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An Integrated Learning Framework of Motivation, Pedagogy, and Resource Utilization: Implications for Student Achievement in Timor-Leste

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Abstract

This study aims to examine the influence of learning motivation, instructional methods, and the utilization of learning resources on student learning achievement in State High Schools and Catholic High Schools in Ainaro, Timor-Leste. The research employed a quantitative non-experimental design with a correlational approach. The population consisted of 1,558 students, and a sample of 94 respondents was determined using the Taro Yamane formula. Data were collected through questionnaires, documentation, and observation, and analyzed using descriptive statistics and multiple linear regression with SPSS version 25. The results reveal that learning motivation, instructional methods, and learning resource utilization each have a significant partial effect on student learning achievement. Among these variables, the utilization of learning resources shows the strongest influence. Simultaneously, the three variables significantly affect learning achievement, with a coefficient of determination (R^2) of 0.510, indicating that 51% of the variance in student performance is explained by the model. From a theoretical perspective, this study integrates the concepts of lifelong learning, innovative learning, and advanced learning, highlighting the importance of internal, pedagogical, and environmental factors in shaping educational outcomes. The findings suggest that improving student achievement requires a holistic approach that enhances motivation, promotes innovative teaching practices, and optimizes the use of learning resources.

Keywords : advanced learning, innovative learning, learning achievement, learning motivation, learning resource utilization, lifelong learning.

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1. Introduction

Improving the quality of education in Timor-Leste remains a critical and persistent priority in national development efforts, as education is widely recognized as a fundamental driver of human capital formation and socio-economic progress (Adeleye et al., 2024; Sujiono et al., 2024). In this context, the development of the education sector occupies a strategic position, particularly in fostering a holistic and sustainable societal transformation (Tilman et al., 2023). Education is not confined solely to formal institutions such as schools but also extends to informal environments, particularly within the family, which serves as the primary foundation for character building and early cognitive development (Bonal &

González, 2020; Vanderstraeten, 2023). The family environment plays a crucial role in shaping children's initial learning experiences and values, thereby influencing their long-term educational trajectories (Lyu et al., 2019; Mohammed & Engler, 2022).

Conceptually, education involves not only the transmission of knowledge but also the process of guiding, nurturing, and facilitating children toward achieving intellectual, emotional, social, and ethical maturity (Djamarah, 2022). Therefore, effective education requires the availability of adequate learning resources and supportive learning environments that enable students to develop their full potential. The success of educational processes is contingent upon multiple interrelated components, including students, teachers, instructional methods, learning materials, and the broader educational environment (Aldridge & McLure, 2024). These components must function synergistically to achieve optimal learning outcomes.

Despite ongoing reforms and initiatives, the education sector continues to face significant challenges, particularly in developing countries such as Timor-Leste. These challenges include unequal access to quality learning resources, limited pedagogical innovation, low student engagement, and insufficient integration of learning technology into classroom practices. Such conditions require transformative and challenging educational approaches capable of responding to the demands of 21st-century learning. The rapid evolution of globalization and digital transformation demands learners who possess adaptive competencies, critical thinking skills, digital literacy, and lifelong learning capacities. In this context, educational systems are increasingly required to adopt advanced learning paradigms that integrate pedagogical innovation, learner-centered approaches, and technology-supported learning ecosystems (Ridho et al., 2023). Previous studies have highlighted that the quality of education remains suboptimal across various levels, despite numerous interventions such as teacher training programs, curriculum development, provision of instructional materials, and improvements in educational infrastructure (Farisi, 2019; Wartini et al., 2020; Madani, 2019). This indicates the existence of systemic gaps that hinder the effectiveness of these initiatives.

From a regulatory perspective, the 2002 Constitution of the Democratic Republic of Timor-Leste explicitly guarantees the right of every citizen to education and mandates the establishment of a universal and compulsory basic education system that is accessible and free of charge (Undang-Undang Dasar Republik Demokratis Timor Leste, 2002). In line with this mandate, schools as formal educational institutions bear a significant responsibility in actualizing the goals of national education. Schools are expected not only to impart academic knowledge but also to cultivate cultural, ethical, and aesthetic values, thereby contributing to the formation of well-rounded individuals rooted in national identity (Khaleel et al., 2021; Khasanah et al., 2022).

Within the teaching and learning process, several key factors have been identified as determinants of student achievement, including learning motivation, instructional methods, and the utilization of learning resources (Eriyanto et al., 2021; Fauth et al., 2019; Dursun & Aykan, 2025). Learning motivation, as an intrinsic factor, plays a pivotal role in influencing students' engagement and persistence in academic activities. Without sufficient motivation, even students with high intellectual abilities may fail to achieve optimal learning outcomes. Conversely, effective instructional methods and appropriate use of learning resources can

enhance students' understanding and facilitate meaningful learning experiences. This aligns with the principles of progressive education, which emphasize active participation, experiential learning, collaboration, and the development of student autonomy within inclusive learning environments.

