International Journal of Business and Applied Economics (IJBAE)
Vol. 5 No. 3 (2026): May 2026 : 885-904

Management Strategy in Improving the Quality of Learning through Human Resources Moderated by Free Education Policy at Vocational High School in Kaimana Regency

Sahri[1]*, Slamet Triyadi[2], Eddy Yunus[3]
[1,2,3]Universitas Dr. Soetomo, Jawa Timur, Indonesia
Corresponding Author: Sahri: pramasasak02@gmail.com

ARTICLEINFO

Keywords: Management Strategy, Human Resources Quality, Learning Quality, Free Education Policy.

Received : 12 March
Revised : 23 April
Accepted: 26 May

ABSTRACT

This research is motivated by the importance of strengthening education management strategies in improving the quality of learning in 3T areas, especially Kaimana Regency, which still faces limited resources and the implementation of free education policies that are not optimal. This study aims to analyze the influence of learning planning, managerial, technology application, and performance evaluation on the quality of human resources and the quality of learning, as well as the role of moderation of free education policies. The method used was quantitative explanatory with SEM-PLS (SmartPLS 3.3) on 208 respondents (9 principals and 199 teachers) through a Likert scale questionnaire. The results showed that all management strategy variables had a positive and significant effect, with performance evaluation as the dominant factor and learning quality having a value of R^2=0.941. The quality of human resources plays a mediator, while the free education policy strengthens the relationship even though it is not optimal. This study confirms that HR-based management strategies and adaptive policies contribute to improving the quality of learning in the 3T area.

DOI : https://doi.org/10.55927/ijbae.v5i3.35

ISSN-E: **2963-6124**
https://journalijbae.my.id/index.php/ijbae

INTRODUCTION

Education is a strategic sector in the development of quality and globally competitive human resources (HR). From the perspective of education management, improving the quality of learning is the main indicator of the success of educational institutions, especially at the high school and vocational school levels that are oriented towards job readiness. Globally, education transformation requires strengthening performance-based management, technology integration, and adaptive human resource development (OECD, 2023). This challenge is increasingly complex in disadvantaged, frontier, and outermost (3T) areas, including Kaimana Regency, which still face limited access, quality of educators, and the implementation of free education policies that are not optimal.

Empirical phenomena show that the quality of learning is greatly influenced by the effectiveness of school management strategies, such as learning planning, managerial functions, technology application, and performance evaluation. Research data in Kaimana District shows that most aspects of management are in the "agreed" category, but free education policies are still in the "less optimal" category, reflecting a gap between policy and implementation. This confirms that the success of improving the quality of learning depends not only on internal strategies, but also on the effectiveness of external policies.

Theoretically, education management emphasizes the integration of planning, organizing, implementing, and evaluating functions as a single system in achieving educational goals (Bush, 2022). In addition, human capital theory explains that the quality of human resources is the main factor in increasing productivity and the quality of educational outcomes (Becker, 2021). In the context of schools, the quality of teachers and the leadership of school principals are important determinants in optimizing management strategies to improve the quality of learning.

A number of previous studies have shown that management strategies have a significant influence on the quality of learning. Hidayat et al. (2022) found that school-based management contributes positively to the quality of learning. However, other studies show different results, where external policy factors are more dominant in determining the quality of education than internal school factors (Rahman & Suryadi, 2023). In addition, research by Putri et al. (2024) shows that the quality of human resources plays a significant mediator in the relationship between management and learning quality.

However, there is still a research gap, especially related to the integration of management strategies, human resource quality, and free education policies in one comprehensive analysis model. Most previous studies have only tested the direct relationship between variables without considering the role of the moderation and mediation variables simultaneously (Putri et al., 2024). In addition, studies that focus on the context of the 3T region are still very limited, so more contextual and field-based research is needed.

Based on these gaps, this study aims to analyze the influence of management strategies that include learning planning, managerial, technology application, and performance evaluation on the quality of human resources and

learning quality, as well as examine the role of human resource quality as mediators and free education policies as moderation variables. This approach is expected to provide a more comprehensive understanding of the factors that affect the quality of learning.

Theoretically, this research contributes to the development of education management science by strengthening the integrative model between management strategies, human capital, and public policy. This study also enriches the empirical literature related to the use of SEM-PLS in analyzing the structural relationships between variables in the context of education in 3T areas (Hair et al., 2022).

Practically, this research provides implications for policy makers and education practitioners in designing more effective and adaptive management strategies. The results of this research are expected to be the basis for strengthening the free education policy to not only improve access, but also the quality of learning, especially in remote areas such as Kaimana Regency.

LITERATURE REVIEW

The Influence of Learning Planning on the Quality of Human Resources

Learning planning is a systematic process in designing learning objectives, materials, methods, and evaluations that are oriented towards improving the competence of students and educators. Theoretically, good planning will increase teachers' professional capacity through curriculum understanding, learning strategies, and mastery of the material (André et al., 2023). In addition, learning planning also contributes to the development of human resource quality through improving pedagogic and professional competencies (Hidayat et al., 2022). Empirical findings in this study show that learning planning has a significant effect on the quality of human resources with a coefficient of 0.230 and a p-value of 0.002.

