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Application of Path Analysis in Determining Factors Affecting the Learning Outcomes of Elementary School Teacher Education Students at HKBP Nommensen University, Pematangsiantar

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ABSTRACT

This study aims to analyze the direct and indirect influence of the role of parents, the role of lecturers, and learning motivation on the learning outcomes of Elementary School Teacher Education (PGSD) students at UHKBPNP using the Path Analysis method. Data processing was carried out using the SPSS program. The prerequisite test showed that the model met the assumption of normality and was free from multicollinearity. The findings showed: (1) The role of parents did not have a significant direct influence on learning outcomes. (2) The role of lecturers had a significant direct influence on learning outcomes. (3) Learning motivation had a significant direct influence on learning outcomes. Furthermore, the analysis revealed that the role of parents and the role of lecturers indirectly influenced learning outcomes significantly through the mediating role of learning motivation. This study concluded that learning motivation functions as a central psychological mechanism that bridges the influence of environmental factors (the role of parents and lecturers) on improving student learning outcomes. Environmental support becomes optimal only when it succeeds in fostering strong internal motivation in students.

INTRODUCTION

Achievements learning student is indicator main success education high . Learning outcomes No only determined by ability intellectual , but also by factors environmental , social , and psychological factors that are interconnected interact . Deep understanding to various influencing factors results Study become crucial for institution education For increase quality of learning process and results academic student .

In the context of the Elementary School Teacher Education Study Program (PGSD), the achievements Study own meaning strategic Because candidate educator must own competence academic , pedagogical , social , and balanced personality . Therefore that , the factors like role of parents , role lecturers and motivation Study become important For reviewed in a way simultaneous .

A number of study previously confirm importance factors Epstein (1995) stated that that parental involvement in education good boy in form moral support and provision facility learn , play a role in form motivation and attitude positive to learning . However , at the level of education height , role of parents more nature supportive and facilitative compared to instructive . While that , role lecturer at college tall No just transmitter knowledge , but also as a motivator, facilitator and guide academics that can create atmosphere Study conducive and inspiring (Buchari , 2018).

Apart from the factors external said , motivation Study is internal mediating factors success academic students . Deci and Ryan (2000) through theory *Self-Determination Theory* explain that motivation intrinsic — drive emergent learning from in self individual — plays a role important in maintain involvement high learning . Therefore that , in framework analysis path analysis , motivation Study can functioning as variables mediation that connects factor external (the role of parents and lecturers) with results Study student .

Study This aim For :

1. Analyze influence direct role of parents , role lecturers and motivation Study to results Study Elementary School Teacher Education (PGSD) students at HKBP Nommensen University, Pematangsiantar .
2. Analyze influence No direct the role of parents and the role of lecturer to results Study through motivation Study .

Through approach analysis path , research This expected can give understanding more empirical deep about structure connection between variables , as well as become base development of improvement strategies quality learning in the environment education tall .

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LITERATURE REVIEW

Students are individuals involved in learning at the higher education level. Higher education aims to produce educated individuals who are not only intelligent but also skilled and capable of reflecting the characteristics of high-quality human resources (Government of the Republic of Indonesia, 2003). A student's achievement during their studies is influenced by two factors—internal and external—thus, a student as an adult must be able to manage personal and environmental conditions to achieve the best academic performance during their studies (Adjani & Adam, 2012). A student's learning success is measured by the Cumulative Grade Point Average (GPA) they obtain after completing each semester of study (Gustina & Rahayu, 2020). GPA serves as tangible evidence of a student's ability to complete their education in their chosen field. Research conducted by Ferbina Rannu (2024) found that learning styles contribute significantly to student learning outcomes, especially among medical students at Lampung State University (Dawenan, Nurikhwan, & Husin, 2024). Meanwhile, Putri Nabila's (2022) research shows that students' literacy skills significantly influence their learning outcomes (Husna & Jumino, 2022). Ira Veronika Girsang's research revealed that family support, home study intensity, and lecturer teaching styles substantially influence student learning outcomes (Girsang et al., 2024).