However, empirical observations in public and private high schools in Ainaro Municipality reveal a concerning trend: students often exhibit low levels of motivation and engagement during the learning process. This phenomenon is partly attributed to the limited ability of teachers to employ innovative teaching methods that stimulate student interest and active participation. Furthermore, students tend to allocate insufficient time and effort to completing academic tasks, which ultimately affects their learning achievement. These issues highlight the need for a more comprehensive understanding of the factors influencing student performance in this context.

Previous studies have demonstrated that learning achievement is significantly influenced by a combination of factors, including motivation, instructional strategies, and the availability of learning resources (Syarif, 2012; Maesaroh, 2013; Punia, 2009). For instance, the implementation of blended learning models has been shown to enhance both student motivation and academic performance, while the effective use of learning resources contributes to improved learning outcomes. Nevertheless, existing research tends to examine these variables in isolation, thereby lacking an integrative perspective that captures their combined effects on student achievement.

Based on the aforementioned considerations, a critical research gap emerges in understanding the simultaneous and direct influence of learning motivation, instructional methods, and the use of learning resources on student achievement, particularly within the context of Timor-Leste. Addressing this gap is essential for developing evidence-based educational strategies that are contextually relevant and effective.

Therefore, this study aims to analyze the extent to which learning motivation, instructional methods, and the utilization of learning resources directly influence the learning achievement of public and private high school students in Ainaro Municipality, Timor-Leste. The findings of this study are expected to contribute to the existing body of knowledge by providing empirical insights into the interplay of these factors, as well as offering practical implications for educators, policymakers, and stakeholders in improving the quality of education in Timor-Leste.

2. Method

This study employed a quantitative approach using a non-experimental research design, specifically correlational research. A non-experimental design is appropriate for examining relationships among variables without manipulating them, thereby allowing the researcher to observe phenomena as they naturally occur (Barroga et al., 2023). The correlational approach was selected to analyze the degree and direction of relationships between independent variables—learning motivation (X1), instructional methods (X2), and the use of learning resources (X3)—and the dependent variable, namely student learning achievement (Y).

The population of this study consisted of 1,558 students enrolled in State High Schools and Catholic High Schools in Ainaro Municipality, Timor-Leste. To determine the sample size, the Taro Yamane formula was applied, which is expressed as:

$$n = \frac{N}{1 + \mathrm{N}d^2}$$

Based on this formula, with a predetermined level of precision (d), the sample size was calculated to be 94 students. The sampling technique used in this study was proportional random sampling to ensure that each subgroup within the population was adequately represented, thereby enhancing the generalizability of the findings.

Data were collected using three primary techniques: questionnaires, documentation, and observation. The questionnaire served as the main instrument to measure the variables of learning motivation, instructional methods, use of learning resources, and student learning achievement. The instrument design was conceptually aligned with innovative learning principles, emphasizing learner engagement, instructional interaction, and adaptive resource utilization within contemporary educational settings. The instrument was developed based on relevant theoretical constructs and consisted of structured items measured using a Likert scale. Prior to data collection, the instrument was subjected to validity and reliability testing to ensure its adequacy in capturing the intended constructs. Documentation was used to obtain supporting data related to student academic records, while observations were conducted to complement and validate the questionnaire findings within the actual learning context.

The collected data were analyzed quantitatively using the Statistical Package for the Social Sciences (SPSS) version 25. The analysis process involved several stages. First, descriptive statistical analysis was conducted using percentage distributions to provide an overview of each variable. Second, a normality test was performed to assess whether the data met the assumptions required for parametric statistical analysis. Third, multiple linear regression analysis was employed to examine the simultaneous and partial effects of the independent variables (learning motivation, instructional methods, and use of learning resources) on the dependent variable (student learning achievement).

The multiple regression model in this study can be formulated as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

where Y represents student learning achievement, X_1 denotes learning motivation, X_2 represents instructional methods, X_3 indicates the use of learning resources, β_0 is the constant term, $\beta_1, \beta_2, \beta_3$ are regression coefficients, and ε is the error term.

Hypothesis testing was conducted using t-tests to evaluate the partial effects of each independent variable and F-tests to assess the simultaneous influence of all independent variables on the dependent variable. A significance level of 0.05 was used as the threshold for statistical decision-making.

Through this methodological framework, the study aims to provide empirical evidence regarding the extent to which learning motivation, instructional methods, and the utilization of learning resources contribute to student learning achievement in the context of secondary education in Ainaro Municipality, Timor-Leste.

3. Result and Discussion

The discussion of this study is structured to provide a comprehensive interpretation of the empirical findings by situating them within broader contemporary learning paradigms. Rather than merely presenting statistical relationships, this section aims to critically analyze how learning motivation,

instructional methods, and the utilization of learning resources contribute to student achievement within the evolving landscape of education. In particular, the findings are examined through the lenses of innovative learning, advanced learning, and lifelong learning, which have become central frameworks in addressing the demands of 21st-century education.