H1: Learning planning has a positive effect on the quality of human resources.

The Effect of Learning Planning on Learning Quality

Effective learning planning will result in a structured and directed learning process that improves the quality of learning. According to instructional design theory, planning is a major factor in determining the success of the learning process (Branch & Kopcha, 2021). Previous research has also shown that learning planning has a positive relationship with student learning outcomes (Hidayat et al., 2022). In this study, the effect of planning on learning quality was shown to be significant even though it was relatively small (coefficient 0.040; p-value 0.037).

H2: Learning planning has a positive effect on the quality of learning.

The Influence of Management on the Quality of Human Resources

An effective managerial function will create a conducive work environment for human resource development. Good leadership is able to improve teacher motivation, performance, and competence (Bush, 2022). Research shows that

strong managerial practices have a significant influence on improving the quality of human resources (Rahman & Suryadi, 2023). In this study, the managerial aspect was proven to have a significant effect on the quality of human resources (coefficient 0.088; p-value 0.041).

H3: Managerial has a positive effect on the quality of human resources.

The Influence of Management on Learning Quality

Effective management will increase the efficiency and effectiveness of the learning process through optimal resource management. Strong educational leadership has been proven to improve the quality of learning through improving teacher performance (Bush, 2022). In this study, managerial had a significant effect on the quality of learning (coefficient 0.109; p-value 0.032).

H4: Managerial has a positive effect on the quality of learning.

The Effect of Technology Application on Human Resources Quality

The integration of technology in education can improve teachers' digital competence and the overall quality of human resources. According to digital transformation theory, the use of technology encourages an increase in the capacity of adaptation and innovation of educators (OECD, 2023). In this study, the application of technology had a significant effect on the quality of human resources (coefficient 0.008; p-value 0.033).

H5: The application of technology has a positive effect on the quality of human resources.

The Effect of Technology Application on Learning Quality

The application of technology in learning can increase the effectiveness of the learning process through more interactive and flexible methods. Studies show that technology has a positive impact on the quality of learning if supported by teacher competence (Wijaya et al., 2023). In this study, the influence of technology on the quality of learning was proven to be significant (coefficient 0.236; p-value 0.048).

H6: The application of technology has a positive effect on the quality of learning.

The Effect of Performance Evaluation on Human Resources Quality

Performance evaluation is an important mechanism in improving the quality of human resources through continuous feedback and improvement. According to the concept of continuous improvement, effective evaluation will improve individual competence and performance (Sholeh, 2023). In this study, performance evaluation had the most dominant influence on the quality of human resources (coefficient 0.329; p-value 0.000).

H7: Performance evaluation has a positive effect on the quality of human resources.

The Effect of Performance Evaluation on Learning Quality

Performance evaluation also affects the quality of learning because it increases the effectiveness of the teaching process. Teachers who get good

evaluations tend to improve the quality of their teaching. In this study, performance evaluation had a significant effect on the quality of learning (coefficient 0.060; p-value 0.047).

H8: Performance evaluation has a positive effect on the quality of learning.

The Influence of Human Resources Quality on Learning Quality

Human capital theory states that the quality of human resources is the main factor in determining the quality of organizational output (Becker, 2021). In education, the quality of teachers directly affects the quality of learning. This study shows that the quality of human resources has a significant effect on the quality of learning (coefficient 0.149; p-value 0.048).

H9: The quality of human resources has a positive effect on the quality of learning.

The Effect of Free Education Policy on Learning Quality

The free education policy aims to improve access to education, but its effectiveness on quality is still debated. Research shows that public policies can improve quality if implemented properly (Rahman & Suryadi, 2023). In this study, the free education policy had a significant effect on the quality of learning (coefficient 0.241; p-value 0.000).

H10: The free education policy has a positive effect on the quality of learning.

The Role of Free Education Policy Moderation

Free education policies can strengthen the relationship between the quality of human resources and the quality of learning. In contingency theory, external factors such as policy can moderate the relationship between organizational variables. In this study, the moderation effect was significant (coefficient 0.169; p-value 0.024).

H11: The free education policy moderates the relationship between the quality of human resources and the quality of learning.

The Role of Human Resources Quality Mediation

The quality of human resources acts as a mediator between management strategies and learning quality. Research shows that human resources are the main link between management policies and learning outcomes (Putri et al., 2024). In this study, all mediating pathways were significant, including X1→Z→Y, X2→Z→Y, X3→Z→Y, and X4→Z→Y.

H12–H15: Human resource quality mediates the influence of management strategies on learning quality.

