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The Effect of Improving Human Resources for Student Interest in Selecting University on Food Security and Health: Structural Equation Modeling (SEM)

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ABSTRACT

The selection of State Universities by students has a significant impact on improving the quality of human resources, so it can also affect the improvement of food security and health. This study aims to understand the extent of students' interest in selecting university which contributes to improving human resources and can indirectly affect food security and health. This study uses the Structural Equation Modeling (SEM) method to analyze the interaction between latent variables. Data was collected through questionnaires from 474 high school students on the Indonesia-Timor Leste borde. The data used in this study include students' interest in selecting university (Y), education and knowledge (X1), skills and abilities (X2), food security (X3), and health (X4). The results showed that students' interest in selecting university had a significant correlation with improving human resources through education by 90% (X1) and 84% (X2). The impact of this increase in human resources is also seen in the improvement of food security and public health which provides a correlation of 98% (X3) and 81% (X4). This study contributes to understanding the impact of State University selection on human resource quality, food security, and health among high school students in the Indonesia-Timor Leste border region, employing Structural Equation Modeling to analyze latent variable interactions.

Keywords: University Selection, Food Security, Health, SEM.

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Introduction

Problems related to food security and public health are often correlated with the level of quality of Human Resources, which can be reflected in the educational background of individuals. Several factors affect the level of education, especially continuing to the tertiary level, including awareness, knowledge, and commitment of individuals in continuing their education to a higher level (Balzer, 2020; Hernandez, 2019). College graduates in agriculture and food technology contribute to agricultural technology innovation, natural resource management, and the development of more efficient production methods. This can help increase agricultural productivity, increase food availability, and reduce vulnerability to climate change and natural disasters. In addition, education in the field of public policy can provide the insights needed to formulate policies that support food security. Through this education, resources can be managed efficiently, community assistance programs can be better designed, and the sustainability of the

agricultural environment can be given more attention. Qualified human resources, trained in agriculture, agribusiness, and food technology, can help reduce poverty, increase food production, and increase people's access to nutritious food. In addition, higher education in the health sector can also increase public awareness of the importance of a healthy lifestyle, disease prevention, and a nutritious diet. This contributes to the improvement of overall public health (Almutairi et al., 2018; Raghupathi & Raghupathi, 2020).

Improving the quality of human resources in agriculture, food technology, health, and public policy contributes significantly to food security and health (Mc Carthy et al., 2018; Mok et al., 2020). This creates an environment where people have access to quality food and the availability of adequate health services. The balance between improving the quality of human resources in various fields of education can have a direct impact on the sustainability and balance of food security systems and public health. The importance of higher education in creating quality human resources in related fields can provide a strong foundation for improving food security and overall public health. In this context, investment in education is one of the key steps in creating a healthier society and ensuring adequate food availability and guaranteed health of every individual (Barrett et al., 2019; Tzenios, 2020).

Several studies that have examined the relationship between the quality of human resources in the aspect of education to food security and health include (Damayanti & Khoirudin, 2016) in their research results show that education has a positive influence on food security. Next, (Arlius et al., 2017) in his research shows a close relationship between food security and the health status of toddlers in the nutritional aspect, namely if the family has enough food security, the nutritional status will be good, otherwise if the food is lacking, the nutritional status will experience malnutrition. Based on this research, this study aims to further analyze the relationship between food security and health on the quality of human resources seen based on educational aspects. The improvement of the quality of human resources is based on the readiness of students to prepare themselves to continue their studies at the university level. The type of university chosen in this study is a state university. This is because university is a university managed by the government and has facilities that can be reached by students who come from poor families.

Methods

Data Sources

Structural Equation Modeling (SEM) is a statistical method used to test cause-and-effect relationships between variables (Rashid, 2020; Whittaker & Schumacker, 2022). SEM involves a combination of structural equation models and measurement models (Hanafiah, 2020; Simarmata & Chrisinta, 2022). The data used in the SEM analysis in this study were collected through surveys or

questionnaires given to respondents. The questions in the questionnaire are designed to measure the variables to be studied in the SEM model. The number of respondents used in this study was 474 students.

