

Understanding Learning Outcomes: The Predictive Roles of Academic Resilience and Student Engagement

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ABSTRACT

This study examines the extent to which academic resilience and student engagement predict students' learning outcomes in a vocational education context. Despite increasing attention to these factors, prior research has largely examined them separately and has focused more on general or higher education settings, leaving their combined role in vocational secondary education, particularly in developing countries, underexplored. Addressing this gap, this study adopts a quantitative approach with an explanatory design and was conducted at SMKN 1 Painan, West Sumatra, Indonesia. A total of 190 eleventh-grade students were selected from a population of 359 using proportional random sampling. Data were collected through structured questionnaires and school records and analyzed using multiple linear regression. The results indicate that academic resilience and student engagement significantly predict students' learning outcomes, both individually and simultaneously, explaining 37.9% of the variance. This study offers a distinct contribution by examining persistence in facing academic challenges and active participation in learning within a single analytical framework in a vocational education context. These findings imply that strengthening students' persistence and promoting active involvement through interactive and practice-oriented learning strategies are essential for improving academic performance.



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INTRODUCTION

Education systems worldwide are increasingly expected to produce graduates who possess not only cognitive competencies but also adaptive psychological capacities necessary for navigating complex learning environments. In the context of rapid technological change and global economic competition, improving students' learning outcomes has become a central goal of educational institutions. Learning outcomes represent the measurable knowledge, skills, and competencies acquired by students through educational processes and serve as key indicators of educational quality and effectiveness (Schunk & DiBenedetto, 2020). Consequently, identifying the factors that contribute to students' academic success has become a major concern in contemporary educational research.

Recent developments in educational research indicate that academic performance is influenced not only by students' cognitive abilities but also by a range of internal and behavioral factors that shape the learning process. Elements such as persistence in completing academic tasks, active participation in classroom activities, and the ability to respond constructively to learning challenges play a crucial role in determining students' academic achievement. These dimensions reflect students' learning behaviors and engagement patterns, which are increasingly recognized as important determinants of learning outcomes, particularly in educational environments that require sustained effort and continuous involvement in instructional activities (Zimmerman, 2008; Steel et al., 2024). In addition, recent empirical studies emphasize that internal student factors, including self-regulated learning and adaptive learning behaviors, significantly contribute to variations in academic performance (Broadbent & Poon, 2021). Therefore, examining these internal and behavioral dimensions provides a more comprehensive basis for understanding students' learning outcomes and offers a coherent foundation for further discussion on constructs such as academic resilience and student engagement.

Academic resilience has increasingly attracted attention in educational research as an important factor supporting students' success in learning. Academic resilience refers to students' capacity to deal with academic challenges, difficulties, and learning demands while continuing to strive for academic achievement (Cassidy, 2016). Students who demonstrate strong academic resilience tend to show persistence in completing learning tasks, maintain effort when encountering difficult material, and actively seek solutions when facing obstacles in the learning process. This capacity is particularly relevant in vocational education contexts, where learning activities often emphasize practical problem solving, project based tasks, and the integration of theoretical knowledge with real world applications. In such environments, students are required to remain actively engaged and consistently adaptive when facing complex and task oriented learning demands. Therefore, the ability to persist and respond constructively to challenges becomes a critical determinant of successful learning. Empirical studies have reported that academic resilience contributes positively to students' academic performance across various educational settings, including vocational contexts (Obeng et al., 2025; Cai & Meng, 2025; Surya & Armianti, 2023; Apriliana & Suranata, 2025). Students who are able to remain persistent and adaptive when encountering academic challenges are more likely to sustain their learning efforts and achieve better academic outcomes.

In addition to resilience, student engagement has been widely acknowledged as another key determinant of academic success. Student engagement refers to the degree to which students actively participate in the learning process through behavioral, emotional, and cognitive involvement (Fredricks et al., 2004). Engaged students are more likely to invest effort in learning activities, interact actively with teachers and peers, and employ deeper learning strategies. Previous research consistently demonstrates that higher levels of engagement are associated with improved academic performance, greater learning motivation, and stronger educational persistence (Bond et al., 2020; Guo et al., 2025).

The importance of engagement in shaping academic success has been widely documented across different educational settings. Studies indicate that student engagement not only directly influences learning outcomes but also mediates the relationship between various psychological factors and academic performance (Alrashidi & Alshammari, 2025). Furthermore, engagement has been shown to enhance students' motivation, participation, and commitment to learning activities, which ultimately contribute to better academic achievement (Pang & Veloo, 2024). These findings emphasize that engagement plays a crucial role in promoting meaningful learning experiences.