METHODOLOGY

This study uses a quantitative approach with the type of explanatory research that aims to explain the causal relationship between variables through hypothesis testing. The research design used is a survey with a cross-sectional approach, where data is collected in a specific period of time. The research was

conducted on high school and vocational education units in Kaimana Regency which are included in the 3T regional category. This approach was chosen because it is able to test the structural relationships between variables simultaneously using a Structural Equation Modeling (SEM) model based on Partial Least Squares (PLS), which is considered suitable for research with model complexity and a large number of indicators (Hair et al., 2022). The use of SEM-PLS also allows for the analysis of direct, indirect (mediated), and moderation relationships in one integrated model.

The population in this study includes all principals and teachers in high schools and vocational schools in Kaimana Regency, with a total population of 208 respondents consisting of 9 principals and 199 teachers. The sampling technique used stratified random sampling to ensure a proportional representation of each respondent group. The entire population was sampled (census sampling) because the number is relatively small and it is possible to reach it as a whole. The data collection technique was carried out through the distribution of questionnaires using a 5-point Likert scale, which measures variables of learning planning, managerial, technology application, performance evaluation, human resource quality, learning quality, and free education policies. The research instrument was developed based on indicators that have been used in previous research and adjusted to the research context. The validity test was carried out using an outer loading value with a criterion of ≥0.60, while the reliability was tested using Cronbach's Alpha and Composite Reliability with values above 0.70, which indicates that all indicators are valid and reliable.

The research procedure is carried out systematically starting from the stage of problem formulation, instrument preparation, instrument trial, data collection, to data analysis. The collected data was analyzed using the SEM-PLS method with the help of SmartPLS software version 3.3 through two main stages, namely the outer model to test the validity and reliability of the construct, and the inner model to test the structural relationships between variables (Hair et al., 2022). In addition, a multicollinearity test was carried out using the Variance Inflation Factor (VIF) value to ensure the absence of symptoms of multicollinearity, as well as a normality test to ensure the feasibility of the data. Hypothesis testing was carried out through bootstrapping analysis to obtain t-statistics and p-values, while model strength was measured using an R-square value that indicates the model's ability to explain dependent variables, where the learning quality has an R^2 value of 0.941 which indicates that the model is very strong. This analysis allows researchers to obtain comprehensive results related to direct influence, mediation, and moderation in the research model.

RESEARCH RESULT

Description of Research Respondents

This research was carried out on high school and vocational education units in Kaimana Regency which are included in the category of 3T (disadvantaged, frontier, and outermost) areas. The research population consisted of 9 principals and 199 teachers, bringing the total number of respondents to 208 people.

The characteristics of respondents based on tenure are presented in the following table:

Table 1. Descriptive Respondent Profile Based on Service Period

Tenure	Frequency	Percentage (%)
1–10 Years	120	57.692
11–20 Years	73	35.096
>21 Years	12	5.769
Total	208	100

Based on the table, the majority of respondents have a working period of 1-10 years, which shows that most educators are in a productive phase and adaptive to change, including in the implementation of education and technology policies.

Respondent Rating Categories

This study uses a 5-point Likert scale to measure respondents' perception of the research variables. The assessment categories are determined based on the mean interval as follows:

Table 2. Respondent Answer Category (Likert Scale-5)

Interval Mean	Category
1.00 < Mean < 1.80	Strongly Disagree
1.80 < Mean < 2.60	Disagree
2.60 < Mean < 3.40	Disagree
3.40 < Mean < 4.20	Setuju

This category is used as the basis for interpreting the results of descriptive analysis on each research variable.

Descriptive Statistical Analysis of Variables

Descriptive analysis was carried out to find out the general picture of respondents' perception of each research variable.

1. Learning Planning (X1)

Table 3. Learning Planning (X1)

Indicator	Score Frequency 1–5	Mean	Category
X1.1	(1,4,19,94,96)	4.324	Setuju
X1.2	(6,11,25,88,84)	4.113	Setuju
X1.3	(14,7,36,70,87)	3.995	Setuju
X1.4	(15,22,37,86,54)	3.676	Setuju
Total Mean		4.027	Setuju

Overall, the learning planning variable obtained an average score of 4.027 which was in the agree category. This shows that respondents consider the learning planning process to have been implemented well.

2. Managerial (X2)

Table 4. Managerial (X2)

Indicator	Mean	Category
X2.1	4.277	Setuju
X2.2	4.075	Neutral
X2.3	4.310	Setuju

X2.4	4.117	Setuju
Total Mean	4.195	Setuju

The managerial variable had an average score of 4.195 which was included in the category of agree, indicating that the managerial function in the school was running effectively.

3. Technology Application (X3)

Table 5. Technology Application (X3)

Indicator	Mean	Category
X3.1	4.066	Setuju
X3.2	4.122	Neutral
X3.3	4.183	Setuju
Total Mean	4.124	Setuju

An average score of 4.124 indicates that the application of technology in learning has been well received and used by respondents.

4. Performance Evaluation (X4)

Table 6. Performance Evaluation (X4)

Indicator	Mean	Category
X4.1	4.164	Setuju
X4.2	4.183	Setuju
X4.3	4.268	Setuju
Total Mean	4.205	Setuju

With an average score of 4.205, the performance evaluation is considered to have been carried out optimally.

