

## **The Effect of Digital Literacy and Writing Skills on The Skills of Developing Teaching Materials for Prospective Teacher Students**

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**Abstract:** Instructional materials are an essential component of the learning process. The use of instructional materials can be tailored to students; requirements and characteristics. Prospective instructors must take courses on the development of teaching materials in order to acquire the skills necessary to create instructional materials. To have the skills to develop teaching materials, other skills are needed to support this, including digital literacy and writing skills for prospective teacher students. The purpose of this study was to determine the effect of digital literacy and writing skills on the skills of developing teaching materials for prospective teacher students. This study uses quantitative research methods using causal associative research, namely research that seeks the influence of one variable (independent) with other variables (dependent). The population of this study were 210 students of the Indonesian Language and Literature Education Study Program at UNP BP 2020. The sample selection technique uses purposive sampling. The number of samples obtained were 35 students. The research instrument is in the form of teaching material products, performance tests. Assessment is carried out with the help of an assessment rubric. The data analysis method uses SPSS with the Multiple Regression analysis method. The results of the study show that digital literacy and writing skills have a significant effect on the skills of developing teaching materials for prospective teacher students both collectively and individually.

**Keywords:** Digital Literacy, Prospective Teacher Student, Teaching Material, Writing Skill

### **A. Introduction**

Important to the consistency of the learning process are instructional materials. It is designed to foster an atmosphere conducive to student learning (Sarip, Rafli, and Rahmat, 2018; Djamdjuri, Suseno, Tajuddin, Lusthantie, and Chaeruman, 2021). (Nugraheni & Marsigit, 2021) The term "teaching materials" refers to knowledge and data presented in a range of mediums and formats to help students achieve the intended learning outcomes. As a bridge between the intended and actual curriculum, language teaching materials make use of text in all of its forms, including paper, audio, and video as well as predetermined language learning assignments (Dockx, et al., 2020; Khany & Kamalvand, 2022). Student assignments in

teaching materials aim to broaden students' understanding of the theories or concepts they have learned (Singer, 2008; Sariyatun, et al., 2021). In addition, it must stimulate and motivate students to learn, be simple to learn, meaningful to students, instill confidence in students, and be written in a language style that corresponds to the nature, objectives, and characteristics of students (Noor & Purnamasari, 2019).

Teaching materials are fundamental and indispensable tools for teaching and learning, or significant tools for instructors to facilitate productive learning that can enhance student achievement (Olayika, 2016). Teaching materials have main functions including providing resources for teaching, producing linguistic, textual, and generic structures of the target language, providing authentic content, giving students the talent to communicate, developing cultural awareness, contributing to judgmental considerations, setting up a sufficient level of practice, task, or practice for the internalization of the instructions received (Khany & Kamalvand, 2022). It is essential to understand this because teaching materials serve as the primary reference and guide in the teaching and learning process (Wulandari & Purwanto, 2017). Accurate material implications may support educational goals (Bykova, et al., 2019).

Teachers have a duty to respond to the various expectations of generation Z (digital generation) by facilitating the use of innovative teaching technologies in the classroom (Somyürek, 2014; Simşek & Yazici, 2021). The selection of teaching materials that are inappropriate for certain contexts leads to a lack of comprehension of these topics, so the outcomes may not be satisfactory (Mokmin & Ridzuan, 2022). The growing number of teaching materials has provided instructors with more options when selecting their teaching materials. However, in many instances, teachers select textbooks without much regard for the accompanying learning materials (Rahmawati, et al., 2010). There are still a significant number of educators who use prefabricated conventional instructional materials (Mokmin & Ridzuan, 2022). This type of instructional materials is readily available, and educators frequently rely on them without attempting to design their own (Ramadhan, et al., 2018; Ramadhan, et al., 2019; Ramadhan, et al., 2020).