The interaction between academic resilience and student engagement has also attracted increasing scholarly attention. Students with strong resilience tend to maintain higher levels of engagement in learning activities because they are better able to cope with academic challenges and setbacks (Lobo et al., 2025). Similarly, resilience has been found to strengthen students' persistence and emotional regulation, enabling them to remain actively involved in learning despite experiencing difficulties (Ahmed et al., 2023; Romano et al., 2021). These findings suggest that resilience and engagement may work together in shaping students' academic outcomes.

However, despite the growing body of literature on resilience and engagement, many studies have examined these constructs separately. Existing research often focuses on resilience as an individual predictor of academic performance or examines engagement as an outcome of motivational processes (Steel et al., 2024; Bond et al., 2020). Only a limited number of studies have investigated how academic resilience and student engagement simultaneously contribute to learning outcomes. As a result, the combined predictive role of these two variables remains insufficiently explored.

This issue becomes particularly relevant in vocational education, where students are expected to master both theoretical knowledge and practical competencies. Vocational education environments often involve intensive practical training, project-based learning, and performance-based assessments that may create significant academic pressure for students. These conditions require students to demonstrate strong psychological resilience and sustained engagement in learning activities in order to achieve satisfactory academic performance (Zhang et al., 2025; Yu et al., 2025). Therefore, understanding the psychological factors that influence learning outcomes in vocational education contexts is crucial.

Preliminary observations conducted at SMKN 1 Painan indicate several challenges related to students' learning activities. Some students show limited persistence when encountering demanding tasks, such as project based assignments or problem solving activities that require

sustained effort and creativity. This is reflected in tendencies to delay task completion, rely heavily on peers' work, or discontinue efforts when facing difficulties. In addition, variations in classroom participation are evident during both discussions and practical activities, where certain students actively contribute ideas, ask questions, and engage in tasks, while others remain passive, show minimal involvement, or participate only when prompted by the teacher. These observable patterns illustrate differences in students' persistence in dealing with academic challenges and their level of engagement in learning activities. Such conditions may influence students' academic achievement and underline the importance of examining factors related to persistence and engagement in the learning process.

Furthermore, documentation of students' academic performance shows that variations in learning outcomes are still evident among students within the same academic cohort. These differences may reflect disparities in students' effort in completing academic tasks, consistency in learning, and involvement during classroom activities. Previous studies indicate that variations in academic performance are often associated with differences in students' persistence in learning and their level of engagement in instructional activities (Obeng et al., 2025; Pang & Veloo, 2024). Therefore, examining the roles of these learning-related factors is important for understanding the determinants of students' academic achievement.

Despite extensive research on academic resilience and student engagement, empirical evidence examining their combined influence on learning outcomes in vocational education settings, particularly in developing countries, remains limited. Most prior studies have focused on higher education or general secondary education contexts, leaving vocational education relatively underexplored. This gap is important because vocational education has distinctive characteristics, including an emphasis on practical competencies, task based learning, and the integration of theoretical knowledge with real world applications. Such learning environments require students to demonstrate sustained persistence when facing complex tasks and to actively participate in both classroom and practice oriented activities. Consequently, understanding how students' persistence in dealing with academic challenges and their level of involvement in learning activities jointly relate to learning outcomes becomes particularly relevant in vocational education contexts.

Therefore, this study aims to examine the roles of academic resilience and student engagement in explaining students' learning outcomes. By considering these two learning related factors within a single analytical framework, this research seeks to provide a broader understanding of factors associated with students' academic achievement.

The contribution of this study can be seen in three aspects. First, this research analyzes academic resilience and student engagement simultaneously as factors related to learning outcomes. Second, the study provides empirical evidence from a vocational education context, which is still relatively limited in previous studies. Third, this research presents findings from a developing country context, thereby contributing additional perspectives to the discussion of factors associated with students' academic achievement.