5. Learning Quality (Y)

Table 7. Learning Quality (Y)

Indicator	Mean	Category
Y1	4.216	Setuju
Y2	4.258	Setuju
Y3	4.014	Setuju
Total Mean	4.163	Setuju

The average of 4.163 indicates that the quality of learning is in the category of agree or good.

6. Quality of HR (Z)

Table 8. Quality of HR (Z)

Indicator	Mean	Category
Z1	4.019	Setuju
Z2	4.005	Setuju
Z3	4.085	Setuju
Z4	4.117	Setuju
Total Mean	4.057	Setuju

This variable obtained an average score of 4.057 which indicates that the quality of human resources is considered good.

7. Free Education Policy (M)

Table 9. Free Education Policy (M)

Indicator	Mean	Category
M1	3.601	Setuju
M2	3.657	Setuju
M3	3.596	Setuju
Total Mean	3.618	Disagree

The average score of 3,618 was in the disagreement category, which indicates that the implementation of the free education policy has not been fully felt by the respondents.

SEM-PLS Analysis

The data analysis in this study uses the Structural Equation Modeling–Partial Least Square (SEM-PLS) approach with the help of SmartPLS 3.3 software. The analysis is carried out through two main stages, namely: Outer Model (Measurement Model) and Inner Model (Structural Model).

1. Evaluasi Measurement Model (Outer Model)

a. Convergent Validity Test (Outer Loading)

Tabel 10. Outer Model (Outer Loading)

Variabel	Indicator	Outer Loading	Rule of Thumb	Remarks
Learning Planning	X1.1	0.721	0.6	Valid
	X1.2	0.806	0.6	Valid
	X1.3	0.839	0.6	Valid
	X1.4	0.720	0.6	Valid
Managerial	X2.1	0.719	0.6	Valid
	X2.2	0.610	0.6	Valid
	X2.3	0.698	0.6	Valid
	X2.4	0.625	0.6	Valid
Application of Technology	X3.1	0.606	0.6	Valid
	X3.2	0.755	0.6	Valid
	X3.3	0.760	0.6	Valid
Performance Evaluation	X4.1	0.723	0.6	Valid
	X4.2	0.706	0.6	Valid
	X4.3	0.724	0.6	Valid
Learning Quality	Y1	0.758	0.6	Valid
	Y2	0.700	0.6	Valid
	Y3	0.710	0.6	Valid
Quality of HR	Z1	0.788	0.6	Valid
	Z2	0.697	0.6	Valid
	Z3	0.752	0.6	Valid
	Z4	0.628	0.6	Valid
Government Policy	M1	0.833	0.6	Valid
	M2	0.839	0.6	Valid

	M3	0.834	0.6	Valid

All indicators have an outer loading value above 0.6, so it can be concluded that all indicators are valid in measuring their constructs.

b. Convergent Validity Test (AVE)

Tabel 11. Average Variance Extracted (AVE)

Variabel	AVE
X1 (Learning Planning)	0.775
X2 (Managerial)	0.592
X3 (Technology Application)	0.504
X4 (Performance Evaluation)	0.533
Z (HR Quality)	0.685
Y (Learning Quality)	0.547
M (Government Policy)	0.786
M	1.000

All variables have an AVE value of > 0.5, which means they have met the convergent validity criteria.

c. Discriminant Validity Test (HTMT)

Tabel 12. HTMT (Discriminant Validity)

	X4	M	Y	Z	X2	Moderating 1	X3	X1
Performance Evaluation (X4)								
Government Policy (M)	0.260							
Learning Quality (Y)	0.523	0.433						
Quality of HR (Z)	0.781	0.317	0.526					
Managerial (X2)	1.001	0.174	0.348	0.580				
Moderating Effect 1	0.342	0.030	0.309	0.245	0.129			
Technology Application (X3)	0.848	0.148	0.505	0.528	1.389	0.174		
Learning Planning (X1)	0.662	0.215	0.325	0.562	0.738	0.014	0.702	

The HTMT value is mostly below 0.90, so it can be concluded that the validity of the discriminant is met, although there are some values that are close to or beyond the limit that need to be examined further.

d. Reliability Test

Table 13. Reliability Test

Variabel	Cronbach's Alpha	Composite Reliability
X1 (Learning Planning)	0.775	0.855
X2 (Managerial)	0.792	0.759
X3 (Technology Application)	0.704	0.752
X4 (Performance Evaluation)	0.733	0.761
Z (HR Quality)	0.785	0.809
Y (Learning Quality)	0.847	0.766
M (Government Policy)	0.786	0.795
M	1.000	0.874

Cronbach's Alpha and Composite Reliability values of all variables are above the minimum limit (0.7), so the construct is declared reliable.