Research Variables

The research variables used in this study consisted of exogenous and endogenous variables. Exogenous variables are variables that are considered causes or drivers in the model. This variable is treated as an independent variable that is not affected by other variables in the model. Endogenous variables are variables that are considered as outcomes or responses in the model. This variable is influenced by exogenous variables and may also be influenced by other endogenous variables in the model. In SEM, endogenous variables are the main focus of analysis because we are interested in understanding cause-and-effect relationships between these variables. In SEM, exogenous and endogenous variables can be constructed by latent indicators or hidden variables (latent variables) (Kock, 2020; Loh et al., 2020; Simarmata at al., 2024). Latent variables cannot be measured or observed directly, but that can measure them through some indicators or measurable variables that represent concepts according to the variables to be measured. The research variables used are given in Table 1 below:

Table 1. *Research Variables and Indicators*

Variable Type	Information	Indicator
Exogenous variables	Education and Knowledge (X1)	• Academic ability, • A scale of students' assessment of the extent to which they feel they have gained relevant knowledge in university, and
	Skills and Abilities (X2)	• Assessment scale of practical skills acquired by students during the education period, such as agricultural skills, technical skills, and managerial skills, • Scale evaluation of students' ability to apply the knowledge gained in a real context, and • Scale assessment of non-technical aspects such as leadership, communication, and collaboration.
	Food Security (X3)	• The scale of food accessibility felt by students, • Assessment scales related to awareness of issues of food security and self-reliance, and • Assessment scale related to students' contributions in efforts to improve food security.
	Health (X4)	• Physical fitness level, • student self-health assessment, and • Scale of students' perceptions of diet and health.
Endogenous Variables	Student Interest in Selecting university (Y)	• The scale of student interest in certain study programs at university, • A scale of student preference for a particular field of study related to agriculture, nutrition, or sustainability, and • Scale of students' willingness to select programs related to food security and health.

Stages of Data Analysis

Data analysis using SEM involves several stages involving statistical modeling to test the relationships between variables in a model (Teo et al., 2013; Thakkar, 2020). Here are the stages of data analysis using SEM in this study:

1. Overview analysis of data using descriptive statistics,
2. Testing the measurement model using factor loadings and Cronbach's Alpha values,
3. Testing of structural models using t tests,
4. Overall model testing using CFI (Comparative Fit Index) and TLI (Tucker-Lewis Index) values, and
5. Evaluation of the model and conclusions.

Results and Discussion

The selection of State University as a decision for grade 12 students in continuing their studies is closely related in improving their quality in order to prepare for a better future life. In addition, the existence of facilities in continuing education to a higher level, especially universities, is one aspect in improving human resources. Therefore, students' decisions in selecting a university are things that need attention. This aspect of research only considers State Universities as students' select in continuing their studies. This is a consideration because State Universities in addition to being managed by the government, the costs that must be incurred are also less than Private Universities. Some variables selected in observing students' interest in continuing their studies at State University consist of 4 independent variables and 1 dependent variable which has been given detailed information in the previous sub-chapter. The selected variables will be analyzed using SEM. The select of this analysis is due to considerations in determining independent variables directly and indirectly.

The samples used came from 7 schools located in the Indonesia-Timor Leste border area, namely, SMAN 2 Kefamenanu, SMAN 3 Kefamenanu, SMA Kristen Petra, SMK Trikari, SMK Katolik Kefamenanu, SMAS Darma Ayu and SMA Negeri Taekas. The following is given in Figure 1 and 2 description of the initial gender and age data from the 7 schools:

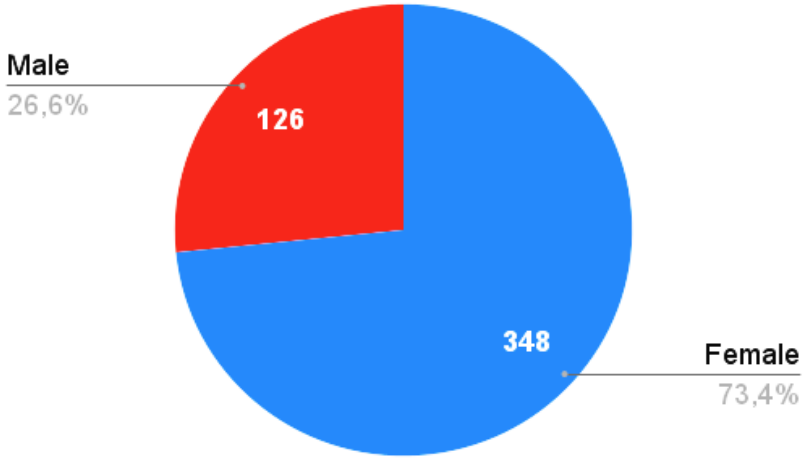

Figure 1. *Description of data by gender*

The pie chart shows the distribution of a sample by gender. It divides two categories, namely male and female. Males make up 26.6% of the sample, which is represented by a blue slice of the pie. Females make up 73.4% of the sample, which is represented by a red slice of the pie.