METHOD

This study employed a quantitative approach using a causal associative research design to examine the influence of academic resilience and student engagement on students' learning outcomes. Causal associative research is intended to identify the magnitude and direction of relationships between two or more variables within a particular context. The study was conducted at SMKN 1 Painan, located in Pesisir Selatan Regency, West Sumatra, Indonesia. The population comprised all eleventh grade students, totaling 359 individuals. The sample size was determined using the Slovin formula, resulting in 190 respondents. A proportional random sampling technique was applied to ensure that each subgroup within the population was adequately represented. Specifically, the number of respondents selected from each class or study program was determined proportionally based on its share of the total population. For example, classes with a larger number of students contributed a higher number of respondents, while smaller classes contributed fewer participants. Within each subgroup, respondents were then selected randomly to ensure that every student had an equal probability of inclusion. This procedure enhances the representativeness of the sample and strengthens the generalizability of the findings.

Data were collected using both primary and secondary sources. Primary data were obtained through a structured questionnaire distributed to the sampled students to measure the constructs of academic resilience and student engagement. The questionnaire used a five-point Likert scale, ranging from strongly disagree to strongly agree. The measurement of academic resilience was adapted from the framework proposed by Cassidy (2016), which includes three dimensions: perseverance, reflecting and adaptive help-seeking, and negative affect and emotional response. Meanwhile, student engagement was measured using the multidimensional model developed by Fredricks, Blumenfeld, and Paris (2004), encompassing behavioral engagement, emotional engagement, and cognitive engagement. Secondary data were obtained from school documentation, specifically students' mid-semester examination scores in the Entrepreneurship subject, which were used as an indicator of students' learning outcomes in the cognitive domain. Prior to the main data collection, the research instrument was tested for validity and reliability using a pilot sample of 30 students from another vocational school. Item validity was examined using Corrected Item–Total Correlation, while reliability was assessed using Cronbach's Alpha, with values above 0.60 considered acceptable.

The collected data were analyzed using Statistical Package for the Social Sciences (SPSS) version 25. The analysis began with descriptive statistics to describe the distribution and characteristics of the data, including mean scores and percentage distributions. Subsequently, several classical assumption tests were conducted to ensure the robustness of the regression model, including tests for normality (Kolmogorov–Smirnov test), multicollinearity (Variance Inflation Factor and tolerance values), and heteroscedasticity (Spearman rank correlation test). After confirming that the data met the required assumptions, multiple linear regression analysis was employed to examine the effect of academic resilience and student engagement on students' learning outcomes. Hypothesis testing was conducted using the F-test to evaluate the simultaneous effect of the independent variables and the t-test to assess the partial influence of

each predictor variable. Additionally, the coefficient of determination (R^2) was calculated to determine the proportion of variance in learning outcomes explained by the independent variables.

RESULT AND DISCUSSION

Result

Respondent Carracteristic

Based on the questionnaire distributed to 190 respondents consisting of class XI of SMKN 1 Painan, the respondent data obtained based on gender and class can be seen in the following table:

Table 1. Respondent Carracteristics

		Number of Respondent	Percentage (%)
Gender	Male	65	34%
	Female	125	66%
Class	XI OTKP 1	18	9%
	XI OTKP 2	16	8%
	XI AKL 1	17	9%
	XI AKL 2	16	8%
	XI BDP 1	13	7%
	XI BDP 2	11	6%
	XI BDP 3	15	8%
	XI PHT 1	14	7%
	XI PHT 2	15	8%
	XI TKJ 1	16	8%
	XI TKJ 2	13	7%
	XI TAV	10	5%
XI Boga	16	8%	

Based on the distribution of questionnaires administered to the respondents, the data obtained represent 190 eleventh grade students of SMKN 1 Painan. The distribution of respondents by gender and class is presented in Table 1. It should be noted that the allocation of respondents across different classes was determined proportionally according to the actual population distribution in each class. In other words, classes with a larger number of students contributed a higher proportion of respondents, while smaller classes contributed fewer respondents. This proportional distribution indicates that the sample adequately reflects the structure of the population, thereby strengthening the representativeness of the sample and enhancing the credibility of the sampling procedure employed in this study.

Descriptive Analysis Results

Description of learning outcomes

The learning outcomes of class XI students at SMKN 1 Painan in the Entrepreneurship subject can be seen in the frequency distribution table.