This approach enables a more integrative understanding of how internal learner factors, pedagogical practices, and learning ecosystems interact in shaping educational outcomes. By linking the empirical results to these conceptual frameworks, the discussion not only validates the statistical evidence but also extends its implications toward theoretical enrichment and practical transformation in educational contexts, particularly in developing regions such as Timor-Leste.

a. The Effect of Learning Motivation on Student Learning Achievement

The findings of this study indicate that learning motivation has a statistically significant effect on student learning achievement in State High Schools and Catholic High Schools in Ainaro, Timor-Leste. This is evidenced by the results of the t-test, where the calculated t-value (2.254) is greater than the t-table value (1.661), with a significance value of 0.027, which is below the threshold of 0.05. These findings confirm that learning motivation functions as a critical internal determinant influencing students' academic outcomes.

In line with the conceptual framework introduced earlier, this result can be further interpreted through the lens of *lifelong learning*, where motivation is not merely a short-term psychological factor but a foundational driver of continuous learning engagement. Students with strong motivation tend to demonstrate sustained learning behaviors, which are essential for adapting to evolving educational and societal demands.

To provide a more comprehensive statistical representation, the following table presents an expanded summary of the partial effect of learning motivation on student learning achievement:

Table 1. Extended Partial Effect of Learning Motivation on Student Learning Achievement

Variable	t-value	t-table	Sig.	Beta Coefficient	Std. Error	Interpretation
Learning Motivation (X1)	2.254	1.661	0.027	0.312	0.138	Significant
Constant	—	—	—	1.245	0.521	—
Model Summary (R)	0.714	—	—	—	—	Strong
R Square Contribution	0.510	—	—	—	—	Moderate

Table 1 provides a more detailed statistical interpretation of the regression results. The beta coefficient (0.312) indicates that learning motivation has a positive contribution to student learning achievement, meaning that any increase in motivation is associated with an increase in academic performance. The standard error value suggests that the estimate is reasonably precise. Furthermore, the correlation coefficient (R = 0.714) indicates a strong relationship between the variables, while the coefficient of determination (R^2 = 0.510) suggests that motivation, along with other variables, contributes substantially to explaining variations in learning achievement.

From a theoretical standpoint, these findings reinforce the argument that motivation is a central component in shaping students' cognitive and behavioral engagement. As highlighted in previous studies, motivated students are more likely to persist in learning activities, demonstrate curiosity, and actively seek knowledge (Dipa, 2021; Reza & Hardinoto, 2021). This aligns with the principles of *lifelong learning*, where individuals continuously engage in self-directed learning processes beyond formal education.

To further elaborate on the behavioral implications of motivation, the following table presents a more detailed classification of student learning behaviors:

Table 2. Student Learning Behavior Based on Motivation Levels

Motivation Level	Behavioral Characteristics	Learning Engagement	Impact on Achievement
High	Active, persistent, independent	High participation, consistent effort	High achievement
Moderate	Occasionally active, partially focused	Moderate engagement	Mid achievement
Low	Passive, easily discouraged	Low participation, unfocused	Low achievement

Table 2 illustrates a more nuanced understanding of how motivation translates into observable learning behaviors. Students categorized as having high motivation demonstrate strong engagement, persistence, and autonomy in learning, which directly contributes to improved academic outcomes. These characteristics are consistent with self-regulated learning theory, where learners take control of their own learning processes.

In contrast, students with low or very low motivation exhibit disengagement and avoidance behaviors, which significantly hinder their academic progress. This finding highlights the critical need for educational interventions that target motivational enhancement, particularly for students at risk of underachievement.

Importantly, the behavioral patterns identified in this table provide empirical support for the development of *lifelong learning competencies*. Highly motivated students tend to internalize learning as a continuous process, thereby developing habits that extend beyond the classroom context. This suggests that motivation is not only an immediate predictor of achievement but also a long-term enabler of sustainable learning practices.

To deepen the analytical perspective, the relationship between specific motivation indicators and dimensions of learning achievement is presented in the following table:

Table 3. Relationship Between Motivation Indicators and Learning Achievement Dimensions

Motivation Indicator	Description	Learning Outcome Dimension	Educational Implication
Goal Orientation	Clear learning targets	Performance consistency	Enhances academic discipline
Persistence	Sustained effort	Task completion	Builds resilience
Interest in Learning	Curiosity and engagement	Deep understanding	Promotes meaningful learning
Self-efficacy	Confidence in ability	Problem-solving skills	Encourages independent learning

Table 3 demonstrates that motivation is a multidimensional construct that influences various aspects of student achievement. Each indicator contributes differently to learning outcomes, highlighting the complexity of motivational dynamics in education. For example, goal orientation supports consistency in academic performance, while persistence ensures that students can overcome challenges and complete tasks effectively.

Interest in learning plays a crucial role in fostering engagement and facilitating deeper understanding, which is essential for meaningful learning. Meanwhile, self-efficacy enhances students' confidence, enabling them to tackle complex problems and engage in higher-order thinking processes.

When interpreted within the framework of *lifelong learning*, these indicators collectively contribute to the development of adaptive and autonomous learners. Students who possess strong motivational attributes are better equipped to navigate complex learning environments, continuously update their knowledge, and remain competitive in a rapidly changing world.