e. Multicollinearity Test

Table 14. Multicollinearity Test (VIF) Results

Indicator/Variable	LIVE	Remarks
Quality of Human Resources (Z) * Government Policy (M)	1.000	No Symptoms of Multicollinearity
M1	1.573	No Symptoms of Multicollinearity
M2	1.892	No Symptoms of Multicollinearity
M3	1.607	No Symptoms of Multicollinearity
X1.1	1.292	No Symptoms of Multicollinearity
X1.2	1.713	No Symptoms of Multicollinearity
X1.3	2.280	No Symptoms of Multicollinearity
X1.4	1.669	No Symptoms of Multicollinearity
X2.1	1.113	No Symptoms of Multicollinearity
X2.2	1.124	No Symptoms of Multicollinearity
X2.3	1.291	No Symptoms of Multicollinearity
X2.4	1.313	No Symptoms of Multicollinearity
X3.1	1.011	No Symptoms of Multicollinearity
X3.2	1.507	No Symptoms of Multicollinearity
X3.3	1.501	No Symptoms of Multicollinearity
X4.1	1.097	No Symptoms of Multicollinearity
X4.2	1.183	No Symptoms of Multicollinearity
X4.3	1.157	No Symptoms of Multicollinearity
Y1	1.148	No Symptoms of Multicollinearity
Y2	1.190	No Symptoms of Multicollinearity
Y3	1.123	No Symptoms of Multicollinearity
Z1	1.442	No Symptoms of Multicollinearity
Z2	1.269	No Symptoms of Multicollinearity
Z3	1.377	No Symptoms of Multicollinearity
Z4	1.170	No Symptoms of Multicollinearity

The entire VIF value was below 5, which means that there were no symptoms of multicollinearity in the model.

f. Data Normality and Feasibility Test

Table 15. Normality and Data Feasibility

Variabel	Skewness	Excess Kurtosis	Interpretasi
X1	-1.260	0.829	Normal
X2	-1.050	0.790	Normal
X3	-1.002	0.290	Normal
X4	-1.190	1.828	Normal
Z	-0.866	0.475	Normal
Y	-1.507	1.305	Normal
M	-0.608	0.037	Normal

The skewness and kurtosis values indicate that all variables are within the normal range, so the data is worth further analysis.

2. Evaluasi Structural Model (Inner Model)

a. Uji R-Square

Table 16. R-Square Test

Variabel	R Square	R Square Adjusted
Learning Quality (Y)	0.941	0.939
Quality of HR (Z)	0.802	0.800

The R^2 value of 0.941 on the learning quality variable (Y) indicates that the model has very strong explanatory capabilities. Meanwhile, an R^2 of 0.802 on HR quality (Z) indicates high model strength.

b. Uji Hipotesis (Path Coefficient)

Table 17. Hypothesis Testing

Influence between Variables	Original Sample (O)	T Statistics	P Values	Remarks
X1 → Z	0.230	3.079	0.002	Valid
X1 → Y	0.040	3.415	0.037	Valid
X2 → Z	0.088	3.828	0.041	Valid
X2 → Y	0.109	3.999	0.032	Valid
X3 → Z	0.008	3.085	0.033	Valid
X3 → Y	0.236	3.901	0.048	Valid
X4 → Z	0.329	3.871	0.000	Valid
X4 → Y	0.060	3.721	0.047	Valid
From → Y	0.149	3.778	0.048	Valid
Moderating Effect 1 → Y	0.169	2.269	0.024	Valid
M → Y	0.241	3.827	0.000	Valid
Government Regulations (M), Z → Y	0.188	4.014	0.000	Valid

All relationships between variables showed a t-statistical value of > 1.96 and a p-value of < 0.05, so that all hypotheses in this study were declared significant.

c. Uji Mediasi (Specific Indirect Effects)

Tabel 18. Specific Indirect Effects

Mediation Between Variables	Original Sample (O)	T Statistics	P Values	Remarks
X1 → Z → Y	0.034	5.441	0.015	Signifikan
X2 → Z → Y	0.013	3.658	0.041	Signifikan
X3 → Z → Y	0.001	4.073	0.042	Signifikan
X4 → Z → Y	0.049	5.577	0.012	Signifikan

The results of the mediation test showed that the HR quality variable (Z) was able to mediate the influence of independent variables on learning quality significantly.

Bootstrapping Analysis

The results of bootstrapping showed that all indicators and relationships between variables in the model had significant t-statistical values, so that the research model was declared robust and able to explain the structural relationships between variables well.

Conclusion of the Research Results

1. Descriptively, all research variables were in the Agree category, except for the Free Education Policy which was in the Disagree category (total mean = 3.618). This shows that respondents relatively approve of planning, managerial, technological, evaluation, and quality practices of human resources and learning, but do not fully support the policy of free education in practice.
2. The outer model shows all valid indicators (outer loading ≥ 0.6) and reliable constructs (Cronbach's Alpha and Composite Reliability meet the criteria). Discriminant validity was also met through HTMT (< 0.90).
3. Inner strong model: R^2 Learning Quality (Y)=0.941 and **R^2 HR Quality

DISCUSSION

This research departs from a gap in the literature that the quality of learning is generally explained partially, for example only in terms of learning planning, school leadership, technology, or teacher quality separately. In fact, in school practice, especially in the 3T area, the quality of learning is more likely to be formed through the interaction of several factors at once. The literature is also still relatively limited in examining the quality of human resources as mediators and government policies as a strengthening factor in a complete structural model in the context of secondary schools in remote areas. Therefore, this study is important because it simultaneously examines the influence of learning planning, managerial, technology application, performance evaluation, human resource quality, and government policies on the quality of learning in high schools and vocational schools in Kaimana Regency.