Improving the standard of teaching materials used in teaching activities is one way to enhance the quality of education (Situmorang, 2013). (Silaban, et al., 2018) In order to make the subject matter easier to grasp, encourage students to study Indonesian in depth, and improve student accomplishment, teaching materials must be created in a more interesting way. Among other things, effective teaching and learning materials and media must take into account the differences between students; exercises in textbooks must be applicable; covers and pictures must be appealing and colourful; topics covered in textbooks must be relevant to students' interests; and there must be no difficult words or information (Arsyad, 2018). In addition, providing material that is tailored to the level of cognitive development of students can aid in the formation of thought and knowledge (Khoiruzzadi & Prasetya, 2021; Rahadini, et al., 2021).

To design digital learning materials, an educator must be imaginative and creative (Kier & Khalil, 2018). Print and digital instructional resources both provide

practice questions and explanations of the material based on competency criteria and indicators (Pearls & Emilia, 2022). Digital teaching materials can be defined as learning materials that are digitized and interconnected (Sariyatun, et al., 2021). These teaching materials are organized in an electronic format that articulates the scope and sequence of curricular content (Tossavainen, et al., 2020). It aids students in gaining a deeper comprehension of the subject due to its ability to collect data more rapidly (Zwart, et al., 2017). With the ability to capture data, digital teaching materials can offer time and cost savings as well as unlimited access (Russo, 2019; Cheon, et al., 2012).

Understanding the design and implementation processes of these resources is just as crucial as using technology and other materials in the classroom. Improving the technology infrastructure alone is insufficient because instructors are responsible for using instructional technology and digital learning resources (Simşek & Yazici, 2021). Teachers are essential to the integration of educational concepts and technology (Inan & Lowther, 2010). The blending of educational concepts with technology requires teachers. As a result, teachers need to be knowledgeable about educational technology, especially as it relates to the creation of digital teaching resources. (Simşek & Yazici, 2021).

In popular discourse and academic scientific literature, digital literacy is synonymous with digital skills, digital fluency, digital capabilities, digital competence, digital intelligence, etc. (Iskandar, et al., 2022). Providing instructors with high-quality curriculum materials aligned with digital literacy standards is a way to ensure that all students receive an equitable education. According to Pratolo and Solikhati (2021), digital literacy abilities are not only considered 21st century skills but also learning and living skills. As a result, teachers must foster these skills in order for students to consume and generate in a digital society (Erwin & Mohammed, 2022). Teachers who have assimilated lifelong learning in the digital age must be able to make appropriate use of information and technology and organize educational programs to increase students; digital literacy awareness (Demir, et al., 2022).

Digital literacy is more than just the knowledge, skills and abilities needed to use information technology and the internet (Gökdaş & Çam, 2022). Digital literacy has a broad definition that incorporates the technical, cognitive, and social attitudes of online and offline learning with digital technology (Ng, 2012). In recent years, events that demand increased technological competence, critical and ethical reasoning, and a sense of digital citizenship have heightened the need for digital literacy (Tham, et al., 2021). The idea of digital competence places an emphasis on both technological know-how and cognitive and behavioural personality traits (Ramboousek, et al., 2016). Digital literacy is essential for both children and adults as a survival skill for the 21st century because technological advancements and digitalization cannot be avoided in the present and future eras, necessitating adaptable human resources (HR) (Ahsan, et al., 2022; Atmojo, et al., 2022).

All disciplines must participate in the digital transformation process, which involves integrating the process with the vision and goal of the university, in order

for institutions to be successful in the digital transformation and for students to be digitally literate (Ozcan, 2022). Students in tertiary institutions, including those that educate future instructors, must have digital literacy skills so that they can grow professionally and prepare their students to be digitally literate (Rahmi, et al., 2022). In this regard, it is recommended that educators improve their skills according to standards, especially those related to digital literacy (Spante, et al., 2018; Atmazaki & Indriyani, 2019; Syahrul, et al., 2019). As someone who guides and introduces students to competency development, teachers must acquire competence as a guiding instrument (Tican & Deniz, 2019). Because the availability of learning resources affects students; participation in the learning process, receipt of learning resources, annotation of learning resources, and identification of reliable and accessible learning resources, educators can support students; learning through the use of digital literacy (Atmojo, et al., 2022).

