



## ***Analysis of Factors Influencing Learning Motivation of Students in the Faculty of Science and Technology at Universitas Jambi Using Structural Equation Modeling (SEM)***

### **Analisis Faktor yang Mempengaruhi Motivasi Belajar Mahasiswa Fakultas Sains dan Teknologi Universitas Jambi menggunakan *Structural Equation Modeling (SEM)***

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#### **Abstract**

*Learning motivation is the driving force that ensures the continuous learning process to achieve educational goals. This study analyzes the factors influencing students' learning motivation. The sample consists of active students from the Faculty of Science and Technology at Jambi University. The research employs a quantitative survey method, with data collected through a Likert-scale questionnaire. Data analysis is conducted descriptively using Structural Equation Modeling (SEM). Three exogenous variables are examined: learning strategies, learning facilities, and learning environment, while learning motivation serves as the endogenous variable. The results indicate that learning strategies contribute the most to learning motivation, followed by the learning environment and learning facilities. Overall, these latent variables have a positive impact on learning motivation.*

**Keywords:** Learning Motivation; Structural Equation Modeling; Students.

#### **Abstrak**

*Motivasi belajar adalah dorongan yang memastikan berlangsungnya proses pembelajaran secara berkesinambungan agar tujuan pembelajaran dapat tercapai. Penelitian ini melakukan analisis terhadap faktor-faktor yang memengaruhi motivasi belajar mahasiswa. Sampel yang digunakan adalah mahasiswa aktif di Fakultas Sains dan Teknologi Universitas Jambi. Metode digunakan adalah survei kuantitatif dengan pengambilan data melalui kuesioner berskala Likert. Analisis data dilakukan secara deskriptif menggunakan Structural Equation Modeling (SEM). Ada tiga variabel eksogen yang digunakan yaitu cara belajar, fasilitas belajar, dan lingkungan belajar. Sedangkan motivasi belajar digunakan sebagai variabel endogen. Hasil penelitian menunjukkan bahwa cara belajar memberikan kontribusi paling besar terhadap motivasi belajar, diikuti oleh lingkungan belajar dan fasilitas belajar. Secara keseluruhan, variabel-variabel laten tersebut memiliki pengaruh positif terhadap motivasi belajar.*

**Kata Kunci:** Mahasiswa; Motivasi Belajar; Structural Equation Modeling.

## Introduction

Motivation is an effort aimed at driving, directing, and supporting human activities, encouraging actions to achieve specific results or objectives. In the context of learning, motivation can be described as a general driving force that produces learning activities, ensuring the continuity of the learning process so that course objectives are achieved. Thus, motivating students means encouraging them to take actions that will help them reach their learning goals.

Recently, some students at the Faculty of Science and Technology (FST) at Universitas Jambi (UNJA) have shown a decline in learning motivation, as evidenced by suboptimal grades achieved during the learning process. The reasons for this decline have not been recorded or analyzed properly. Several academic supervisors have conducted interviews with students whose motivation to study has decreased, and various reasons were found, such as because of financial concern, family concern, learning method, etc.

A student's learning motivation is influenced by various factors, one of which is their learning approach. Learning outcomes are determined by the quality of the learning methods. Good learning habits lead to effective learning, while poor study habits often result in academic setbacks or failure<sup>1</sup>. Many students fail to achieve satisfactory results simply because they are unaware of effective learning methods. Therefore, it can be concluded that positive learning outcomes are generally the result of good study habits, and vice versa<sup>2</sup>.

To achieve optimal learning outcomes, students should organize study schedules, read and take notes, review study materials, maintain concentration, and complete practice assignments. Aside from the role of educators, students' desire and motivation to learn significantly influence their success. Motivation is a driving force in the learning process, and learning facilities are one component that can enhance this motivation<sup>3</sup>. Learning facilities impact students' ability to learn effectively; thus, a lack of equipment or resources can hinder academic progress<sup>4</sup>.

Learning motivation is also affected by the learning environment. According to Muhib<sup>5</sup>, The school environment, family environment, and community environment are part of the learning environment. To examine the factors that influence students' learning motivation, one method used in the research is the SEM (Structural Equation Modelling) method. The SEM method

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<sup>1</sup> The Liang Gie, *Cara Belajar Yang Efektif* (Yogyakarta: Liberty, 2010).

