

## **LEARNING RESOURCES DIGITALIZATION FOR ELEMENTARY SCHOOL STUDENTS**

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### **ABSTRACT**

This study aims to determine the effect of using gadgets and the parental consent to the digitalization of learning resources for elementary school students. The research method uses the associative quantitative approach which aims to determine the relationship between two or more variables. The research sample was 10478 respondents from superior accredited elementary schools in Jakarta, Bogor, Depok, Tangerang and Bekasi. The research was conducted from October to November 2022. The data are collected by the means of questionnaires, and analyzed with covariance-based Structure Equation Modeling (CB-SEM). Model evaluation is carried out through two stages of testing, namely testing the measurement model with Confirmatory Factor Analysis (CFA) and testing the overall fit of the model with Absolute Fit Indices, Incremental Fit Indices, and Parsimonious Fit Indices. Absolute Fit Indices are GFI and RMSEA. Incremental Fit Indices are AGFI, TLI, NFI, CFI, IFI, and RFI. Parsimonious Fit Indices are PNFI, PCFI, and PGFI. Both tests produce acceptable values when compared to reference values. Thus the overall SEM model fits the sample data. Testing the structural model shows that the use of gadgets has a direct effect, while the parental consent has an indirect effect through the use of gadgets on the digitalization of learning resources for elementary school students.

***Keywords : digitalization, learning resources, the parental consent***

### **INTRODUCTION**

Many elementary schools have a long duration of study time, almost all day long, in school. One of the consideration is huge willing to produce high quality of graduates then schools add some subjects as special school content to provide added value which results in increasing the duration of study at school. In terms of curriculum, this is indeed made possible by both the 2013 Curriculum and the Independent Curriculum (Kemendikbudristek, 2022) (Kemendikbudristek, n.d.). As a result of the addition of some subjects, students bring more books to school. A preliminary study conducted at elementary schools with superior accreditation in the greater Jakarta area found that parents stated that their children's school bags were heavy because the number of subjects per day was large and on average each subject required at least 3 books. Based on research conducted at SMP MA 2 Samarinda by Mahdatul Heavy, backpacks can cause complaints of lower back, shoulder and neck pain Lisa (MAHDATUL LISA, 2018).The physical development of students can be disrupted by carrying too much weight. Schools need to find a way so that the heavy burden of school bags does not interfere with the physical growth of students.

The problems above seem to have been resolved with the Covid-19 pandemic, where many learning resources use digital forms because learning is carried out remotely and

learning communication media mostly use conference media such as zoom, teams, google meet (Riasat & Farooq, 2022). The use of printed books decreased as learning resources are found to be transferred in digital form to facilitate distribution and efficiency. The positive impact of the Covid-19 pandemic has been felt by the world of education including both teachers and students at all levels of education who are increasingly skilled at using digital technology through applications on gadgets.

Gadgets are used in various activities such as learning, assessment, gamification, and storing learning resources in the form of e-books. In addition, gadgets are also used as learning media to make learning more interesting. Learning becomes more active, effective and fun and teachers and students know the application of information technology with the demands of an increasingly sophisticated era (Fitriansyah, n.d.). With more interesting methods of learning, students' learning motivation is expected to increase. Research conducted at the upper education level shows that gadgets are used as learning infrastructure on a more massive basis, but not for social media. Instructors continue to try new ways to optimize the use of gadgets in learning, and to increase the learning motivation (Wali & Omaid, 2020). However, at the lower education level, namely junior high, research has found no significant effect of gadgets on student learning motivation. Collaboration between school counseling teachers and parents is needed to increase students' awareness regarding the use of gadgets to increase learning motivation (Sudiyono & Pgri, 2021).

However, there are concerns about the negative impact on physical and mental health that children cannot be separated from gadgets and always want to use them continuously, causing disruption to eye health and social relations. The root cause of the emergence of negative impacts to children is their lack of self control. Therefore it is important that the parents introduce control mechanism for their children. It is recommended that families set time limits for children to use gadgets at home (Ariston & Frahasini, 2018).