Table 2. Frequency Distribution of Learning Outcomes (Y)

Number	Interval Class	Frequency	
		Fi	%
1	15-23	6	3%
2	24-32	0	0%
3	33-41	4	2%
4	42-50	16	8%
5	51-59	5	3%
6	60-68	27	14%
7	69-77	54	28%
8	78-86	46	24%
9	87-95	32	17%
Total		190	100
Average			71,74
Median			74,6
Maximum			95
Minimum			15

Source: Primary data processed (2026)

Table 2 indicates that the learning outcomes of Grade XI students at SMKN 1 Painan in the 2022/2023 academic year remain below the Minimum Completeness Criteria (KKM) of 75, with an average score of 71.74. Although some students have achieved or exceeded the KKM, the overall average suggests that most students have not yet reached the expected level of mastery in the Entrepreneurship subject.

Description of Independent Variables

Table 3. Description of Independent Variables

No	Variabel	Skor	Mean	TCR	Criteria
1	Resiliensi akademik	11558	60,832	80,20%	Good
2	Student engagement	11763	61,91	77,65%	Moderate

Source: Primary data processed (2026)

The table above shows that students' academic resilience is in the good category. This means that students at SMKN 1 Painan possess the strength and resilience to recover from negative emotional experiences when facing difficult and stressful situations during their studies.

In addition, the level of student engagement among the students is also categorized as moderate. This condition is consistent with the level of learning outcomes, which also remains in the moderate category. The similarity between these two conditions suggests that student engagement may have an important role in influencing academic achievement. Therefore, it is necessary to increase students' involvement in the learning process so that they participate more actively in classroom activities. Greater involvement in learning activities is expected to create a more meaningful learning experience and ultimately contribute to the improvement of students' learning outcomes.

Classical Assumption Tests

Prior to conducting the regression analysis, several classical assumption tests were performed to ensure the suitability of the data for multiple regression analysis. The normality test was conducted using the Kolmogorov–Smirnov test with a significance level of 0.05. The results indicated that the Asymp. Sig. (two tailed) value of the residuals was 0.062, which exceeds the significance threshold of 0.05. This result suggests that the residuals are normally distributed and that the normality assumption is satisfied. Furthermore, the multicollinearity test results show that the Variance Inflation Factor values for the independent variables are well below the critical threshold of 10. Specifically, academic resilience (X1) has a VIF value of 1.320 and student engagement (X2) also has a VIF value of 1.320, indicating that no multicollinearity problem exists among the predictor variables. In addition, the heteroscedasticity test demonstrates that the significance values for academic resilience and student engagement are 0.263 and 0.950, respectively, both of which are higher than 0.05. These findings indicate that the variance of the residuals is homoscedastic, confirming the absence of heteroscedasticity in the regression model.

Table 4. Multiple Linear Regression Analysis

		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-31,110	9,707		-3,205	,002
	Academic Resiliensi	,926	,171	,356	5,402	,000
	Student Engagement	,752	,136	,363	5,507	,000

a. Dependent Variable: Learning Outcomes

Source: Primary data processed (2026)

The results presented in the table indicate that the regression coefficient for the academic resilience variable (X1) is 0.926, while the regression coefficient for the student engagement variable (X2) is 0.752. In addition, the constant value obtained in the regression model is -31.110. Based on these coefficient values, the multiple linear regression equation can be formulated as follows.

$$Y = a + b_1X_1 + b_2X_2$$

$$Y = -31,110 + 0,926X_1 + 0,752X_2$$

Based on the regression equation obtained, several interpretations can be drawn. First, the constant value of -31.110 indicates the predicted value of students’ learning outcomes when both academic resilience and student engagement are assumed to be absent or equal to zero. Second, the regression coefficient for academic resilience (X1) is 0.926, suggesting that an increase of one unit in academic resilience is associated with an increase of 0.926 units in students’ learning outcomes, assuming that other variables remain constant. Third, the regression coefficient for student engagement (X2) is 0.752, indicating that a one unit increase in student engagement is predicted to improve students’ learning outcomes by 0.752 units. These findings imply that both academic resilience and student engagement have positive contributions to the improvement of students’ academic performance.

Hypothesis testing

Table 5. F test

ANOVAa					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	20270,168	2	10135,084	58,622	,000b
Residual	32330,195	187	172,889		
Total	52600,363	189			

a. Dependent Variable: Learning Outcomes

b. Predictors: (Constant), Student Engagement, Academic Resilience

Source: Primary data processed (2026)

Based on the table above, it can be concluded that the F-test results for the first hypothesis have a significant value of $0.000 < 0.05$, thus H_0 is rejected. This means that there is a significant influence of academic resilience and student engagement on the learning outcomes of class XI students at SMKN 1 Painan.