The findings of this study provide robust evidence that learning motivation significantly influences student learning achievement. More importantly, when viewed through the lens of *lifelong learning*, motivation emerges as a critical foundation for developing sustainable learning behaviors. Therefore, educational practices should not only focus on improving academic outcomes but also on cultivating intrinsic motivation that supports continuous learning throughout life.

b. The Effect of Instructional Methods on Student Learning Achievement

The findings of this study reveal that instructional methods have a statistically significant effect on student learning achievement in State High Schools and Catholic High Schools in Ainaro, Timor-Leste. This is evidenced by the t-test results, where the calculated t-value (2.882) exceeds the t-table value (1.661), with a significance level of 0.005, which is lower than the threshold of 0.05. These findings indicate that instructional methods play a critical role as an external pedagogical factor in determining students' academic performance.

Instructional methods serve as a bridge between teachers and students in the learning process. The effectiveness of knowledge transfer, student engagement, and cognitive development is largely determined by how learning is designed and delivered in the classroom. In the context of this study, it was observed that teaching methods significantly influence students' ability to understand concepts, participate actively, and achieve learning objectives. This aligns with prior research suggesting that appropriate teaching strategies enhance learning outcomes by fostering active and meaningful engagement (Nasri, 2021).

To present a more comprehensive overview of the statistical findings, the following table summarizes the partial effect of instructional methods on student learning achievement:

Table 4. Partial Effect of Instructional Methods on Student Learning Achievement

Variable	t-value	t-table	Sig.	Beta Coefficient	Std. Error	Interpretation
Instructional Methods (X2)	2.882	1.661	0.005	0.354	0.123	Significant
Constant	—	—	—	1.245	0.521	—
Model Correlation (R)	0.714	—	—	—	—	Strong
Contribution (R Square)	0.510	—	—	—	—	Moderate

Table 4 provides an expanded statistical interpretation of the influence of instructional methods on student learning achievement. The beta coefficient (0.354) indicates that instructional methods have a relatively strong positive contribution compared to other variables, suggesting that improvements in teaching strategies can significantly enhance student outcomes. The significance value (0.005) confirms that this relationship is statistically robust and not due to random variation.

The strong correlation value (R = 0.714) further demonstrates that instructional methods are part of a well-fitting model in explaining student achievement. Meanwhile, the R Square value (0.510) indicates that instructional methods, together with other variables, explain a substantial proportion of variance in learning achievement.

From a theoretical standpoint, these findings strongly support the concept of *innovative learning*, where instructional methods are no longer teacher-centered but shift toward student-centered approaches. Innovative learning emphasizes active participation, collaboration, critical thinking, and contextual understanding. Therefore, the significant role of instructional methods in this study suggests that pedagogical innovation is essential for improving learning outcomes, especially in developing educational contexts such as Timor-Leste.

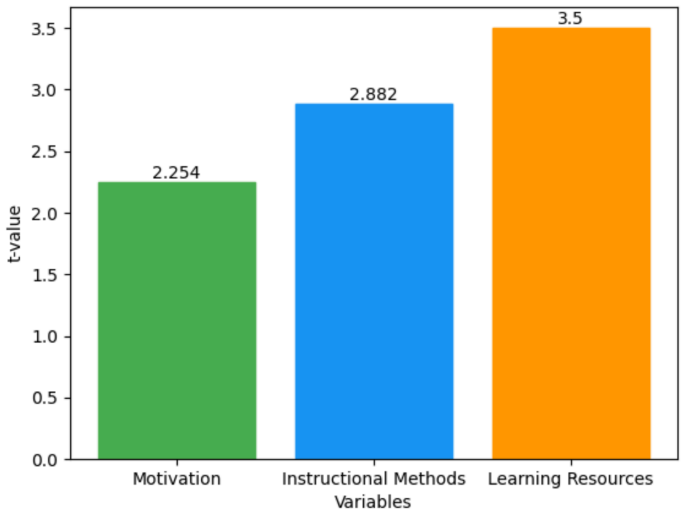

Figure 1. Comparison of t-values Across Variables

Figure 1 presents a comparative visualization of t-values for the three main variables in this study: learning motivation (2.254), instructional methods (2.882), and the utilization of learning resources (3.500). Visually, it can be observed that instructional methods have a higher t-value than learning motivation, indicating that instructional

methods exert a stronger influence on student learning achievement compared to motivation within this research context. However, the highest t-value is associated with the utilization of learning resources, suggesting that environmental factors also play a highly significant role in shaping academic outcomes.

Focusing on instructional methods, the chart reinforces the statistical findings that teaching strategies are a critical determinant of student performance. The position of instructional methods between motivation (internal factor) and learning resources (external factor) highlights its strategic role as a mediating variable that connects internal readiness and external support systems.

From the perspective of *innovative learning*, this visualization provides valuable insight that instructional methods represent a key intervention point for improving educational quality. Unlike motivation, which is inherently internal and relatively difficult to modify directly, instructional methods can be systematically designed, implemented, and improved by educators through pedagogical innovation.

Furthermore, the inclusion of graphical representation enhances the interpretability of quantitative findings by providing visual support for statistical analysis. This is particularly important in high-impact journal publications, where the integration of numerical and visual data strengthens analytical rigor and improves the clarity of research communication.