Especially at the basic education level, other problems emerge. The students are felt to be too young to bring gadgets to school. Therefore the use of learning resources in the form of e-books and utilizing gadgets requires positive support by the parents. In addition using digital learning resources could help to solve the problem that the number of books that children currently carry to school is too heavy.

With the problems above, we want to know the effect of using gadgets and parental consent in using gadgets on digitalizing learning resources. This research wants to know the effect of using gadgets and the parental consent in using gadgets on digitalizing learning resources for elementary school students.

## **THEORITICAL FRAMEWORKS**

### **Instrument Development**

This research comes from the problems that occur in the school through a preliminary study conducted. Therefore, the research instrument was developed by the steps below:

1. Formulate the variables to be measured which are built from understanding or concepts.
2. Develop the dimensions and variable indicators to be measured
3. Create an instrument grid containing dimensions, indicators, item numbers, number of items
4. Set the parameter to move from one pole to another or set the scale as an option. 5. Write the questions developed from the indicators
5. Performing theory validation, namely expert validation
6. Revise the instrument

7. Testing the instrument
8. Perform construct validation based on test results data
9. Calculating reliability
10. Filter valid and reliable question items to be used as measuring tools
12. Use the instrument to measure.

### **Learning Resources**

Some definitions of learning resources according to Hamalik in Priyadi (1998:24) are as follows:

- a. Everything that is used as a material/reference in increasing the knowledge and abilities of students,
- b. A system or material device that is deliberately created or prepared to facilitate student learning,
- c. Hardware functions as teaching aids and software as teaching materials (sasmita, 2020).

The definition of learning resources according to experts is everything that is used for learning, making learning behavior appear. Learning resources can be reading books in the form of printed books and e-books, information, environment, and all things that are used as sources of learning materials. Since the Covid-19 pandemic, there has been an acceleration in the types of learning resources that can be found in digital form, one of which is obtained through internet media (Sasmita, 2020). Internet as a medium to find information as a source of learning. The results of Sasmita's research, 2020 state that the internet has been widely recognized as a tool for finding information.

### **Gadgets**

Gadget is an electronic device that functions as a tool in activities in various fields. Its special function and benefits are relative according to its users. The functions and benefits of gadgets in general are

1. Communication. Gadgets make communication easy, fast, practical and efficient.
2. Social. The gadget serves as a social media for sharing news, news and stories so as to make friends and build relationships.
3. Education. Gadgets are used for learning, accessing knowledge (Puji Asmaul Chusna, 2017).

### **Structure Equation Modeling (SEM)**

Structural Equation Modeling (SEM) is a statistical method for measuring latent variables. SEM answers problems that cannot be solved by linear regression about the inability to explain indirect effects and path analysis which cannot explain latent variables. The advantage of SEM is being able to calculate errors while the weakness of SEM is not being able to solve complex systems and dynamic systems with many variables. SEM analysis involves the simultaneous evaluation of several variables and their relationships. Two techniques based on SEM are covariance-based SEM (CB-SEM) and partial least squares-based SEM (PLS-SEM). SEM analysis facilitates the discovery and confirmation of the relationship between several variables (Jonathan, 2010).

The stages of analysis in CB-SEM consist of 5 steps, namely model specification, model identification, model estimation, model evaluation, and model modification or respecification. Model specification is carried out based on the purpose of CB-SEM, namely confirming theories or testing theories, so that the direction of causality between observed

variables or latent constructs must be hypothesized clearly. Model identification is used to determine whether the empirical data collected has a unique value or not so that data can be estimated. There are 6 options for estimating the model in the AMOS program, namely Maximum Likelihood (ML), Generalized Least Square (GLS), Unweighted Least Squares (ULS), Scale-Free Least Squares (SFLS), and Asymptotically Distribution Free (ADF). Each model has its own requirements. ML for normally distributed data and the total data is between 200 – 400. GLS for normally distributed data and the total data is 300 – 400. If the data is not normally distributed then the number of samples is  $\geq 2500$ . ADF requires that the data does not have to be normally distributed and the total data is  $\geq 2500$ .