<sup>2</sup> Slameto, *Belajar Dan Faktor Yang Mempengaruhinya* (Jakarta: Rineka Cipta, 2010).

<sup>3</sup> Mudjiono Dimiyati, *Belajar Dan Pembelajaran* (Jakarta: Rineka Cipta, 2015).

<sup>4</sup> M Dalyono, *Psikologi Pendidikan* (Jakarta: PT Rineka Cipta, 2018).

<sup>5</sup> Achmad Muhib, *Pengantar Ilmu Pendidikan* (Semarang: UPT UNNES Press, 2013).

is an appropriate analysis used in social research <sup>6</sup>. SEM analysis combines regression techniques, factor analysis, and path analysis simultaneously to assess the relationships between latent variables, calculate the loading values of the indicators of these latent variables, and create a path model for those variables <sup>7</sup>.

SEM is used to analyze relationships between variables involving latent variables and their indicators <sup>8</sup>. In SEM, latent variables are categorized into two types: exogenous and endogenous variables <sup>9</sup>. In this study, three exogenous variables are examined: learning methods, learning facilities, and the learning environment. The endogenous variable being analyzed is learning motivation.

Previous studies on SEM, such as Putlely's research <sup>10</sup>, explored Structural Equation Modeling to assess the influence of service, pricing, and safety on user satisfaction levels of public transportation services in Ambon City during the COVID-19 pandemic. This study found that, generally, passenger satisfaction with public transportation services in Ambon City was very high during the pandemic. Widyasari also conducted research on the use of Structural Equation Modeling to analyze factors affecting students' learning motivation at FIP UMJ. However, there were certain indicator variables not included in this research, while some others were added. Then, Herry also used SEM to examine the effect of brand awareness on brand image, the effect of brand image on perceived value, the effect of perceived value on satisfaction,

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<sup>6</sup> Sherli Yurinanda, Syamsyida Rozi, and Sarmada Sarmada, "Analisis Model Kepuasan Civitas Akademika Terhadap Pelayanan Perpustakaan Di Fakultas Sains Dan Teknologi Universitas Jambi Dengan Metode Structural Equation Modeling (SEM)," *Jurnal Lebesgue: Jurnal Ilmiah Pendidikan Matematika, Matematika Dan Statistika* 4, no. 3 (2023): 1532-42, <https://doi.org/10.46306/lb.v4i3.434>; Marwan Ghaleb and Muhsin Yaslioglu, "Structural Equation Modeling (SEM) for Social and Behavioral Sciences Studies: Steps Sequence and Explanation" 6, no. 1 (January 27, 2024): 69-108.

<sup>7</sup> Ririn Widiyasari and Mutiarani Mutiarani, "Penggunaan Metode Structural Equation Modelling Untuk Analisis Faktor yang Mempengaruhi Motivasi Belajar Mahasiswa FIP UMJ," *FIBONACCI: Jurnal Pendidikan Matematika dan Matematika* 3, no. 2 (December 31, 2017): 147-60, <https://doi.org/10.24853/fbc.3.2.147-160>; Joseph F. Hair et al., "An Introduction to Structural Equation Modeling," in *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook*, ed. Joseph F. Hair Jr. et al. (Cham: Springer International Publishing, 2021), 1-29, [https://doi.org/10.1007/978-3-030-80519-7\\_1](https://doi.org/10.1007/978-3-030-80519-7_1).

<sup>8</sup> Joseph F. Hair Jr et al., *Multivariate Data Analysis*, 7th edition (Upper Saddle River, NJ: Pearson, 2009).

<sup>9</sup> Singgih Santoso, *Konsep Dasar Dan Aplikasi SEM dengan Amos 22* (Elex Media Komputindo, 2014).