Based on previous research, it can be concluded that many factors influence learning outcomes. Based on previous research, it can be concluded that many factors influence learning outcomes, namely the role of parental education, the role of teachers, and learning motivation. The role of parents in children's education has long been recognized as an important predictor of academic success. Epstein's (1995) Parental Involvement Theory divides involvement into six types, including parenting, communication, and home learning. Although previous research often focuses on school students, research at the higher education level shows a shift in parental roles. For college students, the role of parents largely shifts from an instructive (teaching) role to a supportive and facilitative role . Parental support, whether emotional, providing learning facilities, or financial assistance, has been shown to still correlate with learning outcomes (Christenson & Reschly, 2010). However, research often finds that at the student level, the influence of parental roles on learning outcomes tends to be indirect , mediated by internal student variables. The role of lecturers in higher education is the environmental factor that most directly influences the learning process. The role of a lecturer goes beyond delivering material (instructor), encompassing guidance, character development, and creating a conducive classroom environment (motivator and facilitator). Lecturers who employ engaging teaching strategies, provide constructive feedback, and maintain a pedagogical rapport with students tend to foster higher academic engagement. Lecturers' competence and professionalism, particularly in the context of the Elementary School Teacher Education (PGSD) study program that prepares future educators, have a very strong and significant direct influence on student understanding and learning outcomes (Buchari, 2018). Path analysis was first developed by Sewall Wright, a geneticist, in 1943. Wright designed this technique to enable the identification and management of variables that influence certain outcomes (Sarwono, 2011). Essentially, path analysis explains the causal (cause-and-effect) relationships between variables (Firdausy, 2025). It not only measures the strength of the relationship but also clarifies the mechanisms by which variables influence each other (Keneq, 2020).

METHOD

Method used is the Path Analysis method . Path analysis is a method used for causal models that have been formulated by researchers based on relevant scientific substance, namely the theoretical basis and experience of the researcher. This method is useful for examining or testing theorized causality, and not for deriving the causal theory itself. Therefore, the success of path analysis is highly dependent on the strength of the supporting theory . Theories that do not support the hypothesized model will only produce unusable results (Dr. Kadir, 2010). This path analysis is guided by a path diagram to form a conceptualization of the problem or to test complex hypotheses . Using this approach, the direct and indirect relationships of the independent variables to the dependent variable can be calculated. This relationship is reflected in the path coefficient , which is essentially a standardized regression coefficient (Suparmanto, 2021). This can be illustrated in the following model:

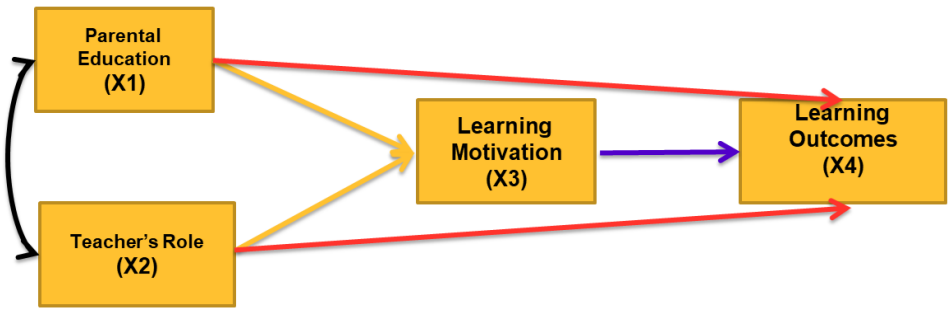


Figure 1. Flowchart Model

In its implementation, data processing is carried out with the help of a computer using the SPSS Version 22 program.

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RESULTS

Normality Test

Normality test is used to determine whether the data distribution is normal. This study used the Kolmogorov-Smirnov method (one-sample test) to detect normality. Using SPSS 22, the following data were obtained, as shown in the table below:

Table 1. One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residues
N		30
Normal Parameters [a,b]	Means	.0000000
	Standard Deviation	4.29448226
The Most Extreme Difference	Absolute	.153
	Positive	.128
	Negative	-.153
Test Statistics		.153
Assimilation . Sig. (2-tailed)		0.072 [c]

a. The test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

Based on the output above, the results of the normality test are known: the Kolmogorov-Smirnov test shows a Sig. value of 0.072 . This value is much greater than 0.05, especially Sig. (2-tailed) of 0.072 > 0.05 . Therefore, it can be concluded that the residuals are normally distributed . This means that the standardized residual values are stated to be normally distributed.

Multicollinearity Test

Multicollinearity test is a statistical test used to detect a high correlation or relationship between two or more independent variables in a multiple linear regression model. Its purpose is to ensure that the regression model can be interpreted correctly and that problems such as unstable or inaccurate regression coefficients do not occur.

Table 2. Multicollinearity Test

Coefficient [a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Parental Education	.620	1,613
	The Role of Teachers	.191	5,233
	Motivation to learn	.210	4,756

a. Dependent Variable: Learning Outcomes

The results of the multicollinearity test in Table 2 show that the VIF (Variance Inflation Factor) value for each variable in the model is below 10 , and the Tolerance value is above 0.1 . Therefore, there are no signs of multicollinearity problems in this model.