Tabel 6. t-test

Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error			
1	(Constant)	-31,110	9,707		-3,205	,002
	Resilience	,926	,171	,356	5,402	,000
	Academic Student Engagement	,752	,136	,363	5,507	,000

a. Dependent Variable: Learning Outcomes

Source: Primary data processed (2026)

Based on the results presented in Table 6, several conclusions regarding the research hypotheses can be drawn. The second hypothesis testing shows that the significance value for academic resilience is 0.000, which is lower than the threshold of 0.05. This result leads to the rejection of the null hypothesis and indicates that academic resilience has a statistically significant effect on the learning outcomes of Grade XI students at SMKN 1 Painan. Similarly, the third hypothesis testing reveals that the significance value for student engagement is also 0.000, which is below the significance level of 0.05. Therefore, the null hypothesis is rejected, suggesting that student engagement has a significant influence on students' learning outcomes. These findings demonstrate that both academic resilience and student engagement play an important role in shaping students' academic achievement.

Table 7. Coefficient of determination (R²)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,621 ^a	,385	,379	13,149

A. Predictors: (Constant), *Resiliensi Akademik*, *Student Engagement*

Source: Primary data processed (2026)

The results presented in the table indicate that the coefficient of determination can be observed from the Adjusted R Square value, which is 0.379 or 37.9 percent. This finding suggests that 37.9 percent of the variance in students' learning outcomes, represented by the mid semester examination scores of Grade XI students at SMKN 1 Painan in the PKK subject during the 2022 to 2023 academic year, can be explained by academic resilience and student engagement. Meanwhile, the remaining 62.1 percent of the variance in learning outcomes is influenced by other factors that were not included in the regression model.

DISCUSSION

The Influence of Academic Resilience and Student Engagement on Students' Learning Outcomes

The findings of this study demonstrate that academic resilience and student engagement significantly influence the learning outcomes of Grade XI students at SMKN 1 Painan, particularly in the PKK subject. The results of the regression analysis show that both variables contribute significantly to students' academic performance. The coefficient of determination indicates that 37.9 percent of the variance in learning outcomes can be explained by academic resilience and student engagement, while the remaining variance is influenced by other variables not examined in this study. These findings confirm that psychological and behavioral factors play a critical role in shaping students' academic success.

Academic resilience is widely recognized as a key psychological factor that enables students to cope effectively with academic challenges and maintain their learning performance. Students with strong resilience tend to demonstrate persistence, emotional control, and adaptive coping strategies when facing learning difficulties. Empirical studies have shown that academic resilience contributes positively to academic performance because resilient students are better able to adapt to academic pressure and maintain their motivation to succeed (Li et al., 2024; Steel et al., 2024). Similarly, research conducted across multiple educational contexts has demonstrated that resilience helps students sustain effort and regulate their learning behavior, which ultimately improves academic achievement (Li et al., 2024; Zhang & Zhang, 2024).

Furthermore, the findings of this study support previous research indicating that academic resilience functions as a protective factor that enables students to overcome academic adversity. Resilient learners are more capable of maintaining engagement in the learning process even when confronted with challenging tasks or complex academic material. Research by Li, Wang, and Siu (2024) found that resilience significantly enhances students' academic performance through improved self-regulation behaviors and persistence in learning activities. In addition, socio-

emotional competencies such as perseverance, emotional regulation, and curiosity have been identified as important elements that strengthen academic resilience and support students' educational achievement across different countries (OECD-based cross-national studies) (OECD, 2023; Zhang & Zhang, 2024).

In addition to academic resilience, student engagement also plays a crucial role in determining students' learning outcomes. Student engagement reflects the degree to which learners actively participate in academic activities through behavioral, emotional, and cognitive involvement. When students demonstrate high levels of engagement, they tend to invest more effort in learning tasks, sustain their attention during instruction, and actively interact with learning materials. Previous studies have consistently reported that student engagement is strongly associated with improved academic achievement and learning outcomes (Bond & Bedenlier, 2022; Zhang, 2022).

Empirical evidence also indicates that students who demonstrate higher levels of engagement are more likely to achieve better academic performance because engagement encourages deeper learning processes and sustained academic effort. For example, Zhang (2022) reported that sustainable engagement significantly predicts academic achievement, particularly when students actively participate in learning activities and demonstrate strong motivation toward academic tasks. Similarly, recent studies highlight that engagement promotes meaningful learning experiences and increases students' capacity to achieve positive academic outcomes (Li et al., 2024; Zhang & Zhang, 2024).