<sup>10</sup> Zakheus Putlely et al., "Structural Equation Modeling (SEM) Untuk Mengukur Pengaruh Pelayanan, Harga, Dan Keselamatan Terhadap Tingkat Kepuasan Pengguna Jasa Angkutan Umum Selama Pandemi Covid-19 Di Kota Ambon," *Indonesian Journal of Applied Statistics* 4 (May 30, 2021): 1, <https://doi.org/10.13057/ijas.v4i1.45784>.

the effect of brand image on satisfaction, the effect of satisfaction on loyalty<sup>11</sup>. Based on this background, the researcher is interested in analyzing the factors influencing the learning motivation of FST UNJA students using the SEM method.

## Method

This study uses primary data collected by the researcher in the field through the distribution of questionnaires. The sample used in this research consists of students from the Faculty of Science and Technology at Universitas Jambi. A purposive sampling technique was employed to select the sample. The data analysis methods utilized include descriptive analysis and Structural Equation Modeling (SEM) analysis. Based on interviews with students and references from research results by previous researchers<sup>12</sup>, we found factors which can affect students' motivation in learning. We consider those factors as variables in this research as presented in the Table 1.

Table 1. Research Variables

Latent Variables		Manifest Variables (Indicators)
Exogenous Variables	Learning Method ( $X_1$ )	Study Schedule ( $X_{11}$ )
		Reading and Taking Notes ( $X_{12}$ )
		Reviewing Lessons ( $X_{13}$ )
		Concentration ( $X_{14}$ )
		Completing Assignments ( $X_{15}$ )
	Learning Facilities ( $X_2$ )	Campus Building ( $X_{21}$ )
		Classroom ( $X_{22}$ )
		Laboratory or Practice Room ( $X_{23}$ )
		Library ( $X_{24}$ )
		Wifi Facilities ( $X_{25}$ )
	Learning Environment ( $X_3$ )	Parenting Style ( $X_{31}$ )
		Home Atmosphere ( $X_{32}$ )
		Family Economic Status ( $X_{33}$ )
		Campus Environment ( $X_{34}$ )
		Social Friends ( $X_{35}$ )
Endogenous Variables	Learning Motivation ( $Y$ )	Teaching Style of Lecturers ( $X_{36}$ )
		Duration of Activities ( $Y_1$ )
		Frequency of Activities ( $Y_2$ )
		Attitude Toward Achieving Goals ( $Y_3$ )
		Teaching Techniques of Lecturers ( $Y_4$ )

<sup>11</sup> Herry Mulyono, "Brand Awareness and Brand Image of Decision Making on University," *Jurnal Manajemen Dan Kewirausahaan* 18, no. 2 (September 1, 2016): 163–73, <https://doi.org/10.9744/jmk.18.2.163-173>.

<sup>12</sup> Vitor Silva, "8 Factors That Affect Students' Motivation in Education – Built By Me @ – STEM Learning," 21 November 2020, *Built by Me: STEM Learning* (blog), accessed February 25, 2025, <https://www.builtbyme.com/students-motivation-in-education/>; Nguyen Duy, Liu Binh, and Nguyen Thi Phuong Giang, "Factors Affecting Students' Motivation for Learning at the Industrial University of Ho Chi Minh City," *Advances in Intelligent Systems and Computing*, January 1, 2021, 239–62, [https://doi.org/10.1007/978-3-030-63089-8\\_15](https://doi.org/10.1007/978-3-030-63089-8_15); NorHasnida Che Md Ghazali et al., "Factors Influencing Students' Motivation Towards Learning," *Jurnal Cakrawala Pendidikan* 41, no. 1 (2022): 259–70, <https://doi.org/10.21831/cp.v41i1.42211>.

In conducting research, the initial step is careful and systematic planning to ensure accurate and accountable results. Steps in data collection are as follows:

- 1) Determining the object. In this step, we need to establish the research object. In this research, our object is the respondents of the questionnaire.
- 2) Determining the sample from the research population.
- 3) Testing the research instruments which consist of validity and reliability tests on 30 samples.
  - a. Validity test is conducted by measuring the correlation between item scores and total scores.
  - b. Reliability test is doing by using the Alpha method which is suitable for likert scale.
- 4) Distributing questionnaire.