Path Analysis

Model 1

Table 3. Model Analysis 1

Coefficient [a]

Model		Unstandardized Coefficients		Standard Coefficient		
		B	Standard Error	Beta	T	Signature.
1	(Constant)	14,782	5,374		2,751	.010
	Parental Education	.019	.085	.025	.227	.822
	The Role of Teachers	.837	.107	.873	7,794	.000

a. Dependent Variable: Learning Motivation

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Based on the results of the Model 1 test above, the data obtained shows the path coefficient indicated by the Standardized Coefficient (Beta) column . From the Model 1 Coefficient table, the following data are obtained sequentially:

a. p_{31}= 0.025, t = 0.227, p-value = 0.822 > 0.05, meaning that H0 $_{is}$ accepted, which means there is no direct influence of parental education on learning outcomes.

b. p_{32}= 0.873, t = 7.794, p-value = 0.000 > 0.05, then H $_0$ is rejected which means there is a direct influence of the role of lecturers on learning outcomes .

Model 2

Table 4. Model 2 Analysis

Coefficient [a]

Model		Unstandardized Coefficients		Standard Coefficient	T	Signature.
		B	Standard Error	Beta		
1	(Constant)	26,519	4,369		6,070	.000
	Parental Education	.211	.061	.339	3,427	.002
	The Role of Teachers	.285	.139	.365	2,051	.001
	Motivation to learn	.265	.138	.326	1,920	.006

a. Dependent Variable: Learning Outcomes

Path coefficients will be shown by the Standardized Coefficient (Beta) column . From the Model 2 Coefficient table, the following data are obtained sequentially:

a. p_{41}= 0.339, t = 3.427, p-value = 0.002<0.05, or H $_0$ is rejected, which means there is an influence of parental education on learning outcomes through learning motivation.

b. p_{42}= 0.365, t = 2.051, p-value = 0.001 > 0.05, or H $_0$ is rejected, which means there is an influence of the role of lecturers on learning outcomes through learning motivation .

c. p_{43}= 0.326, t = 1.920, p-value = 0.006>0.05, or H $_0$ is rejected, which means there is an influence of learning motivation on learning outcomes.

DISCUSSION

Research result show that the role of parents No own influence direct to results Study students , however influential in a way No direct through motivation learn . This is show that parental support new effective increase results academic if capable grow internal motivation of students . Findings This in line with theory Epstein (1995) stated that that parental involvement influence achievements academic child especially through formation motivation and attitude Study positive .

Temporary that , role lecturer proven own influence direct and No direct to results learning . Influence direct show that interaction pedagogical and professionalism lecturer in a way direct strengthen understanding conceptual students . Influence No direct through motivation Study show that lecturer play a role important in grow enthusiasm , desire know , and commitment Study students . This is support view Buchari (2018) that lecturers who play a role as facilitators and motivators can increase participation and achievement student .

In addition , the results research also confirms that motivation Study own influence significant to results Study students . Findings This in line with Sunarti's research (2018) found that that efficacy self , intelligence emotional and motivational Study contribute direct to performance academic . With Thus , motivation Study functioning as mechanism psychological central connecting factor environment (the role of parents and lecturers) with achievements academic .

In a way Overall , the causal model found in study This support framework Bandura's (1986) theory about *triadic reciprocal causation* , which states that behavior Study influenced by interactions dynamic between personal factors (motivation), environment (role of parents and lecturers) , and behavior (results) study). Research this also strengthens view that support environment education will effective only if capable awaken motivation strong intrinsic in self student

The implication is that institutions education tall need :

1. Optimizing role lecturer in give guidance academic and motivation .
2. Weaving more partnerships strong with parents student for build environment supportive learning .
3. Developing strengthening programs motivation study based counseling academic and activities development self

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With Thus , the increase results Study PGSD students can achieved through approach balancing system internal and external factors in a way sustainable.

CONCLUSION

Based on the direct data analysis conducted in Model 1, it can be concluded that parental education does not affect the learning outcomes of PGSD UHKBPNP students, and the role of lecturers influences the learning motivation of PGSD UHKBPNP students. Based on the data analysis in Model 2, it can be concluded that parental education through learning motivation influences the learning outcomes of PGSD UHKBPNP students, and the role of lecturers through learning motivation influences learning outcomes . Directly, learning motivation influences the learning outcomes of PGSD UHKBPNP students.

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