The combined influence of academic resilience and student engagement observed in this study also aligns with recent research emphasizing the interrelated nature of psychological resilience and active learning participation. Students who possess high levels of resilience tend to remain engaged in learning even when they encounter academic obstacles. Research conducted during remote learning conditions demonstrated that resilience significantly predicts students' engagement and participation in academic activities, particularly in challenging educational environments (Versteeg et al., 2022).

These findings suggest that resilience and engagement function as complementary factors that collectively support students' academic success. Academic resilience provides students with the psychological capacity to cope with challenges, while engagement reflects their active participation in the learning process. When both factors are present, students are more likely to sustain motivation, maintain persistence, and achieve higher learning outcomes. A recent study on language learning also found that resilience and engagement jointly predict academic achievement, highlighting the importance of integrating psychological and behavioral dimensions in educational research (Zhang & Zhang, 2024).

These findings can be further interpreted within the context of vocational education, where learning environments are characterized by a strong emphasis on practical skills, hands-on activities, and problem-solving tasks. In such settings, students are frequently required to complete applied projects, collaborate in teams, and demonstrate competence through performance-based assessments. These demands may intensify the need for persistence when facing task complexity and for active participation during practice-based learning sessions.

Consequently, students who are able to remain consistent in completing practical assignments and actively engage in demonstrations, discussions, and simulations are more likely to achieve better learning outcomes. In addition, contextual factors such as instructional strategies, availability of practice facilities, and teacher support may further influence how persistence and engagement contribute to academic performance. This suggests that the relationship between these variables is not only individual in nature but also shaped by the characteristics of vocational learning environments that prioritize experiential and application-oriented learning processes.

Based on the results of this study and the findings of previous research, it can be concluded that academic resilience and student engagement are important determinants of students' academic performance. More specifically, these two factors appear to function in a complementary manner within the learning process. Students with strong academic resilience are more likely to sustain their involvement in learning activities when encountering academic challenges, as they are able to persist and adapt to difficulties. In turn, consistent engagement in learning activities reinforces students' effort and supports the development of better learning outcomes. This dynamic interaction suggests that resilience helps maintain engagement under challenging conditions, while engagement provides a pathway through which persistence is translated into academic achievement. Therefore, educational institutions and teachers should design learning environments that simultaneously foster persistence and active participation through supportive instructional strategies, collaborative learning activities, and positive classroom interactions.

The Effect of Academic Resilience on Students' Learning Outcomes

The findings of this study indicate that academic resilience has a significant effect on students' learning outcomes among Grade XI students at SMKN 1 Painan. This result suggests that students who demonstrate higher levels of academic resilience tend to achieve better academic performance. Conversely, students with lower levels of resilience are more likely to experience difficulties in maintaining optimal learning outcomes. These findings highlight the importance of psychological factors in shaping students' academic achievement, particularly the ability to cope with academic challenges and maintain persistence in the learning process.

Academic resilience is generally understood as an individual's capacity to effectively adapt to academic challenges, stress, and setbacks encountered during the learning process. Students who possess strong resilience tend to demonstrate perseverance, emotional regulation, and adaptive coping strategies when facing academic difficulties. Recent studies emphasize that academic resilience enables students to maintain motivation and learning engagement even under challenging academic conditions (Martin & Marsh, 2020; Zhang & Zhang, 2024). In addition, resilient learners are better able to recover from academic setbacks and continue pursuing their educational goals, which ultimately contributes to improved academic performance (Steel et al., 2024).

The importance of academic resilience in educational settings has been widely recognized in recent research. Students with strong resilience are more capable of managing stress, regulating their emotions, and maintaining positive attitudes toward learning. These

psychological strengths allow students to remain focused on academic tasks and persist in the face of difficulties. Empirical evidence suggests that resilient students tend to employ more effective learning strategies and demonstrate higher levels of academic persistence, which significantly contributes to improved learning outcomes (Li et al., 2024; Yu et al., 2025). Furthermore, resilience supports students' ability to develop adaptive learning behaviors and overcome academic obstacles that may otherwise hinder their performance.