In addition to digital literacy which is one aspect of developing teaching materials, as a language teacher, it is necessary to have writing skills. This is related to teaching materials designed by teachers need to be adapted to the needs, situations and characteristics of students. According to specialists, activities designed to develop the ability to compose informative texts should incorporate appropriate instructional materials. These resources consist of magazines, newspapers, periodicals, web tools, sample texts, and textbooks (Yesul & Anshu, 2022). The utilization of materials in educational and training environments will spur students to learn more by increasing their interest in the subjects being covered in class (Şaşmaz & Çifci, 2023). In addition, learning Indonesian is text-based, so teachers need to write these texts as a way to design the expected teaching materials (Atmazaki, et al., 2020).

Writing and thinking are two things that are recursively related and influence each other (Etemadzadeh, et al., 2013; Nejmaoui, 2019). By writing, one trains one's thinking skills because to convey messages that are easy to understand, clear, coherent, and neat, one must be able to transform abstract ideas in one's mind into concrete concepts that can be clarified explicitly (Sumarno, et al., 2022). Writing is a process that involves planning, interpreting, and reviewing in addition to literally communicating knowledge, thoughts, feelings, experiences, news, and imagination from the writer to the readers (Luo, et al., 2022). It is a means of self-expression; a better way could not be found. Moreover, it is an effective tool for those who wish to bring about real reforms in their society and country (Damanik, 2022). Writing has a big and effective role in adding to human information and making him an encyclopaedic person, especially if he is a person who is distinguished by his various interests (Al-Mikhlaifi, 2019).

Writing is the foundation of education and one of the most fundamental requirements across all disciplines. Additionally, it should be noted that writing is extremely essential in both personal and professional life, as it is in college and in the real world. Individuals who fail to cultivate these skills may have difficulty competing for jobs against more qualified applicants (Ismael, et al., 2021). Students; writing is one of the most essential indicators of their progress and learning at

university. In particular, language students must be proficient in writing. Writing is at the top of the hierarchy of learning skills and language abilities (Damanik, 2022). One of the implications of language students in writing skills is being able to write texts in various genres to be applied to the development of their teaching materials when they become teachers. One of the subjects in the Indonesian Language and Literature Education Study Program, FBS UNP, is the development of teaching materials. In this lecture, students create an independent project in the form of developing digital teaching materials for one text for each student. Based on that, the purpose of this study was to analyse the effect of digital literacy and students' writing skills on the skills of developing Indonesian digital teaching materials.

## **B. Methods**

This study uses quantitative research methods using causal associative research, namely research that seeks the influence of one variable (independent) with other variables (dependent). This study looks at the relationship between digital literacy and writing skills on the skills of developing Indonesian language teaching materials by prospective teacher students. The population of this study were students of the Indonesian Language and Literature Education Study Program at UNP class of 2020 with a total of 210 students. Based on that, it is necessary to do sampling. The sample selection technique uses purposive sampling by determining sampling by establishing certain characteristics. The number of samples obtained were 35 students. The research instrument is a test. Assessment is carried out with the help of an assessment rubric. The data analysis method uses SPSS with the Regression analysis method with the following order of analysis, namely Normality test, Linearity Test, Multicollinearity Test, Autocorrelation Test, Heteroscedasticity Test, Hypothesis Test (t test, F test, R<sup>2</sup>) (Purwanto, 2019). The research hypothesis is as follows.

- a. H<sub>0</sub>: There is no effect of digital literacy on the skills of developing Indonesian teaching materials by prospective teacher students.
- b. H<sub>a</sub>: There is an influence of digital literacy on the skills of developing Indonesian language teaching materials by student teacher candidates.
- c. H<sub>0</sub>: There is no effect of writing skills on the skills of developing Indonesian language teaching materials by prospective teacher students.
- d. H<sub>a</sub>: There is an influence of writing skills on the skills of developing Indonesian language teaching materials by student teacher candidates.
- e. H<sub>0</sub>: There is no joint effect between digital literacy and writing skills on the skills of developing Indonesian language teaching materials by prospective teacher students.
- f. H<sub>a</sub>: There is a joint influence between digital literacy and writing skills on the skills of developing Indonesian language teaching materials by prospective teacher students.