Then, steps in modeling with SEM are as follows:

- 1) Data Transformation. i.e. convert ordinal data to interval data using the MSI (Method of Successive Interval).
- 2) Normality Test, i.e. use multivariate normality.
- 3) Model Specification, i.e. define variables and path diagrams with a hybrid model.
- 4) Model Identification, i.e. assess the ability to obtain unique values for each parameter.
- 5) Model Estimation, i.e. estimate parameter with Maximum Likelihood Estimation.
- 6) Goodness of Fit Test, i.e. test for Goodness of Fit, validity, and reliability.
- 7) Model Respecification, i.e. adjust the model based on the fit results.

## **Results and Discussion**

The data was collected directly from questionnaires distributed to 341 randomly selected students in the Faculty of Science and Technology at UNJA.

### *1. Data Transformation*

The questionnaire data collected was averaged for each indicator with multiple questions per respondent. This data was initially on an ordinal scale. Using ordinal data may result in an unsuitable or inaccurate model. Consequently, the data was converted to an interval scale through the Method of Successive Interval (MSI), utilizing Microsoft Excel.

### *2. Normality Test*

In modeling with SEM, a normality test is necessary, as SEM assumptions require a normal distribution across all variables (multivariate normality). In this study, normality assumptions can be tested using the z-statistics for skewness and kurtosis. A distribution is considered normal if the  $Z_{\text{skewness}}$  and

$Z_{\text{kurtosis}}$  values fall between  $-2.58$  and  $+2.58$ . Refer to Table 2, the  $Z_{\text{skewness}}$  and  $Z_{\text{kurtosis}}$  values are within the range of  $-2.58$  to  $+2.58$ , indicating univariate normality. Furthermore, multivariate normality is also satisfied as the value is less than  $2.58$ . The results of the normality test after transformation are shown in Table 2.

Table 2. Normality Test Results After Transformation

Variable	$Z_{\text{skewness}}$	$Z_{\text{kurtosis}}$
$Y_4$	-2,573	0,530
$Y_3$	-2,533	-0,343
$Y_2$	-2,573	0,143
$Y_1$	-2,533	0,302
$X_{31}$	0,141	2,323
$X_{32}$	-1,473	-1,323
$X_{33}$	-2,739	1,134
$X_{34}$	-0,833	-1,041
$X_{35}$	-1,231	-0,307
$X_{36}$	-0,586	-0,597
$X_{21}$	-2,414	2,535
$X_{22}$	-0,364	-0,181
$X_{23}$	-2,430	0,467
$X_{24}$	-2,759	0,062
$X_{25}$	-1,673	-0,710
$X_{15}$	-2,256	-1,042
$X_{14}$	-0,785	0,233
$X_{13}$	-2,217	-1,243
$X_{12}$	-1,948	-0,733
$X_{11}$	0,036	-0,134
<b>Multivariate</b>		<b>2,216</b>

Source: Data processed

### 3. Model Specification

In the model specification stage, the initial model is constructed and depicted in a path diagram to facilitate the understanding of the relationships between latent variables and the relationships between latent variables and manifest variables, based on relevant theories. The diagram illustrating the relationships between constructs can be seen in Figure 1.