Students with higher levels of academic resilience also demonstrate stronger self-regulation and problem-solving abilities. These students are more likely to seek assistance when encountering learning difficulties, reflect on their learning strategies, and adjust their approach to academic tasks. Such behaviors are associated with improved academic achievement because students become more proactive in managing their learning process. Recent empirical studies confirm that academic resilience positively predicts academic achievement by strengthening students' self-regulated learning behaviors and persistence in completing challenging academic tasks (Li et al., 2024; Zhang & Zhang, 2024).

The results of this study are consistent with previous research demonstrating that academic resilience functions as an important predictor of academic success. Research conducted in various educational contexts shows that resilience significantly contributes to students' academic performance by helping them maintain engagement and motivation in learning activities (Steel et al., 2024). Similarly, studies on student well-being and educational success indicate that resilience enables students to effectively cope with academic stress and maintain sustained learning effort, which ultimately enhances academic achievement (Yu et al., 2025).

In addition, academic resilience can be conceptualized through several key dimensions, including perseverance, adaptive help-seeking behavior, and emotional regulation. Students who demonstrate perseverance tend to persist in completing academic tasks despite difficulties. Meanwhile, students who engage in adaptive help-seeking behaviors actively seek support from teachers or peers when encountering challenges. Emotional regulation, on the other hand, allows students to manage negative emotions and maintain positive attitudes toward learning. These dimensions collectively contribute to students' capacity to navigate academic challenges and sustain their learning motivation, thereby improving their academic outcomes.

In the context of vocational education, the role of academic resilience becomes particularly important due to the nature of learning activities that emphasize practical skills, creativity, and problem-solving. Students are often required to complete project-based assignments, engage in hands-on practice, and apply theoretical knowledge to real-world situations. These learning conditions can present complex challenges, such as difficulties in executing practical tasks, generating creative ideas, or solving applied problems. In such situations, students with strong academic resilience are more likely to persist in completing tasks, experiment with alternative solutions, and remain engaged despite initial failure or difficulty. This capacity enables them to gradually improve their competence and achieve better learning outcomes. Therefore, academic resilience not only supports students in coping with academic pressure but also facilitates their ability to adapt to the demands of vocational learning environments that require continuous practice and active problem-solving.

Based on the findings of this study and the evidence from previous research, it can be concluded that academic resilience plays a crucial role in enhancing students' learning outcomes. Students who possess strong resilience are more likely to persist in learning activities, manage academic stress effectively, and maintain positive attitudes toward educational challenges. Therefore, fostering academic resilience should be considered an important strategy in educational practice, particularly in vocational education contexts, in order to support students' academic success and long-term learning development.

The Effect of Student Engagement on Students' Learning Outcomes

This study also aims to examine the influence of student engagement on the learning outcomes of Grade XI students at SMKN 1 Painan. The results indicate that student engagement has a significant effect on students' learning outcomes. This finding suggests that when students demonstrate high levels of engagement in the learning process, their academic performance tends to improve. Conversely, low levels of student engagement are associated with lower academic achievement. These results emphasize the importance of active student participation in the learning process as a key determinant of educational success.

Student engagement is commonly understood as a multidimensional construct that reflects students' active involvement in learning activities through behavioral, emotional, and cognitive participation. It represents the extent to which students invest attention, effort, and interest in academic tasks. Contemporary research emphasizes that engaged students are more likely to demonstrate persistence, sustained attention, and deeper learning strategies, which contribute to improved academic outcomes (Bond & Bedenlier, 2022; Li et al., 2024). When students actively engage with learning materials and classroom activities, they tend to process information more effectively and retain knowledge for longer periods.

Recent empirical studies consistently highlight the positive relationship between student engagement and academic achievement. Students who are actively involved in classroom activities, collaborative learning, and problem-solving tasks tend to develop stronger academic skills and achieve higher levels of academic performance. Research by Zhang (2022) indicates that higher levels of engagement significantly predict students' academic achievement because engagement encourages deeper cognitive processing and sustained learning motivation. Similarly, Li et al. (2024) found that engaged students demonstrate stronger learning persistence and greater commitment to academic tasks, which ultimately enhances their academic performance.

Student engagement also reflects students' motivation and willingness to participate in the learning process. From a psychological perspective, engagement can be seen as the manifestation of intrinsic and extrinsic motivation in educational contexts. Students who are motivated to learn are more likely to show interest in learning activities, actively participate in classroom discussions, and invest greater effort in completing academic tasks. Research conducted in various educational settings has demonstrated that motivation-driven engagement significantly contributes to improved academic outcomes and more meaningful learning experiences (Bond & Bedenlier, 2022; Panadero et al., 2022).