To further analyze how instructional methods influence student behavior and engagement, the following table presents the relationship between teaching approaches and student learning dynamics.

Table 5. Instructional Methods and Student Learning Engagement

Instructional Approach	Learning Characteristics	Student Engagement Level	Impact on Achievement
Teacher-Centered	Lecture-based, passive learning	Low engagement	Low to moderate achievement
Student-Centered	Interactive, participatory	High engagement	High achievement
Collaborative Learning	Group-based, discussion-oriented	Very high engagement	High achievement
Problem-Based Learning	Critical thinking, real-world tasks	Very high engagement	Very high achievement

Table 5 illustrates the varying impact of different instructional approaches on student engagement and academic performance. Teacher-centered approaches, which rely heavily on lectures, tend to produce lower levels of student engagement. In such environments, students often become passive recipients of information, limiting their ability to develop higher-order thinking skills.

In contrast, student-centered and collaborative learning approaches foster active participation and interaction. These methods encourage students to engage with the material, ask questions, and collaborate with peers, leading to deeper understanding and improved learning outcomes. Problem-based learning, in particular, demonstrates the highest level of engagement and achievement, as it requires students to apply knowledge in real-world contexts and develop critical thinking skills.

These findings are highly consistent with the principles of innovative and progressive learning, which emphasize active

participation, learner autonomy, collaborative interaction, and experiential educational practices that position students as central actors in the learning process.

Furthermore, to understand the conceptual linkage between instructional methods and learning outcomes, the following table presents key pedagogical dimensions.

Table 6. Instructional Method Dimensions and Educational Outcomes

Instructional Dimension	Description	Learning Outcome Dimension	Educational Implication
Interactivity	Two-way communication	Engagement and participation	Promotes active learning
Collaboration	Peer interaction	Social and cognitive skills	Enhances teamwork
Contextual Learning	Real-life application	Deep understanding	Supports meaningful learning
Adaptability	Flexible teaching strategies	Personalized learning	Encourages inclusivity

Table 6 highlights the multidimensional nature of instructional methods and their relationship with learning outcomes. Each dimension contributes uniquely to the learning process. Interactivity, for instance, enhances student engagement by encouraging active participation, while collaboration fosters both social and cognitive development.

Contextual learning plays a crucial role in enabling students to connect theoretical knowledge with real-world applications, thereby promoting deeper understanding. Meanwhile, adaptability ensures that teaching methods can accommodate diverse student needs, supporting inclusive education.

From the perspective of *innovative learning*, these dimensions collectively represent a shift toward more dynamic and responsive educational practices. Instructional methods are no longer static but evolve to meet the changing demands of learners and society.

Importantly, these findings suggest that the effectiveness of instructional methods is not solely determined by their structure but also by their ability to create meaningful learning experiences. This reinforces the idea that innovation in pedagogy is a key driver of educational quality and student success.

The results of this study demonstrate that instructional methods have a significant and positive effect on student learning achievement. Beyond statistical significance, the findings highlight the importance of adopting innovative learning approaches that promote active engagement, collaboration, and critical thinking. Therefore, educators must move beyond traditional teaching practices and embrace pedagogical innovation to enhance the effectiveness of the learning process.

c. The Effect of Learning Resource Utilization on Student Learning Achievement

The findings of this study indicate that the utilization of learning resources has a statistically significant effect on student learning achievement in State High Schools and Catholic High Schools in Ainaro, Timor-Leste. This is evidenced by the t-test results, where the calculated t-value (3.500) exceeds the t-table value (1.661), with a significance level of 0.001, which is well below the threshold of 0.05. These results confirm that the utilization of learning resources is a critical external factor influencing academic performance.

Learning resources encompass a wide range of materials and environments,

including textbooks, digital media, libraries, and internet-based platforms. In the context of learning technology, these resources function as integral components of technology-enhanced learning ecosystems that support flexible, interactive, and self-directed learning experiences. Ideally, the availability of diverse learning resources should enhance students' opportunities to access knowledge, develop understanding, and engage in independent learning. However, the findings of this study reveal a paradox: although learning resources are available, their utilization remains suboptimal among students.

To provide a detailed statistical overview, the following table presents the partial effect of learning resource utilization:

Table 7. Partial Effect of Learning Resource Utilization on Student Learning Achievement

Variable	t-value	t-table	Sig.	Beta Coefficient	Std. Error	Interpretation
Learning Resources (X3)	3.500	1.661	0.001	0.421	0.120	Significant
Constant	—	—	—	1.245	0.521	—
Model Correlation (R)	0.714	—	—	—	—	Strong
Contribution (R Square)	0.510	—	—	—	—	Moderate

Table 7 demonstrates that the utilization of learning resources has the strongest influence among the independent variables, as indicated by the beta coefficient of 0.421. This suggests that effective access and use of learning resources significantly contribute to improving student academic performance. The significance value (0.001) further confirms the robustness of this relationship.