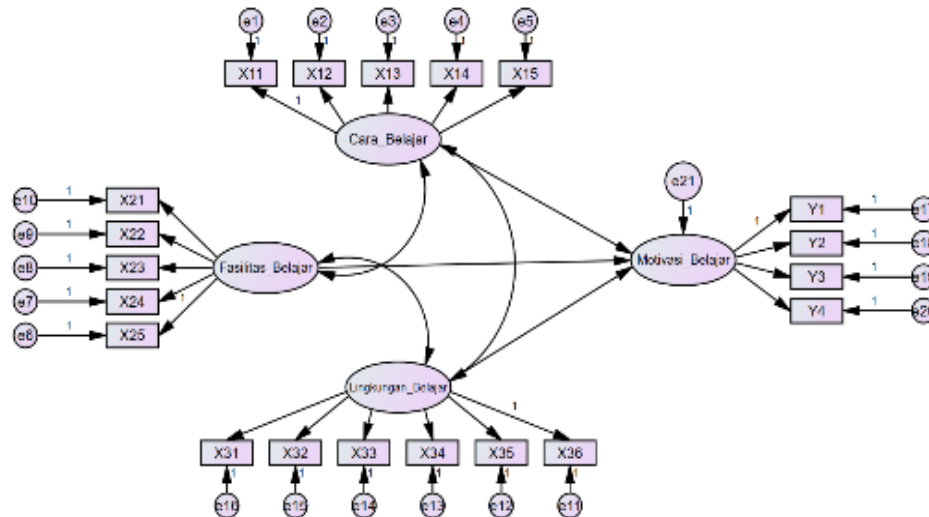


Figure 1. Path Diagram of Causal Relationships

#### 4. Assessing Model Identification

In SEM, it is expected to obtain an over-identified model (positive degree of freedom). Model identification begins with determining the quantity of manifest variables and the parameters that need to be estimated. The degree of freedom is computed as  $210 - 46 = 164$ , which exceeds 0, signifying that the model is over-identified and appropriate for the estimation phase.

#### 5. Conducting Model Estimation

Once the research model meets the model specification and identification stages, model estimation can be performed. Maximum Likelihood Estimation (MLE) is used for estimation. MLE is chosen due to the sample size of 200-300 data points. AMOS 2.2 software is employed during the estimation stage to assist in generating parameter values.

#### 6. Testing Model Fit

##### 1) Overall Model Fit Test

The overall model fit test in this study produced a chi-square value of 248.906, which exceeds the critical value of 194.88, signifying that the model is a good fit. Besides the chi-square statistic, model fit was also assessed using various goodness-of-fit indices, which were as follows: GFI = 0.871, RMSEA = 0.076, RMSR = 0.035, TLI = 0.836, NFI = 0.802, AGFI = 0.835, IFI = 0.860, and AIC = 151.49, which is lower than the critical value of 156. The complete results of the overall model fit test are presented in Table 3.

Table 3. Goodness of Fit

Goodness of Fit Index	Cut of Value	Model Index	Description
GFI	GFI $\geq$ 0,90 <i>good fit</i> 0,80 $\leq$ GFI $\leq$ 0,90 <i>marginal fit</i>	0,871	<i>Marginal Fit</i>
RMSEA	RMSEA $\leq$ 0,08 <i>good fit</i>	0,076	<i>Good Fit</i>
RMSR	RMSR $\leq$ 0,05 <i>good fit</i>	0,035	<i>Good Fit</i>
TLI	TLI $\geq$ 0,90 <i>good fit</i> 0,80 $\leq$ TLI $\leq$ 0,90 <i>marginal fit</i>	0,836	<i>Marginal Fit</i>
NFI	NFI $\geq$ 0,90 <i>good fit</i> 0,80 $\leq$ NFI $\leq$ 0,90 <i>marginal fit</i>	0,802	<i>Marginal Fit</i>
AGFI	AGFI $\geq$ 0,90 <i>good fit</i> 0,80 $\leq$ AGFI $\leq$ 0,90 <i>marginal fit</i>	0,835	<i>Marginal Fit</i>
IFI	IFI $\geq$ 0,90 <i>good fit</i> 0,80 $\leq$ IFI $\leq$ 0,90 <i>marginal fit</i>	0,860	<i>Marginal Fit</i>
AIC	The AIC value of the model that approaches the Saturated AIC value indicates a good fit	151,49 < 156	<i>Good Fit</i>

Source: Data processed

Based on Table 3, the average goodness-of-fit indices indicate that the model is fit, so model respecification is not required.