Model evaluation aims to evaluate the model as a whole which is done by assessing the results of the measurement through Confirmatory Factor Analysis (CFA) by testing the validity and reliability of latent constructs, followed by evaluating the structural model. CFA analysis by testing convergent validity based on the value of the loading factor. The higher the loading factor value, the more convergent the indicator is at one point. The criteria for a good loading factor are  $> 0.7$  but some use a limit of  $\geq 0.5$ .

Testing the overall fit of the model (overall fit model or goodness of fit model) there are 3 types of fit measures, namely absolute fit indices, incremental fit indices, and parsimony fit indices. Absolute Fit Indices are the goodness of fit that compares the theoretical fit of the model with the data collected. Absolute Fit Indices consist of Chi-square, GFI, and RMSEA. The most commonly used model accuracy index is the Chi-square with a p-value limit  $> 0.05$  according to Joreskog & Sorbom, 1993. The Chi-square value is very sensitive to a large number of samples, as evidenced in this study which used a very large number of samples to produce p-value is equal to 0.000 so that model fit needs to be seen from other sizes. The Goodness Fit Index (GFI) is a model fit criterion developed by Joreskog and Sorbom (1993), the value is between 0 and 1. It is recommended that  $GFI > 0.90$ , the greater the GFI value, the better the model. Root Mean Square Error of Approximation (RMSEA) describes the residues contained in the model. RMSEA does not depend on the number of samples, so it is often used as a measure of model fit. RMSEA measures the deviation of model parameter values with the population covariance matrix. The RMSEA value that is still tolerated is  $\leq 0.08$  indicating the model is still quite good (Fan et al., 2016).

Incremental fit indices are often referred to as comparative fit indices which are the goodness of fit for comparing theoretical models relative to alternative baseline models. Incremental fit indices consist of Adjusted Goodness of Fit (AGFI), Tucker Lewis Index (TLI), Normed Fit Index (NFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Relative Fit Index (RFI). AGFI, TLI, NFI with a reference value  $\geq 0.90$  and CFI, IFI, RFI with a reference value  $> 0.90$ .

Parsimony fit indices are a measure of the goodness of fit model relationship with a number of estimated coefficients to achieve model fit. The goal is to estimate the achievement of the fit model with overfitting data. Parsimony fit indices consist of Parsimony Normal Fit Index (PNFI), Parsimony Comparative Fit Index (PCFI), and Parsimony Goodness of Fit Index (PGFI). PNFI and PCI have a reference value  $> 0.6$  while PGFI has a reference value  $> 0.5$ .

Evaluation of the structural model aims to determine the percentage variance of each endogenous variable which is explained by exogenous variables through the R-squares value. The recommended R-square value is 0.25 which means strong, 0.45 means enough and 0.65 means weak. Model evaluation is also carried out through the P-value as a basis for accepting or rejecting the null hypothesis. Significance values (two-tailed) P-value 0.1 (10%

significance level), 0.05 (5% significance level), and 0.01 (1% significance level). The rule of thumb for significance (two-tailed) is the value of Critical Ratio (CR) > 1.65 (10% significance level), CR > 1.96 (5% significance level), and CR > 2.58 (1% significance level). The direct effect is obtained through testing this hypothesis. Meanwhile, the indirect effect needs to be calculated using the Sobel formula because AMOS does not issue the results of testing the indirect effect for the mediating variable.

According to Ghazali (2011) in Sugiyono (2018) a variable is called an intervening variable if it influences the relationship between the independent variable and the dependent variable.

## **METHOD**

The research design/method uses the associative quantitative approach which aims to determine the relationship of two or more variables. This study uses survey methods, factor analysis and path analysis techniques. The results of the quantitative research were obtained from the parents of elementary school students who answered to the distributed questionnaire. The nature of the quantitative evaluation is formal, objective, rigorous, deductive approach, systematic strategy to produce problem solving and improve knowledge. Quantitative research conducted with systematic observation and description can be used for the purpose of finding the relationship between the independent variable (predictor) and the dependent variable (outcome). In this study, structural equation modeling (Structural Equation Modeling) was used to find the relationship between variables. In this study, covariance-based SEM will be used.