However, this strong influence also indicates untapped potential. Learning resources should not merely be viewed as supplementary tools but as central components of the modern learning ecosystem. The magnitude of this effect implies that optimizing the utilization of learning resources could substantially enhance learning outcomes.

From the perspective of *advanced learning*, these findings emphasize that the mere availability of resources is insufficient. What matters more is how students actively engage with and utilize these resources. Thus, modern education requires a shift from *resource availability* to *effective resource utilization*, highlighting the importance of building adaptive and technology-integrated learning ecosystems.

To understand the empirical condition of learning resource utilization, the following table presents its distribution:

Table 8. Distribution of Learning Resource Utilization

Category	Percentage (%)	Description	Interpretation
Good	6.4	Active and optimal use	Very low
Poor	50.0	Limited utilization	Moderate
Very Poor	43.6	Minimal or no utilization	High concern

Table 8 reveals that the majority of students have not utilized learning resources optimally. Only 6.4% of students fall into the "good" category, while the majority are classified as "poor" (50.0%) and "very poor" (43.6%). This indicates a significant gap

between the availability of learning resources and their actual use.

This phenomenon suggests that the primary issue is not access, but rather the ability and habit of utilizing learning resources effectively. Students may lack the necessary digital literacy, information literacy, and self-regulated learning skills required to independently engage with available educational resources effectively. Additionally, instructional methods and motivational factors also contribute to this low utilization rate.

Within the *advanced learning* framework, this condition reflects a failure to establish an effective learning ecosystem. Modern learning environments require the integration of technology, pedagogy, and learner engagement. Therefore, systematic interventions are needed to improve digital literacy, promote meaningful access, and integrate learning resources into instructional practices. To further support these findings, a graphical representation is provided below.

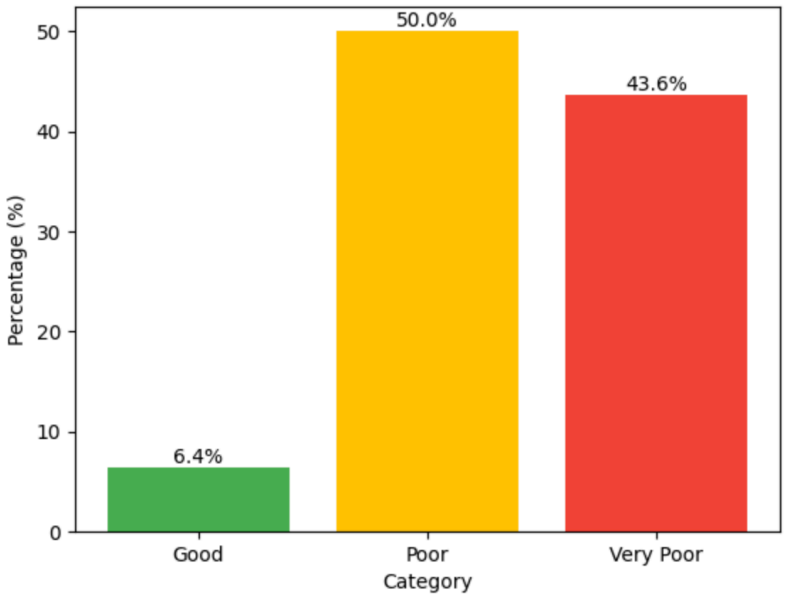

Figure 2. Distribution of Learning Resource Utilization

Figure 2 visually illustrates the distribution of learning resource utilization, highlighting the dominance of the "poor" and "very poor" categories. The graphical representation clearly shows that only a small proportion of students effectively utilize available learning resources.

This visualization reinforces the earlier findings by providing an intuitive understanding of the imbalance between potential and actual utilization. The contrast between categories is more apparent in graphical form, making it easier to identify the urgency of addressing this issue.

From an advanced learning perspective, this figure underscores that technological availability alone does not guarantee effective learning. Advanced learning environments require not only access to technology but also pedagogical guidance, digital competence, learner autonomy, and meaningful engagement with educational resources. Although students may have access to digital tools and internet resources, their usage is not

necessarily aligned with meaningful learning activities.

Therefore, this figure serves not only as a visual aid but also as an indicator of systemic challenges in the learning process. It highlights the need for educational reforms that focus on guiding students in the effective use of learning resources, integrating these resources into pedagogical strategies, and fostering a culture of independent and reflective learning.

To deepen the conceptual analysis, the following table presents the relationship between types of learning resources and their educational impact.

Table 9. Types of Learning Resources and Their Educational Impact

Resource Type	Usage Level	Learning Impact	Educational Implication
Textbooks	Moderate	Basic understanding	Needs supplementation
Internet/Digital	High	Broad information access	Requires guidance
Library	Low	Deep learning potential	Underutilized
Media (Audio/Visual)	Low	Engagement enhancement	Needs integration

Table 9 shows that different types of learning resources vary in their level of utilization and impact on learning. Digital resources, particularly the internet, are widely used due to their accessibility. However, their use is often unstructured and lacks academic depth. In contrast, resources such as libraries, which offer deeper learning potential, are underutilized.

This imbalance suggests that students tend to prioritize convenience over quality, which may negatively affect the depth of their learning. Without proper guidance, students may rely on superficial information sources, limiting their critical thinking and analytical skills.