## 2) Measurement Model Fit Test

### a. Evaluation of the validity of the measurement model

Table 4. The Factor Loading

	<b>Factor Loading</b>
X <sub>11</sub> ← Learning Method (X <sub>1</sub> )	0,664
X <sub>12</sub> ← Learning Method (X <sub>1</sub> )	0,654
X <sub>13</sub> ← Learning Method (X <sub>1</sub> )	0,696
X <sub>14</sub> ← Learning Method (X <sub>1</sub> )	0,616
X <sub>15</sub> ← Learning Method (X <sub>1</sub> )	0,615
X <sub>25</sub> ← Learning Facilities (X <sub>2</sub> )	0,566
X <sub>24</sub> ← Learning Facilities (X <sub>2</sub> )	0,722
X <sub>23</sub> ← Learning Facilities (X <sub>2</sub> )	0,820
X <sub>22</sub> ← Learning Facilities (X <sub>2</sub> )	0,746
X <sub>21</sub> ← Learning Facilities (X <sub>2</sub> )	0,709
X <sub>36</sub> ← Learning Environment (X <sub>3</sub> )	0,575
X <sub>35</sub> ← Learning Environment (X <sub>3</sub> )	0,647
X <sub>34</sub> ← Learning Environment (X <sub>3</sub> )	0,611
X <sub>33</sub> ← Learning Environment (X <sub>3</sub> )	0,590
X <sub>32</sub> ← Learning Environment (X <sub>3</sub> )	0,729
X <sub>31</sub> ← Learning Environment (X <sub>3</sub> )	0,589
Y <sub>1</sub> ← Learning Motivation (Y)	0,567
Y <sub>2</sub> ← Learning Motivation (Y)	0,756
Y <sub>3</sub> ← Learning Motivation (Y)	0,649
Y <sub>4</sub> ← Learning Motivation (Y)	0,527

Source: Data processed

Based on Table 4, all factor loadings are above 0.5. This indicates that all manifest variables or indicators can adequately explain the latent variables.

## b. Evaluation of Measurement Model Reliability

The reliability of a construct can be calculated using construct reliability and average variance extracted. In this research.

$$\text{construct reliability (CR)} = \frac{[\sum_{i=1}^n \lambda_i]^2}{[\sum_{i=1}^n \lambda_i]^2 + [\sum_{i=1}^n (1 - \lambda_i^2)]}$$

$$\text{average variance extracted (AVE)} = \frac{\sum_{i=1}^n \lambda_i^2}{\sum_{i=1}^n \lambda_i^2 + \sum_{i=1}^n (1 - \lambda_i^2)}$$

Table 5. Measurement Model Reliability

Latent Variables	Sum of Factor Loadings ( $\sum_{i=1}^n \lambda_i$ )	Sum of Squared Factor Loadings ( $\sum_{i=1}^n \lambda_i^2$ )	Sum of Measurement Error ( $\sum_{i=1}^n (1 - \lambda_i^2)$ )	Construct Reliability (CR)	Average Variance Extracted
Learning Method	3,245	2,111	2,889	0,785	0,607
Learning Facilities	3,563	2,573	2,427	0,840	0,732
Learning Environment	3,741	2,349	3,651	0,793	0,602
Learning Motivation	2,499	1,592	2,408	0,722	0,513

Source: Data processed

Based on table 5, the construct reliability for all latent variables are more than 0.70. Similarly, the calculation of average variance extracted shows that all latent variables have an  $AVE \geq 0.50$ . This indicates that the questions used to measure the indicators have a high consistency in measuring their latent variables.

## 3) Model Fit Test

Hypotheses in this research are as follows:

$H_0$  = no relationship between latent variables

$H_1$  = there is a relationship between latent variables

Decision Rule for hypotheses are

If P-value < 0.05 or  $|z| > 1.96$ , then  $H_0$  is rejected.

If P-value > 0.05 or  $|z| < 1.96$ , then  $H_0$  is not rejected.

Table 6. Hypothesis Test

	P-value	Z	Relationship Coefficients
Learning motivation ← Learning methods	***	3.537	$\gamma_{11} = 0.376$
Learning motivation ← Learning facilities	0.002	1.979	$\gamma_{12} = 0.228$
Learning motivation ← Learning environment	0.003	2.968	$\gamma_{13} = 0.362$
Learning methods ↔ Learning facilities	***	5.461	$\varphi_{12} = 0.469$
Learning facilities ↔ Learning environment	***	5.314	$\varphi_{23} = 0.573$
Learning method ↔ Learning environment	***	5.953	$\varphi_{13} = 0.715$

Source: Data processed

\*\*\*: P-value < 0.001

According to Table 6, the relationship between learning motivation and learning facilities has a z-value of 1.979, the relationship between learning motivation and learning methods has a z-value of 3.537, and the relationship between learning motivation and the learning environment has a z-value of 2.968. Since these values are all greater than 1.96, this indicates that  $H_0$  can be rejected. This confirms that there is a significant relationship between learning motivation and learning facilities, learning motivation and learning methods, as well as learning motivation and the learning environment.