## **Respondent of The Research**

The study population was parents of superior accredited private elementary school students in Jakarta, Bogor, Depok, Tangerang, and Bekasi. The research sample was 10478 parents of superior accredited private elementary school students in Jakarta, Bogor, Depok, Tangerang, and Bekasi.

## **Research Variables**

Variables in path analysis consist of exogenous or independent variables and endogenous or dependent variables. The independent variables (X) are the use of gadgets (X) and the parental consent (Z). The dependent variable (Y) is the digitalization of learning resources. Based on the approach used, the research constellation can be described as follows: X Y Z

## **Instrument**

The dependent variable, namely the digitalization of learning resources consists of 3 indicators. The independent variables are the use of gadgets consisting of 4 indicators and the parental consent consisting of 3 indicators. Data collection techniques using questionnaires.

**Table 1. Research Instrument**

<b>Element</b>	<b>Indicator</b>	<b>Item number question</b>	<b>Question</b>	<b>Polar</b>
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Learning resources digitalization (Y)	Schoolbag load	1	Does your child carry a lot of books every day so that the school bag becomes heavy?	Yes/No
	Type of reading	2	Your child prefers to read from... - Printed book - - E-books	Optional
	Approval to go digital	3	Do you agree that printed books are replaced with e-books?	Yes/No
Function (X)	Learning	4	Should gadgets be used for learning?	Yes/No
	Assessment	5	Should gadgets be used for assessment?	Yes/No
	Gamification	6	Should gadgets be used for gamification (games in learning)?	Yes/No
	Storage	7	Should gadgets be used to store e-books?	Yes/No
Parental consent (Z)	Approval using gadget	8	Do you allow children to bring gadgets to school?	Yes/No
	Utilization of gadgets Age/class limit for bringing gadgets	9	In what grades will children be allowed to bring gadgets to school? - 1 - 2 - 3 - 4 - 5 - 6	Optional
	Reason	10	The reason for not allowing gadgets is... - Limited funds - Health - Not a priority - Not yet mature	Optional

### Data Analysis Techniques

Data analysis techniques used structural equation modeling software (Structure Equation Modeling) or SEM with Analysis of Moment Structures (AMOS) software. SEM based data analysis techniques are covariance-based SEM (CB-SEM) and partial least square-based SEM (PLS-SEM). In this study, covariance-based SEM analysis (CB-SEM) was used. The analysis process consists of a measurement model and a structural model.

The stages of CB-SEM analysis include 5 steps, namely model specification, model identification, model estimation, model evaluation and model modification or re specification.

### RESULTS

The process of analyzing the measurement model and structural model is done in one go with the AMOS software. The results of the analysis through the AMOS software are shown in Figure 1 below:

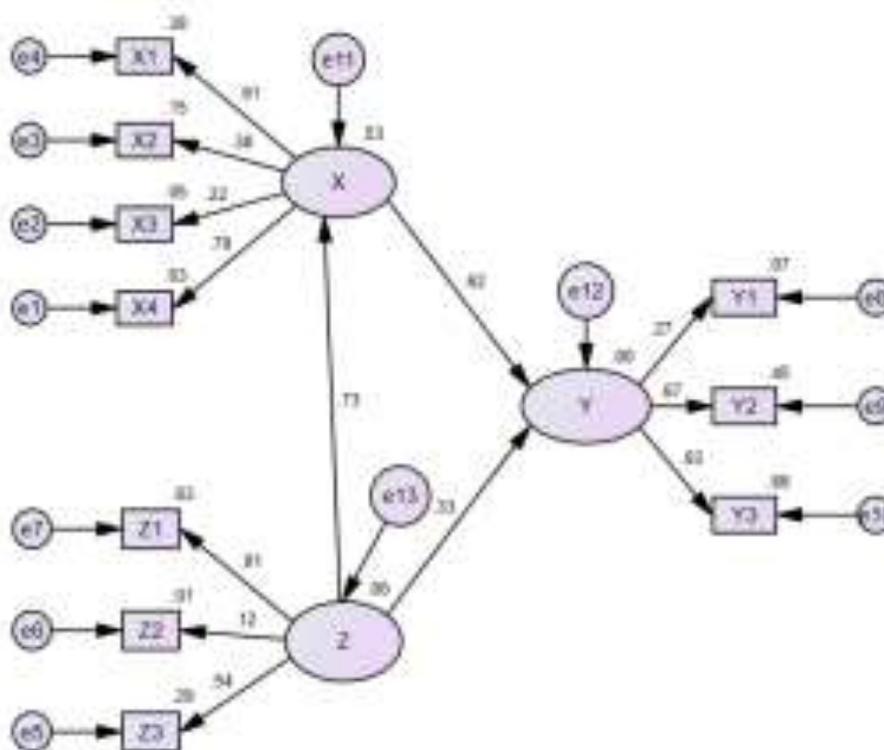


Figure 1: AMOS output results

### Measurement Model Testing

Testing the measurement model through Confirmatory Factor Analysis (CFA) is used to test whether the indicator variables are truly significant reflecting the construct or latent variables to be measured. The CFA indicator is seen from the value of the loading factor. The following table is the loading factor value for each variable.

Table 2. The value of the loading factor for each indicator

Element	Indicator	Loading factor value
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Learning resources digitalitation(Y)	Schoolbag load	0,27
	Type of read	0,67
	Approval go to digital form	0,93
The use of gadget (X)	Learning	0,61
	Assessment	0,38
	Gamification	0,22
	Storage	0,79
Parental consent (Z)	Approval using gadget	0,91
	Utilization of gadgets Age/class limit for bringing gadgets	0,12
	Reason	0,54

### **Testing The Overall Fit of The Model (Overall Fit Model or Goodness of Fit Model)**

The next stage of model testing is overall model fit, in which the AMOS output is able to produce Absolute Fit Indices, Incremental Fit Indices, and Persimionious Fit Indices.

Table 3. Model Fit Size Values

<b>Overall Fit Model</b>	<b>Model Fit Size</b>	<b>Value</b>
Absolute Fit Indices	GFI	1,000
	RMSEA	0,054
Incremental Fit Indices	AGFI	0,962
	TLI	0,950
	NFI	0,963
	CFI	0,964
	IFI	0,964
	RFI	0,948

Persimonious Fit Indices	PNFI	0,685
	PCFI	0,686
	PGFI	0,582

### Structural Model Testing

The structural model test or the significance test based on the direct effect test obtained the results as in the following table:

Table 4. The value of the direct effect

Direct Effect	Critical Ratio (CR)	P-Value
X $\square$ Y	45,511	0,000
Z $\square$ Y	20,472	0,000
Z $\square$ X	15,485	0,000

Indirect effect structural model testing was carried out through the Sobel test with data on Estimate and Standard Error (S.E) values.

Table 5. Estimate and Standard Error (S.E) values

Direct Effect	Estimate	Standard Error (S.E)
Z $\square$ X	0,493	0,011
X $\square$ Y	1,031	0,040

## DISCUSSION

The structural equation model is used to test the effect of a variable on latent variables with several assumptions that must be strictly met, including the number of samples between 200 - 400 for indicators of 10 - 15 (Jonathan, 2010). This study uses a very large number of samples and the number of indicators for each variable  $\geq 3$ , in accordance with the requirements of the model test, so that the suitable estimation method is Asymptotically Distribution Free (ADF). This estimation method does not require the data to be normally distributed.

### Measurement Model Testing

Testing the measurement model through Confirmatory Factor Analysis (CFA) is used to test whether the indicator variables are truly significant reflecting the construct or latent variables to be measured. The CFA indicator is seen from the value of the loading factor.

The following table is the loading factor value for each variable.