### C. Results and Discussion

First, test the normality of the data. This test aims to test whether the variables are normally distributed. The normality test in this study used the one-sample Kolmogorof-Smornov Test (K-S) statistical test. The variable is normally distributed if  $Asymp.sig (2-tailed) > 0.05$ . Based on the analysis using SPSS, the results of the Normality Test can be seen in the following table.

**Table 1. Data Normality Test**  
**One-Sample Kolmogorov-Smirnov Test**

		Development Learning Materials Skill	Literacy Digital	Writing Skill
N		35	35	35
Normal Parameters <sup>a,b</sup>	Mean	83.00	79.89	80.31
	Std. Deviation	5.714	5.738	4.776
Most Extreme Differences	Absolute	.180	.194	.212
	Positive	.163	.166	.212
	Negative	-.180	-.194	-.151
Kolmogorov-Smirnov Z		1.063	1.146	1.254
Asymp. Sig. (2-tailed)		.208	.145	.086
a. Test distribution is Normal.				
b. Calculated from data.				

As previously explained, from the results of the Normality Test data in the table, it can be concluded that the three variables are normally distributed with  $Asymp.sig (2-tailed) > 0.05$ .

Second, test the linearity of the data. This test aims to test whether a regression model has a linear form which aims to convince researchers that this model really meets the assumption of linearity. One way to do a linearity test is to use the Deviation from Linearity test. If the value is significant ( $p > 0.05$ ) then our model can be said to be linear (Widhiarso, 2010). Based on the analysis using SPSS, the results of the data linearity test can be seen in the following table.

**Table 2. Data Linearity Test**

ANOVA Table							
			Sum of Squares	df	Mean Square	F	Sig.
Development Learning Materials Skill *	Between Groups	(Combined)	898.571	5	179.714	24.650	.000
Literacy Digital		Linearity	887.870	1	887.870	121.782	.000
		Deviation from Linearity	10.701	4	2.675	.367	.830
	Within Groups		211.429	29	7.291		
	Total		1110.000	34			

The results of Deviation from Linearity have a significant value ( $p > 0.05$ ) which is 0.199 so it can be concluded that the variables in this study have a linear relationship.

Third, Multicollinearity Test. The purpose of this test is to detect whether there is a correlation between independent variables in a regression model. One of the methods used to detect multicollinearity in regression analysis is to look at the Variance Inflation Factor (VIF) value. A regression model if the VIF value produces numbers 1-10 then the regression model does not contain multicollinearity (Sujarweni, 2008). Based on the analysis using SPSS, the results of the Multicollinearity Test can be seen in the following table.

**Table 3. Multicollinearity Test**

		Coefficients <sup>a</sup>					Collinearity Statistics	
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Tolerance	VIF
		B	Std. Error	Beta				
1	(Constant)	-.176	6.644		-.027	.979		
	Literacy Digital Writing Skill	.622	.108	.624	5.748	.000	.401	2.495
		.417	.130	.349	3.210	.003	.401	2.495

a. Dependent Variable: Development Learning Materials Skill

Based on the VIF results that have been found, it can be concluded that the regression model is free from multicollinearity because the VIF value is  $< 10$ .

Fourth, Autocorrelation Test. The purpose of this test is to test whether there is a correlation between the interference error in period t (the year of observation) and the interference error at t-1 (the previous year). One method to test this is to use the Durbin Watson value (Sujarweni, 2008). SPSS analysis results for the Autocorrelation test can be seen in the following table.