### 7. Respecification

In this study, there is no need for model respecification or modification, as the model fit test results show that the model is already a good fit. The model illustrated in the path diagram is transformed into a set of structural and measurement model equations. The study produces the following structural equation:

$$Y = 0.376X_1 + 0.228 X_2 + 0.362X_3 + 0.62$$

The measurement model equations are as follows:

$$X_{11} = 0.664X_1 + 0.260$$

$$X_{12} = 0.654 X_1 + 0.277$$

$$X_{13} = 0.696 X_1 + 0.298$$

$$X_{14} = 0.616 X_1 + 0.331$$

$$X_{15} = 0.615 X_1 + 0.214$$

$$X_{21} = 0.709 X_2 + 0.244$$

$$X_{22} = 0.746 X_2 + 0.310$$

$$X_{23} = 0.820 X_2 + 0.149$$

$$X_{24} = 0.722 X_2 + 0.237$$

$$X_{25} = 0.566 X_2 + 0.699$$

$$Y_1 = 0.567 Y + 0.314$$

$$Y_2 = 0.756 Y + 0.163$$

$$Y_3 = 0.649 Y + 0.187$$

$$Y_4 = 0.527 Y + 0.38$$

The relationship coefficients  $\gamma_{11} = 0.376$ ,  $\gamma_{12} = 0.228$ , and  $\gamma_{13} = 0.362$  indicate that learning methods ( $X_1$ ) affect learning motivation ( $Y$ ) by 0.376, learning facilities ( $X_2$ ) influence learning motivation ( $Y$ ) by 0.228, and the learning environment ( $X_3$ ) impacts learning motivation ( $Y$ ) by 0.362. This means that based on our research, motivation of the students in FST UNJA will improve when the learning facilities are improved. Similarly, if students improve their learning methods, their motivation will increase, and a better learning environment will also boost their motivation.

The correlation coefficient  $\varphi_{12} = 0.469$  implies that learning methods ( $X_1$ ) are correlated with learning facilities ( $X_2$ ) by 0.469. Meanwhile, the coefficient  $\varphi_{23} = 0.573$ , suggests that learning facilities ( $X_2$ ) are correlated with the learning environment ( $X_3$ ) by 0.573, and  $\varphi_{13} = 0.715$  indicates a correlation of 0.715 between learning methods ( $X_1$ ) and the learning environment ( $X_3$ ).

## Conclusion

The research findings indicate that learning methods ( $X_1$ ) have the most significant impact on learning motivation, with a positive relationship coefficient ( $\gamma_{11}$ ) of 0.376. This suggests that if students at FST UNJA enhance their learning methods such as by establishing study schedules, reading and taking notes, reviewing lessons, maintaining focus, and completing assignments, their motivation to learn will increase accordingly. Furthermore, both learning facilities ( $X_2$ ) and the learning environment ( $X_3$ ) positively influence learning motivation ( $Y$ ). This means that improved learning facilities and a better learning environment will lead to higher motivation among students. Thus, enhancing the learning environment and facilities can further boost students' motivation to learn. Future research is expected to include additional indicator variables related to learning methods, learning facilities, learning environment, and learning motivation.