Table 6. The value of the loading factor for each indicator

<b>Element</b>	<b>Indicator</b>	<b>Loading factor value</b>	<b>Description</b>
Learning resources digitalisation(Y)	Schoolbag load	0,27	Low
	Type of read	0,67	Moderate
	Approval go to digital form	0,93	High
The use of gadget (X)	Learning	0,61	Moderate
	Assessment	0,38	Low
	Gamification	0,22	Low
	Storage	0,79	High
Parental consent (Z)	Approval using gadget	0,91	High
	Utilization of gadgets Age/class limit for bringing gadgets	0,12	Low
	Reason	0,54	Moderate

CFA is obtained through a convergent validity test which is seen through the value of the loading factor for each construct indicator. The CFA value limit that is still acceptable for a construct indicator is 0.5. From the results of the analysis as shown at table 6, it was found that the indicators of school bag load, assessment, gamification, age/class limit for carrying gadgets did not show latent constructs because the loading factor value was less than 0.5. School bag load is not an indicator that determines the digitalization of learning resources. Assessment and gamification have a low loading factor, presumably because respondents do not understand assessment and gamification using gadgets. The age/class limit for bringing gadgets is also not an indicator that influences respondents giving permission to bring gadgets to school.

### **Testing The Overall Fit of The Model (Overall Fit Model or Goodness of Fit Model)**

The next stage of model testing is overall model fit, in which the AMOS output is able to produce Absolute Fit Indices, Incremental Fit Indices, and Parsimonious Fit Indices

. Table 7. Comparison of Model Fitment Size Values with Reference Values

Overall Fit Model	Model Fit Size	Value	Reference Value	Description
Absolute Fit Indices	GFI	1,000	>0,90	Fit
	RMSEA	0,054	≤ 0,08	Fit
Incremental Fit Indices	AGFI	0,962	≥0,90	Fit
	TLI	0,950	≥0,90	Fit
	NFI	0,963	≥0,90	Fit
	CFI	0,964	>0,90	Fit
	IFI	0,964	>0,90	Fit
	RFI	0,948	>0,90	Fit
Persimonious Fit Indices	PNFI	0,685	>0,6	Fit
	PCFI	0,686	>0,6	Fit
	PGFI	0,582	>0,5	Fit

Based on the comparison table 7 above, it is said that the SEM model as a whole fits the sample data.

### Structural Model Testing

The structural model test or the significance test based on the direct effect test obtained the results as in the following table:

Table 8. The value of the direct effect compared to the reference value at the level of significance 5%

Direct Effect	Critical Ratio (CR)	P-Value	Reference CR at 5% significance level	Description
X → Y	45,511	0,000	> 1,96	Direct Effect
Z → Y	20,472	0,000	> 1,96	Direct Effect
Z → X	15,485	0,000	> 1,96	Direct Effect

Based on table 8 where the CR value is more than 1.96, the use of gadgets has a direct effect on the digitization of learning resources, the parental consent has a direct effect on the digitization of learning resources and the parental consent has a direct effect on the use of gadgets. The indirect effect of parental consent on digitalizing learning resources through

mediating or intervening variables in the use of gadgets by calculating the value of Sab with the Sobel formula and the value of t is as follows:

Direct Effect			Indirect Effect (Z $\square$ X $\square$ Y)		Description
	Estimate	S.E	S.E or Sab	t value	
Z $\square$ X	0,493 (a)	0,011 (Sa)	0,232	2,19	Indirect Effect
X $\square$ Y	1,031 (b)	0,040 (Sb)			

The t value as an indirect effect value is 2.19, which is greater than 1.96, it means that the parental consent has an indirect effect through the use of gadgets on digitalizing learning resources.

## CONCLUSION

Research on digitalizing learning resources for elementary school students produces the following conclusions:

1. The use of gadgets has a direct influence on the digitization of learning resources in schools.
2. Parental consent has a direct influence on digitalizing learning resources in schools.
3. Parental consent has an indirect effect through the use of gadget on digitalization of learning resources.

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