**Table 4. Autocorelation Test**

Model Summary <sup>b</sup>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.921 <sup>a</sup>	.849	.839	2.291	1.805

a. Predictors: (Constant), Writing Skill, Literacy Digital  
 b. Dependent Variable: Development Learning Materials Skill

The criteria for determining autocorrelation are as follows.

$$du < d < 4-du$$

Information:

du = Durbin Watson

d = Durbin Watson value

From the Durbin Watson table for a sample of 35 is 1.5838. So based on the criteria previously mentioned, the results are as follows.

$$1.5838 < 1.805 < 2.4162$$

Based on these data, it can be concluded that the regression model in this study does not contain autocorrelation because it meets the criteria.

Fifth, the Heteroscedasticity Test is a test conducted to find out whether in one regression model there is a difference in variance from the residual one observation to another. One of the tests that can be done is the Glejser Test. The results of the Heteroscedasticity test are as follows.

**Table 5. Heteroscedasticity Test**

Model		Unstandardized Coefficients		Standardized Coefficient	t	Sig.
		B	Std. Error			
1	(Constant)	8.075	3.804		2.122	.042
	Literacy Digital	.170	.062	.657	2.737	.010
	Writing Skill	-.249	.074	-.803	-3.343	.002

Based on the results of the Glejser test, it shows that the independent variable is significant ( $p < 0.05$ ) in influencing the dependent variable, so it can be ascertained that the regression model contains heteroscedasticity problems.

Sixth, Test the Regression Equation. The general multiple linear regression equation is as follows:

Information:

Y = dependent variable (profitability)

A = Constant

b1, b2 = Regression Coefficients for independent variables 1 and 2

X1, X2 = Independent variables

The regression model equation in this study is as follows:

$$\text{Profitability} = 8.075 - 0.657X_1 - 0.803X_2 + e$$

- a. If the variables X1 and X2 do not exist or are equal to zero, the ability to create instructional materials will improve by 8.075% or 807.5%.
- b. If X1 (digital literacy) increases by 1%, the skills in developing instructional materials will increase by 65%, assuming all other variables remain constant.
- c. If X2 (skills for developing teaching materials) increases by 1%, the skills for developing teaching materials will increase by 80%, presuming that all other variables remain unchanged.

Seventh, Hypothesis Testing.

Partial Test (t test)

Hypothesis formulation

- a. H0 = There is no influence between the independent variable (X) on the dependent variable (Y)
- b. Ha = There is an influence between the independent variable (X) on the dependent variable (Y)

Decision making by looking at the p-value on the t test with the following conditions:

If the P-Value  $> 0.05$  then H0 is accepted

If the P-Value  $< 0.05$  then H0 is rejected

From the results of the analysis obtained the following results:

**Table 6. T Test**

Model		Unstandardized Coefficients		Standardized Coefficient	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.176	6.644		-.027	.979
	Literacy Digital Writing Skill	.622	.108	.624	5.748	.000
		.417	.130	.349	3.210	.003

Based on the test results, it is known that the digital literacy variable has a significance level of 0.000 ( $p < 0.05$ ), so  $H_0$  is rejected in favour of  $H_a$ . This indicates that digital literacy has a substantial impact on the skills required to develop student instruction materials.

Based on the test results, it is known that the writing skills variable has a significance level of 0.003 ( $p < 0.05$ ), so  $H_0$  is rejected in favour of  $H_a$ . This indicates that writing skills have a significant impact on students; abilities to develop instructional materials.

Simultaneous Testing (Test F)

Hypothesis Formulation

- $H_0$  = There is no joint effect between digital literacy and writing skills on the skills of developing students; teaching materials.
- $H_a$  = There is a mutual influence between digital literacy and writing skills on the skills of developing students; teaching materials.

Decision making by looking at the p-value on the F test with the following conditions:

If the P-Value  $> 0.05$  then  $H_0$  is accepted

If the P-Value  $< 0.05$  then  $H_0$  is rejected

Based on the test results obtained the following results.