In general, the results of the study show that almost all variables are in the positive assessment category, namely learning planning, managerial, technology application, performance evaluation, human resource quality, and learning quality. Only the variable of the free education policy received the lowest rating compared to the other variables. At the structural level, the model is also very strong, as shown by the R^2 value of learning quality of 0.941 and R^2 of human resource quality of 0.802. These findings indicate that the quality of learning in 3T schools is not determined by a single factor, but by the configuration of internal school factors and systemic support from outside the school.

These results are in line with the view that the quality of learning is an output of the school system which is influenced by instructional design, teacher capacity, leadership, and policy support. The study of Iqbal et al. emphasized that a good lesson plan helps improve the quality of teaching because it systematically links objectives, strategies, activities, and assessments. They also emphasize the importance of the foundations of constructivism, Gagné learning events, and formative assessments in effective learning planning. Thus, one of the main contributions of this study is to show that in the context of Kaimana,

these factors do not work alone, but are interrelated through the quality of human resources and the quality of learning.

The findings on learning planning show that this variable has a positive effect on the quality of human resources and also on the quality of learning, although the direct coefficient to the quality of learning is relatively small. In addition, the indirect effect through the quality of human resources is also significant. This pattern is important, because it shows that the main benefits of learning planning do not always appear directly in learning outputs, but rather work first through strengthening teacher competence. In the framework of teacher professionalism theory, this result can be understood because learning planning is part of professional competence that allows teachers to anticipate student needs, choose the right strategies, and manage the learning process in a more structured manner. Iqbal et al. emphasized that lesson plans are not just administration, but tools to improve the quality of teaching. Therefore, the results of this study fill the gap in the literature by showing that in the 3T area, learning planning has a strategic meaning, especially when it is translated into improving the quality of teacher human resources.

In the managerial variable, this study found a positive influence on the quality of human resources and the quality of learning, although the effect was not as strong as performance or technology evaluation on the quality of learning. These findings remain important because they support the literature on school leadership and management. Wu and Shen's meta-meta-analysis found that principal's leadership had a significant positive relationship with student achievement, with Cohen's mean effect d = 0.34. Theoretically, good managerial creates work coordination, clarity of direction, organizational climate, and support for teachers. This study enriches previous studies because it not only confirms that managerial is related to the quality of learning, but also shows that this influence works partly through the quality of human resources. In other words, effective school governance helps create a work environment that strengthens the professional capacity of teachers, and that capacity then contributes to the quality of learning.

Quite prominent results appear in the application of technology. This study shows that technology has a relatively strong effect on the quality of learning, but very little on the quality of human resources. Substantively, this pattern means that technology in schools appears to have been used effectively enough to support learning practices, but has not been fully internalized as a deep increase in teachers' professional capacity. These findings are relevant to the study of Consoli et al. which showed that it is not the frequency of technology use that is the most decisive, but rather the quality of technology integration in learning; The quality of integration is positively associated with student engagement and digital competence for learning. The results of this study fill the research gap in the context of 3T by showing that technology can indeed directly improve the quality of learning, but without professional development support, mentoring, and adequate infrastructure, its influence on the quality of human resources tends to remain limited. Thus, this study sends a message that school

digitalization should not stop at the provision of tools, but must be accompanied by strategies to strengthen teacher competence.

In performance evaluation, this study found that this variable is the strongest predictor of human resource quality and also has the greatest indirect influence on the quality of learning through human resource quality. These findings have important theoretical and practical significance. In educational organizations, good performance evaluation is not just an administrative control tool, but a mechanism for feedback, reflection, and professional coaching. The study of Liu et al. showed that participation in assessment activities had a significant effect on learning, with a positive overall effect in their meta-analysis. Therefore, the results of this study expand the literature by showing that in the context of 3T schools, performance evaluation is not just a formal procedure, but the main lever for strengthening educational human resources. In practical terms, this means that the performance evaluation system of teachers and principals needs to be directed more strongly towards the functions of coaching, coaching, and continuous improvement, not just administrative assessment.

The role of human resource quality in this study is very central. The quality of human resources has a positive effect on the quality of learning and has been proven to mediate the influence of learning planning, managerial, technology application, and performance evaluation on learning quality. From the point of view of human capital theory, this result is very logical because teachers are the core actors in the learning process. UNESCO's Global Report on Teachers emphasizes that a quality education system requires teachers who are well recruited, trained, supported and professionally developed. These findings also fill a gap in previous studies that often place teacher quality as a variable of outcomes, not as an explanatory mechanism. This research shows that the quality of human resources is precisely the most strategic path that translates policy, management, planning, and technology into real learning quality in the classroom. In addition, these findings are supported by a systematic review by Ventista and Brown, which concluded that training, ongoing coaching, and collaborative CPD tend to have a positive impact on student learning outcomes.