Furthermore, student engagement consists of several key dimensions, including behavioral engagement, emotional engagement, and cognitive engagement. Behavioral engagement refers to students' participation in academic activities, such as completing assignments, participating in discussions, and following classroom rules. Emotional engagement reflects students' feelings of interest, enthusiasm, and sense of belonging in the learning environment. Meanwhile, cognitive engagement refers to students' willingness to invest effort in understanding complex learning materials and applying higher-order thinking strategies. Studies have shown that these dimensions collectively contribute to students' academic success by fostering deeper learning and sustained academic effort (Fredricks et al., 2021; Li et al., 2024).

In vocational education settings, student engagement is influenced by several contextual factors related to the learning environment. Teaching methods that emphasize active learning, such as project-based learning, collaborative tasks, and practical demonstrations, have been shown to enhance students' participation and involvement. In addition, a supportive classroom environment, including positive teacher–student interactions and the availability of adequate learning facilities, can foster a sense of belonging and encourage active engagement. Instructional strategies that connect learning materials with real-world applications are also particularly effective in vocational contexts, as they increase the relevance of learning activities and motivate students to participate more actively. Recent studies highlight that instructional design, classroom climate, and teacher support are significant predictors of student engagement, especially in practice-oriented educational settings (Niittylahti et al., 2023; Li & Xue., 2023).

Despite the generally positive level of student engagement observed in this study, some students still show limited participation in learning activities. This condition suggests that not all students are equally involved in the learning process, which may influence their academic performance. Previous research indicates that low levels of engagement can lead to reduced academic motivation, lack of persistence in completing academic tasks, and lower academic achievement (Bond & Bedenlier, 2022). Therefore, improving student engagement remains an important challenge for educators, particularly in vocational education contexts where practical and interactive learning approaches are essential.

The findings of this study are consistent with previous research demonstrating that student engagement has a significant positive relationship with academic achievement. Engaged students are more likely to develop effective learning strategies, demonstrate stronger academic persistence, and achieve higher learning outcomes. Consequently, fostering student engagement through innovative teaching strategies, interactive learning environments, and supportive classroom relationships can significantly enhance students' academic success.

This study also contributes to the broader literature on educational psychology and vocational education by providing empirical evidence on the role of student engagement within a practice-oriented learning context. While previous studies have widely examined engagement in general or higher education settings, this research extends the understanding by demonstrating how engagement operates in vocational environments that emphasize applied skills and experiential learning. The findings reinforce theoretical perspectives that position engagement as a key mechanism linking instructional processes and learning outcomes.

Moreover, this study highlights the importance of integrating behavioral, emotional, and cognitive dimensions of engagement in designing effective vocational learning experiences. Recent literature suggests that such integrative approaches are essential for improving both academic achievement and work-related competencies in vocational education (Hiver et al., 2024; Niittyalahti et al., 2023; Lie & Xue, 2023).

Based on the results of this study and the supporting empirical evidence, it can be concluded that student engagement plays a crucial role in improving students' learning outcomes. The higher the level of student engagement in learning activities, the better the academic performance achieved by students. Conversely, low engagement levels may hinder students' academic progress. Therefore, educational institutions and teachers should prioritize strategies that enhance students' behavioral, emotional, and cognitive engagement in order to promote more effective and meaningful learning experiences.

CONCLUSION

This study concludes that academic resilience and student engagement significantly influence students' learning outcomes. Students who are able to persist when facing academic challenges and actively participate in learning activities tend to achieve better academic performance. These findings underline the importance of strengthening both persistence and active involvement in the learning process, particularly in vocational education settings.

Based on these results, teachers are encouraged to apply interactive and practice-oriented learning strategies, such as project-based activities and collaborative tasks, to increase student participation. At the same time, simple efforts such as providing constructive feedback, encouraging students to keep trying when facing difficulties, and creating a supportive classroom atmosphere can help strengthen students' persistence in learning.

This study is limited to a single school context and focuses only on two variables, which may not fully capture the complexity of factors influencing learning outcomes. Future research is recommended to explore additional factors, such as teaching methods, learning environments, and students' socio-economic backgrounds, in a wider range of vocational education settings to provide a more comprehensive understanding.

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