## Bibliography

- Dalyono, M. *Psikologi Pendidikan*. Jakarta: PT Rineka Cipta, 2018.
- Dimiyati, Mudjiono. *Belajar Dan Pembelajaran*. Jakarta: Rineka Cipta, 2015.
- Duy, Nguyen, Liu Binh, and Nguyen Thi Phuong Giang. "Factors Affecting Students' Motivation for Learning at the Industrial University of Ho Chi Minh City." *Advances in Intelligent Systems and Computing*, January 1, 2021, 239–62. [https://doi.org/10.1007/978-3-030-63089-8\\_15](https://doi.org/10.1007/978-3-030-63089-8_15).
- Ghaleb, Marwan, and Muhsin Yaslioglu. "Structural Equation Modeling (SEM) for Social and Behavioral Sciences Studies: Steps Sequence and Explanation" 6, no. 1 (January 27, 2024): 69–108.
- Ghazali, NorHasnida Che Md, Zahari Suppian, Syaza Hazwani Zaini, and SitiFazlyana Mat Husin. "Factors Influencing Students' Motivation

- Towards Learning." *Jurnal Cakrawala Pendidikan* 41, no. 1 (2022): 259–70. <https://doi.org/10.21831/cp.v41i1.42211>.
- Gie, The Liang. *Cara Belajar Yang Efektif*. Yogyakarta: Liberty, 2010.
- Hair, Joseph F., G. Tomas M. Hult, Christian M. Ringle, Marko Sarstedt, Nicholas P. Danks, and Soumya Ray. "An Introduction to Structural Equation Modeling." In *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook*, edited by Joseph F. Hair Jr., G. Tomas M. Hult, Christian M. Ringle, Marko Sarstedt, Nicholas P. Danks, and Soumya Ray, 1–29. Cham: Springer International Publishing, 2021. [https://doi.org/10.1007/978-3-030-80519-7\\_1](https://doi.org/10.1007/978-3-030-80519-7_1).
- Jr, Joseph F. Hair, William C. Black, Barry J. Babin, and Rolph E. Anderson. *Multivariate Data Analysis*. 7th edition. Upper Saddle River, NJ: Pearson, 2009.
- Muhib, Achmad. *Pengantar Ilmu Pendidikan*. Semarang: UPT UNNES Press, 2013.
- Mulyono, Herry. "Brand Awareness and Brand Image of Decision Making on University." *Jurnal Manajemen Dan Kewirausahaan* 18, no. 2 (September 1, 2016): 163–73. <https://doi.org/10.9744/jmk.18.2.163-173>.
- Putlely, Zakheus, Yopi Lesnussa, Abraham Wattimena, and Muhammad Matdoan. "Structural Equation Modeling (SEM) Untuk Mengukur Pengaruh Pelayanan, Harga, Dan Keselamatan Terhadap Tingkat Kepuasan Pengguna Jasa Angkutan Umum Selama Pandemi Covid-19 Di Kota Ambon." *Indonesian Journal of Applied Statistics* 4 (May 30, 2021): 1. <https://doi.org/10.13057/ijas.v4i1.45784>.
- Santoso, Singgih. *Konsep Dasar Dan Aplikasi SEM dengan Amos 22*. Elex Media Komputindo, 2014.
- Silva, Vitor. "8 Factors That Affect Students' Motivation in Education – Built By Me ® – STEM Learning." 21 November 2020. *Built by Me: STEM Learning* (blog). Accessed February 25, 2025. <https://www.builtbyme.com/students-motivation-in-education/>.
- Slameto. *Belajar Dan Faktor Yang Mempengaruhinya*. Jakarta: Rineka Cipta, 2010.
- Widiyasari, Ririn, and Mutiarani Mutiarani. "Penggunaan Metode Structural Equation Modelling Untuk Analisis Faktor yang Mempengaruhi Motivasi Belajar Mahasiswa FIP UMJ." *FIBONACCI: Jurnal Pendidikan Matematika dan Matematika* 3, no. 2 (December 31, 2017): 147–60. <https://doi.org/10.24853/fbc.3.2.147-160>.
- Yurinanda, Sherli, Syamsyida Rozi, and Sarmada Sarmada. "Analisis Model Kepuasan Civitas Akademika Terhadap Pelayanan Perpustakaan Di Fakultas Sains Dan Teknologi Universitas Jambi Dengan Metode Structural Equation Modeling (SEM)." *Jurnal Lebesgue: Jurnal Ilmiah Pendidikan Matematika, Matematika Dan Statistika* 4, no. 3 (2023): 1532–42. <https://doi.org/10.46306/lb.v4i3.434>.