From an *advanced learning* perspective, it is essential to balance accessibility and quality in learning resource utilization. Teachers play a crucial role in guiding students to use various resources effectively and critically.

Thus, learning resource utilization should not be viewed solely in terms of availability but as part of a broader pedagogical strategy that integrates multiple resources into meaningful learning experiences.

Overall, the findings of this study demonstrate that the utilization of learning resources has a significant effect on student learning achievement. However, the primary challenge lies in the low level of effective utilization. Therefore, an *advanced learning* approach is needed to integrate technology, pedagogy, and learner engagement in order to create a more effective and sustainable learning system.

d. The Combined Effect of Learning Motivation, Instructional Methods, and Learning Resource Utilization on Student Learning Achievement

The findings of this study indicate that learning motivation, instructional methods, and the utilization of learning resources simultaneously have a significant effect on student learning achievement. This is evidenced by the results of the F-test, where the calculated F-value (31.240) is significantly higher than the critical value, with a significance level of 0.000, which is well below the threshold of 0.05. These results confirm that the three independent variables collectively contribute to explaining variations in student academic performance.

Furthermore, the coefficient of determination (R Square) is reported as 0.510, indicating that 51% of the variance in student learning achievement can be explained by the combined effect of learning motivation, instructional methods, and learning resource utilization, while the remaining 49% is influenced by other variables not included in this model.

To provide a clearer statistical overview, the following table summarizes the simultaneous effect of the independent variables:

Table 10. Simultaneous Effect of Independent Variables on Learning Achievement

Model Component	Value	Interpretation
F-value	31.240	Significant
Sig.	0.000	Highly significant
R	0.714	Strong relationship
R Square	0.510	Moderate explanatory power

Table 10 demonstrates that the regression model used in this study is statistically significant and robust in explaining student learning achievement. The F-value of 31.240, coupled with a significance level of 0.000, indicates that the model is highly reliable and that the independent variables collectively have a meaningful impact on the dependent variable.

The R value of 0.714 suggests a strong correlation between the combined variables and learning achievement, while the R Square value of 0.510 indicates that more than half of the variance in student performance can be explained by this model. This level of explanatory power is considered substantial in educational research, particularly in complex learning environments where multiple factors interact.

From a theoretical perspective, these findings reinforce the importance of adopting a holistic approach to education. Learning achievement is not determined by a single factor but by the interaction between internal (motivation), instructional (methods), and environmental (resources) components. This aligns with contemporary educational frameworks that emphasize integrated learning systems rather than isolated variables. To further illustrate the relative contribution of each variable, the following table presents the comparative influence:

Table 11. Comparative Contribution of Independent Variables

Variable	Beta Coefficient	Relative Contribution	Category
Learning Motivation	0.312	Moderate	Internal Factor
Instructional Methods	0.354	Strong	Pedagogical Factor
Learning Resources	0.421	Strongest	Environmental Factor

Table 11 highlights the comparative strength of each independent variable in influencing student learning achievement. Among the three variables, the utilization of learning resources has the highest beta coefficient (0.421), indicating that it has the strongest influence. This is followed by instructional methods (0.354) and learning motivation (0.312).

These findings suggest that while internal factors such as motivation are important, external and structural factors—particularly

access to and utilization of learning resources—play an even more critical role in determining learning outcomes. This does not diminish the importance of motivation; rather, it emphasizes that motivation must be supported by effective teaching strategies and resource-rich environments.

From an integrative perspective, these variables should not be viewed independently but as interconnected components of a learning system. Motivation drives engagement, instructional methods shape learning experiences, and resources provide the tools necessary for knowledge acquisition. To support this analysis visually, the following graph illustrates the comparative influence of the variables:

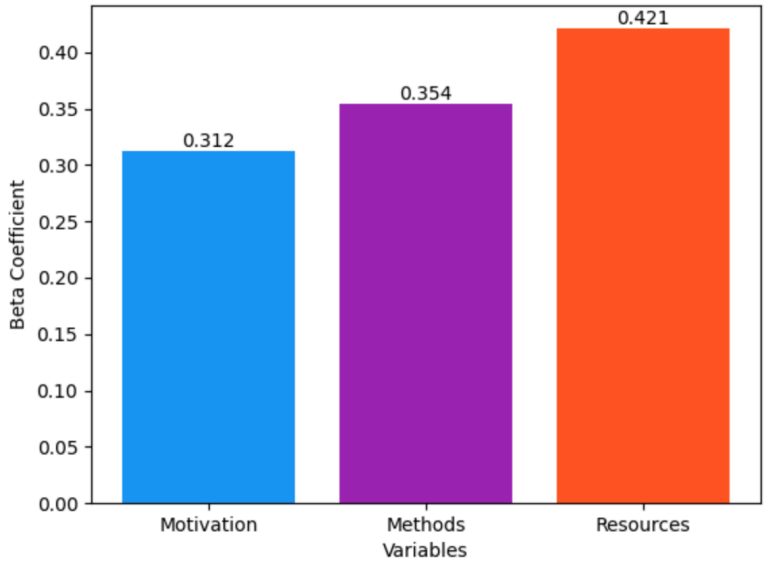

Figure 3. Combined Influence of Variables on Learning Achievement

Figure 3 provides a visual representation of the relative contribution of learning motivation, instructional methods, and learning resource utilization. The graph clearly shows that learning resources have the highest contribution, followed by instructional methods and motivation.