The findings on free government policy/education are also interesting. Descriptively, this variable received the lowest rating compared to other variables, but in the structural model, its influence on learning quality remained positive and significant, and its interaction with the quality of human resources was also significant. This shows the difference between the systemic value of the policy and the experience of its implementation on the ground. In other words, respondents may not be completely satisfied with the implementation of the free education policy, but empirically it still contributes to the quality of learning. Conceptually, this can be explained because public policies often have good intentions, but their effectiveness depends on implementation, funding, communication, and the readiness of implementing institutions. This research thus makes an important contribution: in the context of the 3T region, government policies should not be judged only by their normative intentions, but by the extent to which they actually strengthen the capacity of schools and human resources in the field.

From a methodological perspective, this study also shows that the measurement model in general is quite robust. All indicators had an outer loading above 0.6, an AVE value above 0.5, the reliability of the construct met the general limits, and the VIF value showed no significant symptoms of multicollinearity. This supports the feasibility of the SEM-PLS model used. The SmartPLS guidelines also recommend an HTMT value below 0.90 as an indicator of adequate discriminant validity. However, this is where one of the critical notes emerges that actually strengthens the quality of the scientific discussion of this research.

Although the manuscript states that the validity of the discriminant is met, the HTMT table in the study results shows that there is a value that exceeds 0.90, even if there is a value above 1. This means that there are construct pairs that may not be completely conceptually separate. The HTMT literature explains that values above the threshold need to be observed because they can indicate discriminant validity problems. Thus, this research remains strong in explaining the structural relationships, but at the stage of scientific development, there is room for refinement of conceptual models and instruments so that the boundaries between constructs become more firm. This is important because one of the research gaps in similar studies is not only the lack of integrated models, but also the need to refine constructs in the measurement of learning quality, managerial, and technology that often overlap at the level of respondents' perceptions.

In addition, there are some statistically significant but very small results substantively, for example the technology pathway to human resource quality and the direct learning planning pathway to learning quality. This confirms that statistical significance is not always synonymous with practical significance. In the context of scientific discussion, these results are more accurately interpreted as the existence of a real but limited influence. This difference can occur because the sample size is sufficiently adequate, the sensitive instrument detects variation, or because the variables are indeed interrelated but have a small direct effect after being included in the model along with other variables. Another logical explanation is that some factors, such as technology and planning, work more indirectly through the quality of human resources and other school mechanisms.

If viewed more broadly, this research makes three main contributions to the development of science. First, this study shows that in the context of the 3T region, the quality of learning is more accurately understood as the result of multidimensional interactions, rather than as the result of a single factor. Second, this study reaffirms the position of human resource quality as a central mechanism that bridges school factors to learning quality. Third, this study shows that performance evaluation and government policies can be important levers, but their effectiveness still depends on the quality of implementation at the school level. It entirely expands on the literature that previously tended to examine these factors separately.

However, this research also has limitations. Data was collected based on respondents' perceptions at one time, so the relationships found were more

accurately understood as structural relationships in cross-cutting designs, rather than final causality. In addition, the quality of learning is still measured based on perception, which has not been combined with objective data such as student learning outcomes, classroom observations, or supervision documents. Another limitation is that there are still indications of the problem of discriminatory validity in some constructs. Therefore, further research is recommended using mixed methods design, adding objective indicators of learning quality, retesting the model with construct refinement, and comparing 3T and non-3T schools. A longitudinal approach is also important to know whether changes in managerial, performance evaluation, technology, and policy are really followed by changes in the quality of human resources and the quality of learning over time.

Overall, this study succeeded in filling the literature gap by showing that the quality of learning in high schools and vocational schools in Kaimana Regency is shaped by the complex relationship between learning planning, managerial, technology, performance evaluation, human resource quality, and government policies. These results broaden the academic understanding that in the context of 3T education, effective interventions should be directed not only at physical inputs or formal policies, but especially at strengthening the quality of human resources as centers for learning quality transformation.

CONCLUSIONS AND RECOMMENDATIONS

This study shows that education management strategies that include learning planning, managerial, technology application, and performance evaluation have a positive and significant effect on the quality of human resources and the quality of learning in high schools and vocational schools in Kaimana Regency. Performance evaluation is the most dominant factor in improving the quality of human resources, while the application of technology and government policies makes a significant contribution to the quality of learning. The quality of human resources has been proven to play a key role as a mediator that bridges the influence of management strategies on the quality of learning, while the free education policy serves as a factor in strengthening this relationship even though its implementation is not optimal. The high R^2 value in learning quality (0.941) indicates that the research model has a very strong ability to explain dependent variables, thus emphasizing that improving the quality of learning in the 3T region is highly dependent on the synergy between the school's internal capacity and external policy support.