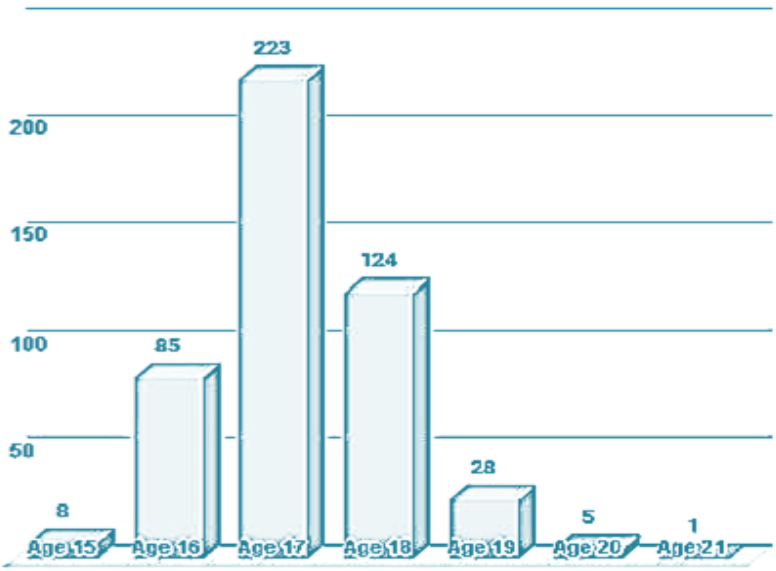

Figure 2. *Description of data by age*

Based on the bar graph, the age group with the most students is 18 years old. There are 124 students in this age group. The number of students then decreases steadily for each age group after 18. There are only 5 students aged 21.

SEM Analysis

The initial stage in SEM analysis is to test the measurement model using factor loadings and Cronbach's Alpha values. Measurement models are concerned with the relationship between latent variables (constructs that cannot be measured directly) and their indicators (variables that are measured directly). The main purpose of measurement models is to understand how indicators measure or reflect latent variables. Measurement model testing is used to assess the extent to which the indicators used in measuring latent variables are consistent and reliable. The test results of the measurement model are given in Figure 3 below:

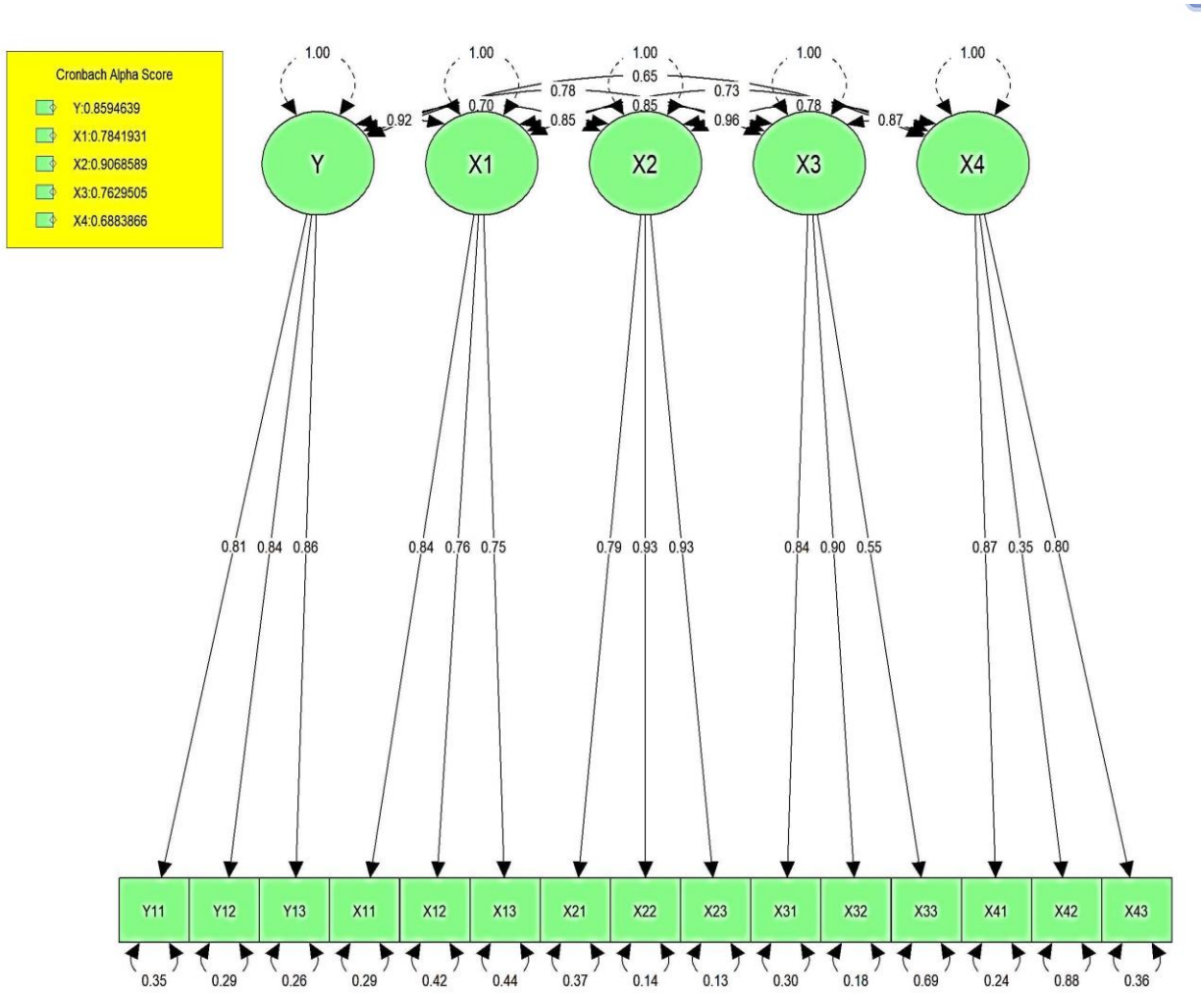

***Figure 3**. Measurement model testing*

Based on Figure 3 there are indicators that are not able to explain latent variables well enough, this is seen from the value factor loadings < 0.7. Therefore, pruning was carried out on these indicators and testing models were carried out without both indicators. The test results are given in Figure 4 below:

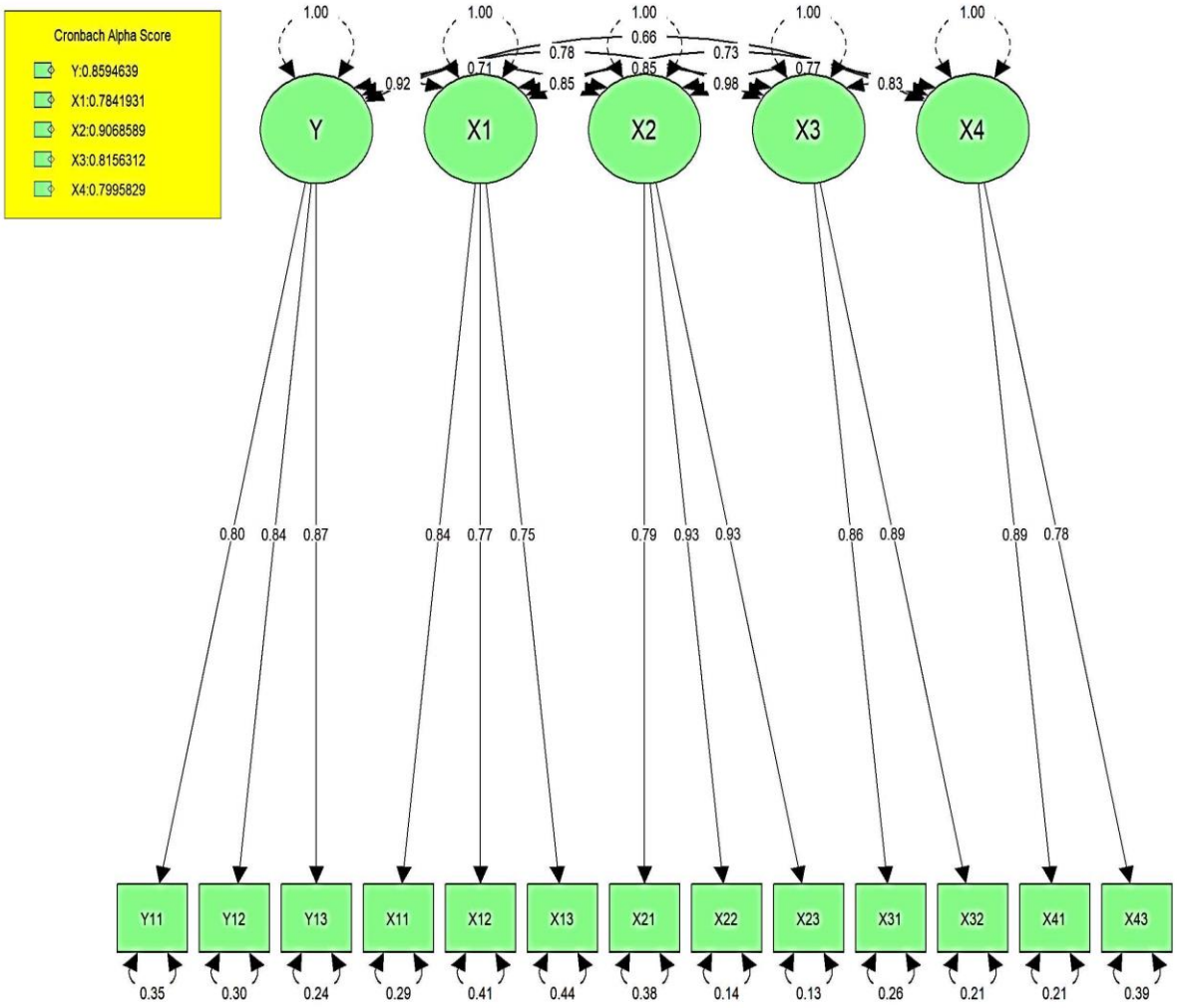

***Figure 4**. Measurement model testing*

After pruning the indicator that makes a small contribution, the impact of this is to increase the value of Cronbach's Alpha which meets the criteria of showing good reliability because the overall latent variable gives a value of Cronbach's Alpha > 0.7.

The next stage is to test the structural model using the z test. The structural model describes the causal relationship between latent variables consisting of direct and indirect influences. The parameters evaluated in structural models involve path coefficients that measure the strength and direction of relationships between latent variables. Here are the test results of the structural model:

***Table 2**. Structural model testing*

Model	Path Coefficient	Standard *Error*	P-Value
X1~X3 (p1)	0.837	0.071	0.000
X2~X3 (P2)	0.978	0.123	0.000
X3~X4 (p3)	0.812	0.079	0.000
Y~X1	0.901	0.084	0.000
Indirect p1*p2*p3			

Based on Table 2 obtained values P-Value < 5%, meaning that the path coefficient is significant. Therefore, the results of SEM analysis based on the latent variables used are depicted structurally in Figure 5 below:

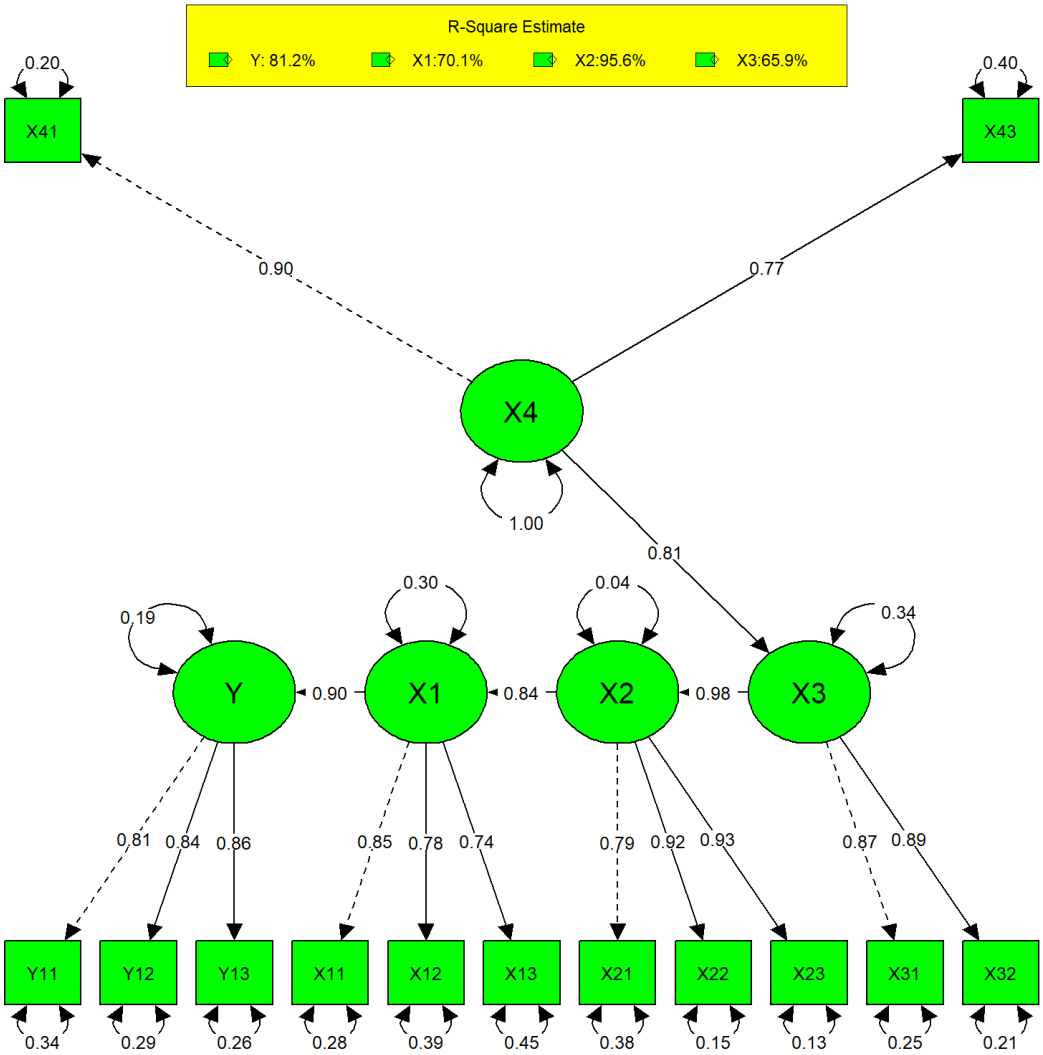

***Figure 5**. Latent variable path diagram*

The path coefficient that has been obtained before interpretation of endogenous variables the entire model is first tested. The test results are given in Table 3 below:

Table 3. *Testing of the entire model*

Criterion	Value
CFI	0.881
TLI	0.848

Based on Table 3, the values obtained on the CFI and TLI criteria which are categories that still meet the criteria and can be said to be marginal fit (Samudro et al., 2020). Therefore, based on all tests on SEM analysis, the path coefficients that have been obtained contribute to explaining their effect on endogenous variables.

The path coefficient given in Figure 4 shows that improving human resources through education prepared based on student interest in selecting university contributes 90% and 84% through skills and knowledge. This also has an indirect influence on food security and health which contributes 98% and 81%. Based on this value, it shows that improving the quality of human resources through students' interest in selecting university can have a major impact on food security and health. Indirectly, the preparation for students in continuing their studies to a higher level can prepare individuals who contribute to food security and health.

Conclusion

Based on the context of university selection, this study analyzes the significant impact associated with improving the quality of Human Resources (HR). Student interest in selecting university has proven to be an important factor that positively influences the improvement of human resources, especially through aspects of education (X1) and skills (X2). Based on the SEM analysis used to describe and understand the relationship between latent variables in the context of university selection, the results showed that students' interest in selecting university had a strong correlation with the improvement of human resources, reaching significant levels of 90% (X1) and 84% (X2). In addition, the positive impact of improving human resources is also reflected in the improvement of food security (X3) and health (X4) of the community, with correlations reaching 98% and 81% respectively. Therefore, this clearly shows that the selection of university by students not only contributes to improving human resources, but also indirectly plays an important role in improving food security and public health. Furthermore, qualitative research methods, such as interviews or focus groups, could offer deeper insights into the underlying motivations and decision-making processes of students when selecting universities. Overall, addressing

these research gaps would contribute to a more comprehensive understanding of the role of university selection in shaping human resources and its broader implications for society.

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