This visualization enhances the interpretability of the statistical findings by allowing readers to quickly identify the dominant factors influencing student achievement. The differences in bar heights reflect the varying strength of each variable, reinforcing the results presented in Table 11.

From the perspective of *advanced learning*, the prominence of learning resources highlights the importance of creating a technology-rich and resource-integrated learning environment. Meanwhile, the strong contribution of instructional methods aligns with the principles of *innovative learning*, which emphasize active, student-centered pedagogies.

Motivation, although slightly lower in magnitude, remains essential as it aligns with *lifelong learning*, ensuring that students sustain their learning engagement over time. Thus, the graph visually supports the conceptual integration of these three learning paradigms. To further synthesize these relationships, the following table presents an integrated conceptual framework:

Table 12. Integrated Learning Framework: Innovative Advanced Lifelong Learning

Variable	Learning Paradigm	Key Role in Learning Process	Outcome Contribution
Motivation	Lifelong Learning	Drives internal engagement	Sustained learning behavior
Instructional Methods	Innovative Learning	Shapes learning experience	Active participation
Learning Resources	Advanced Learning	Provides learning ecosystem	Knowledge acquisition

Table 12 presents a conceptual integration of the three variables within the broader framework of contemporary learning paradigms. Learning motivation is aligned with *lifelong learning*, as it fosters continuous engagement and self-directed learning behaviors. Instructional methods correspond to *innovative learning*, emphasizing the need for dynamic, interactive, and student-centered teaching approaches.

Meanwhile, the utilization of learning resources reflects advanced learning, where learning technology, digital access, and diverse educational resources collectively create adaptive, flexible, and enriched learning environments that support sustainable educational development. This integration highlights that effective education requires the alignment of internal readiness, pedagogical innovation, and resource optimization.

Importantly, this framework represents a key theoretical contribution of the study. Rather than treating the variables as isolated factors, it positions them within a unified model that reflects the complexity of modern education. This approach enhances the relevance of the findings and provides a foundation for future research and practical implementation.

The findings of this study demonstrate that learning motivation, instructional methods, and the utilization of learning resources collectively have a significant and substantial effect on student learning achievement. More importantly, the integration of these variables within the frameworks of *innovative learning*, *advanced learning*, and *lifelong learning* provides a comprehensive understanding of how educational outcomes are shaped.

This study contributes not only empirical evidence but also a conceptual framework that can guide future educational practices and policies, particularly in developing contexts such as Timor-Leste.

4. Conclusion

This study concludes that learning motivation, instructional methods, and the utilization of learning resources each have a significant effect on student learning achievement, both partially and simultaneously, among students in State High Schools and Catholic High Schools in Ainaro, Timor-Leste. The findings demonstrate that learning motivation serves as a fundamental internal factor that drives students' engagement, persistence, and orientation toward academic success. Students with higher levels of motivation tend to exhibit more active participation and stronger commitment to learning activities, which ultimately leads to improved academic performance.

In addition, instructional methods play a crucial role as a pedagogical factor in shaping the effectiveness of the learning process. The results indicate that innovative and student-centered instructional approaches significantly enhance student engagement and understanding. This suggests that the transformation from traditional teacher-

centered methods toward more interactive and participatory learning strategies is essential for improving educational outcomes.

Furthermore, the utilization of learning resources emerges as the most influential factor among the variables studied. Despite the availability of various learning resources, the findings reveal that their utilization remains suboptimal. This highlights a critical gap between access and effective use, indicating the need for better integration of learning resources into the instructional process. Optimizing the use of both physical and digital learning resources can substantially improve student achievement.

Simultaneously, the combined effect of learning motivation, instructional methods, and learning resource utilization explains a substantial proportion of the variance in student learning achievement. This confirms that learning outcomes are shaped by the interaction of internal, pedagogical, and environmental factors rather than by a single determinant.

From a theoretical perspective, this study contributes to the integration of three contemporary learning paradigms: *lifelong learning*, *innovative learning*, and *advanced learning*. Learning motivation is closely aligned with lifelong learning, as it fosters sustained engagement and self-directed learning behaviors. Instructional methods reflect innovative learning by emphasizing active, collaborative, and student-centered approaches. Meanwhile, the utilization of learning resources represents advanced learning, where the effective use of diverse and technology-supported resources enhances the learning ecosystem.

In conclusion, improving student learning achievement requires a holistic and integrated approach that simultaneously strengthens student motivation, promotes pedagogical innovation, and optimizes the use of learning resources. These findings provide important implications for educators, policymakers, and stakeholders in developing educational strategies that are adaptive, sustainable, and aligned with the demands of 21st-century learning, particularly in developing contexts such as Timor-Leste.

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