**Table 7. F Test**

ANOVA <sup>b</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	941.974	2	470.987	89.698	.000 <sup>a</sup>
	Residual	168.026	32	5.251		
	Total	1110.000	34			

a. Predictors: (Constant), Writing Skill, Literacy Digital

b. Dependent Variable: Development Learning Materials Skill

From the results above, it can be seen that the sig. of 0.000 ( $p < 0.05$ ), so the decision is to reject  $H_0$  and accept  $H_a$ . The conclusion from the results of this analysis is that there is a joint influence between digital literacy and writing skills on the skills of developing students; teaching materials.

#### Coefficient of Determination ( $R^2$ )

The coefficient of determination ( $R^2$ ) shows the strength of the functional relationship between the independent variables, namely digital literacy and writing skills, with the dependent variable, namely skills in developing student teaching materials. The magnitude of the correlation coefficient ranges from +1 to -1. The following table shows the value of the coefficient of determination in this study.

**Table 8.  $R^2$**

<b>Model Summary<sup>b</sup></b>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.921 <sup>a</sup>	.849	.839	2.291	1.805

a. Predictors: (Constant), Writing Skill, Literacy Digital  
 b. Dependent Variable: Development Learning Materials Skill

Based on the results of the analysis it is known that the value of the coefficient of determination is 0.849 or 85%, while the remaining 15% is influenced by other variables outside the variables.

Industrial Revolution 4.0 and the 21st century (Warsita, 2018), a teacher must be able to incorporate technology into the learning process in order to make it more engaging for students (Susanto, et al., 2021). Sariyatun, et al., (2018) highlight practical reasons for teachers to utilize digital learning materials, such as the teacher's presumption that digital learning materials are more engaging, simpler to comprehend, and less expensive for students. According to Simşek & Yazici (2021), when teachers have the abilities to use and create the digital teaching resources needed by generation Z education and to serve students; viewpoints, students; interests and wishes rise. Moreover, Turel and Sanal (2018) found these teachers had greater success in terms of fostering lifelong learning and achieving instructional goals. Based on this, digital teaching materials are an essential component of the current learning process that instructors can utilize.

The results of the study indicate that digital literacy influences the creation of instructional materials for future teachers. In order for teachers to utilize digital instructional materials, they must have a high level of digital literacy. Based on this, digital literacy is one of the skills that teachers must possess to support their pedagogical and professional competencies (Atmojo, et al., 2021). In accordance with Erwin & Mohammed (2022) digital literacy skills are important and can be adopted globally as the foundation for constructing an educational community, it is possible

to identify consistent educational resources to meet the needs of students and instructors. The educational resources include digital instructional materials.

In addition, the results of the study indicate that writing skills impact the creation of instructional materials for student teachers-in-training. This is in accordance with the assertion of Nugraheni & Marsigit (2021) that the components of teaching materials should include materials required by students and can be utilized by educators to assist students in acquiring knowledge through learning activities. This material provides discourse, text, images, and illustrations in accordance with the required competencies and is useful for satisfying students' curiosity (Wardani, 2018; Rahmat, et al., 2020). In addition, Rahmawati, et al. (2021) according to the statement, the textbook contains explanations of concepts, definitions, principles, procedures, examples, and exercises so that students can comprehend concepts, identify concepts, explain the characteristics of concepts or ideas, define concepts, develop formulas/rules, build new knowledge, and apply new knowledge in accordance with the Core Competencies and Basic. Therefore, to provide discourse and text in learning materials contained in teaching materials requires teacher writing skills. This is also related to Indonesian language teaching materials which provide many examples of texts, in addition to explaining concepts.

#### **D. Conclusion**

On the basis of the research and discussion, it was determined that digital literacy and students' writing abilities have a significant impact on their ability to develop instructional materials. In line with that, individually, digital literacy and student writing skills have a significant influence on the skills of developing teaching materials for students. Based on these conclusions, a prospective teacher needs to have digital literacy skills and writing skills in order to develop good teaching materials. It is also related to these skills that can support the learning process when prospective teacher students carry out assistance programs or become teachers later after completing lectures.

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