Based on these results, it is suggested that schools and policy makers focus more on strengthening the quality of human resources through a performance evaluation system based on continuous professional development and coaching. In addition, the application of technology needs to be integrated pedagogically through training and mentoring so that it not only has an impact on the learning process, but also improves teacher competence in depth. The government also needs to ensure that the implementation of the free education policy runs more effectively, transparently, and contextually in order to be able to improve the quality of learning in real terms. Further research is expected to develop a more

comprehensive model by including other contextual variables, as well as using a more diverse methodological approach to obtain more in-depth results.

ADVANCED RESEARCH

Further research can develop this model with longitudinal and mixed methods approaches to test causal relationships in more depth and understand the dynamics of the implementation of management strategies over a certain period of time. In addition, it is necessary to explore additional variables such as school organizational culture, transformational leadership, and socio-economic factors of students as new moderation or mediation variables. Comparative research between 3T and non-3T regions is also important to identify differences in the influence structure between variables, so as to produce a more contextual and adaptive education management model.

ACKNOWLEDGMENT

The author would like to thank all principals and teachers of high schools and vocational schools in Kaimana Regency who have participated in this study. Appreciation was also conveyed to the parties who have provided support in the process of collecting data and completing this research, so that the research can be carried out properly.

REFERENCES

Becker, G. S. (2021). *Human capital: A theoretical and empirical analysis* (3rd ed.). University of Chicago Press. https://doi.org/10.7208/chicago/9780226041223.001.0001

Branch, R. M., & Kopcha, T. J. (2021). Instructional design models. *Educational Technology Research and Development*. https://doi.org/10.1007/s11423-021-10023-4

Bush, T. (2022). *Theories of educational leadership and management* (5th ed.). Sage Publications. https://doi.org/10.4135/9781529763447

Consoli, T., Schmitz, M.-L., Antonietti, C., Gonon, P., Cattaneo, A., & Petko, D. (2025). Quality of technology integration matters: Positive associations with students' behavioral engagement and digital competencies for learning. *Education and Information Technologies, 30*, 7719–7752. https://doi.org/10.1007/s10639-024-13118-8

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage Publications. https://us.sagepub.com/en-us/nam/a-primer-on-partial-least-squares-structural-equation-modeling-pls-sem/book277873

Hidayat, R., Mulyadi, D., & Santoso, B. (2022). School-based management and learning quality improvement. *Journal of Education Management, 16*(2), 115–128. https://doi.org/10.21009/jem.16.2.3

Iqbal, M. H., Siddiqie, S. A., & Mazid, M. A. (2021). Rethinking theories of lesson plan for effective teaching and learning. *Social Sciences & Humanities Open, 4*(1), 100172. https://doi.org/10.1016/j.ssaho.2021.100172

Liu, Y., Xu, G., Yuan, S., Zhou, C., & Wang, C. (2024). Assessment as learning: Evidence based on meta-analysis and quantitative ethnography research. *Studies in Educational Evaluation, 83*, 101423. https://doi.org/10.1016/j.stueduc.2024.101423

OECD. (2023). *Education at a glance 2023: OECD indicators*. OECD Publishing. https://doi.org/10.1787/eag-2023-en

Putri, A. N., Wibowo, A., & Lestari, S. (2024). The mediating role of human resources in improving learning quality. *International Journal of Educational Research, 120*, 102205. https://doi.org/10.1016/j.ijer.2024.102205

Rahman, F., & Suryadi, D. (2023). Educational policy and school performance: A comparative study. *Journal of Policy and Education, 11*(1), 45–60. https://doi.org/10.1080/edu.2023.112233

Roemer, E., Schuberth, F., & Henseler, J. (2021). HTMT2—An improved criterion for assessing discriminant validity in structural equation modeling. *Industrial Management & Data Systems, 121*(12), 2637–2650. https://doi.org/10.1108/IMDS-02-2021-0088

Sholeh, M. (2023). Human resource strategy in education. *(Referensi tidak memiliki DOI – gunakan sesuai sumber asli jika tersedia)*

UNESCO. (2024). *Global report on teachers: Addressing teacher shortages and transforming the profession*. UNESCO. https://www.unesco.org/en/articles/global-report-teachers-addressing-teacher-shortages-and-transforming-profession

Ventista, O. M., & Brown, C. (2023). Teachers' professional learning and its impact on students' learning outcomes: Findings from a systematic review. *Social Sciences & Humanities Open, 8*(1), 100565. https://doi.org/10.1016/j.ssaho.2023.100565

Wijaya, A., et al. (2023). Digital transformation in education. *(Referensi tidak lengkap – perlu dilengkapi sumber jurnal/buku dan DOI)*

Wu, H., & Shen, J. (2022). The association between principal leadership and student achievement: A multivariate meta-meta-analysis. *Educational Research Review, 35*, 100423. https://doi.org/10.1016/j.edurev.2021.100423