing Digital Literacy for lecturers is essential to make the transition process of technology-based learning systems easier for them.

However, these two things are not enough because technology in learning must also be supported systemically and technically so that the technology used can meet the convenience and usefulness of its users. Therefore, in facing the disruption during the pandemic, cooperation from essential parties in education, starting from lecturers, universities, and students, is needed to support the development of a digital learning ecosystem used in the learning process.

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