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Determinants of Academic Learning Outcomes: The Impact of Self-Efficacy and Motivation in Aviation Vocational Education

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Abstract

This study looks at how self-efficacy and learning motivation affect the learning results of cadets at the Surabaya Aviation Polytechnic. There is a change in how vocational education is seen, with a focus on practical skills and being ready for work. This means that cadets need strong learning skills and confidence in their academic and technical abilities. However, in practice, there are differences in how well cadets perform, which aren't always linked to their intelligence. So, it's important to understand psychological factors like self-efficacy and learning motivation more deeply. The research used a quantitative method with an explanatory correlational design. The sample included 120 cadets, and data was collected using total sampling. The tools used were questionnaires for self-efficacy and learning motivation as the main factors, and the GPA as a measure of learning outcomes. The data was analyzed using multiple linear regression through SPSS version 26. The results showed that both self-efficacy and learning motivation had a significant impact on learning outcomes. The self-efficacy had a β coefficient of 0.000 ($p < 0.05$), and motivation had a β of 0.000 ($p < 0.05$). The coefficient of determination (R^2) was 0.667, which means that together, these factors explain 66.7% of the variation in learning outcomes. These results show that improving self-efficacy and learning motivation is very important for helping cadets achieve better learning results at aviation vocational schools. The study suggests that the Surabaya Aviation Polytechnic should create programs to boost self-efficacy and support both internal and external motivation to help cadets reach their best learning outcomes.

Keywords*: self-efficacy, psychological factors, motivation, learning outcomes, cadets, aviation vocational education.*

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INTRODUCTION

Vocational education in the aviation field is currently facing increasingly complex challenges, particularly in ensuring that cadets possess adequate theoretical knowledge and practical skills to meet the dynamic demands of the aviation industry. Recent studies emphasize the importance of adaptive and technology-supported learning environments in vocational contexts, as these approaches allow educators to address diverse learner needs more effectively (Afini Normadhi[1] et al., 2019; Liu[2], 2022; Xu & Ouyang[3], 2022). Such adaptive systems encourage the development of self-regulated learning, a process that has been closely linked to both self-efficacy and learning motivation in promoting academic success (Boekaerts, Zeidner, & Pintrich[4], 1999; Panadero[5], 2017).

Within this context, two psychological constructs, namely self-efficacy and learning motivation, play crucial roles in determining student achievement. Self-efficacy refers to an individual's belief in their ability to plan and execute actions required to achieve specific goals, while learning motivation relates to the enthusiasm and persistence a person shows in engaging with learning activities. (Bandura[6], 1997 and Uno[7], 2006) have both emphasized the significance of these constructs in influencing academic behavior. According to Bandura, individuals with strong self-efficacy are more likely to approach difficult tasks as challenges to be mastered rather than threats to be avoided. Previous studies also support this idea, showing that higher levels of self-efficacy positively affect academic outcomes (Suryani[8] et al., 2020). Similarly, motivation helps students remain engaged, overcome obstacles, and take greater responsibility for their learning (Khodijah[9], 2018; Suryani[10] et al., 2020).

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(Guay, Vallerand, and Blanchard[11], 2000) further explained that situational motivation can be either intrinsic or extrinsic, influencing how learners perceive and engage with academic tasks. Recent research by (Bai[12] et al., 2020 and Law, Geng, and Li[13], 2019) also indicates that motivation and self-efficacy together shape students' autonomous learning behaviors and performance in blended learning environments. Despite these valuable insights, there remains limited empirical evidence on how these two factors specifically affect cadets in Indonesian aviation vocational institutions, particularly at the Surabaya Aviation Polytechnic. This institution applies a boarding-based education system that requires cadets to excel in both theoretical and practical competencies under strict discipline.

Previous studies in higher education have explored how factors such as motivation, satisfaction, and engagement interact to predict persistence and dropout tendencies (Bernardo[14] et al., 2022). However, these relationships have rarely been examined in specialized and high-demand environments such as aviation training, where both academic excellence and behavioral discipline are equally emphasized. Therefore, this study seeks to answer three main questions: (1) Does self-efficacy influence cadets' learning outcomes? (2) Does learning motivation affect their learning outcomes? and (3) To what extent do self-efficacy and learning motivation together explain variations in those outcomes? The findings of this study are expected to contribute to the development of vocational education theory and provide practical insights for designing more effective learning programs at aviation institutions. By integrating perspectives from recent studies on adaptive and blended learning (Capone[15], 2022; Kardipah & Wibawa[16], 2020; Suryani[17] et al., 2021), this research aims to bridge theoretical understanding and practical application concerning how self-efficacy and motivation jointly influence cadets' academic performance.

In the broader educational context, self-efficacy has been recognized as a crucial

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determinant of learning achievement. Learners with high self-efficacy tend to be more motivated and capable of overcoming challenges in the learning process (Fitriani & Pujiastuti[18], 2021). These findings are consistent with research conducted by (K. Parangin-Angin[19], 2022), which revealed that soft skills have a positive influence on students' readiness for employment. Similarly, Oktariani (2018) defines self-efficacy as an individual's confidence in their ability to manage circumstances and achieve desired outcomes. This view is reinforced by (Mamentu, Nelwan, and Sendow[20], 2023), who found that in addition to self-efficacy, soft skills and work motivation significantly contribute to the employability of fresh graduates, particularly in the context of the Industrial Revolution 4.0, which demands adaptability and strong interpersonal communication. Correspondingly, (Mutoharoh and Rahmaningtyas[21], 2019) discovered that while self-esteem may not directly determine job readiness, it supports motivation and self-development, both of which are essential for success in professional environments.

In aviation vocational education, self-efficacy, defined as learners' belief in their ability to perform specific technical or academic tasks, serves as a foundation for persistence and success in learning (Bandura[22], 1997; Zimmerman[23], 2008). Motivation also plays an essential role, as students with strong intrinsic motivation tend to demonstrate greater commitment, effort, and engagement (Guay, Vallerand, & Blanchard[24], 2000; Chen, Gully, and Eden[25], 2001) showed that self-efficacy can be reliably measured and is strongly related to confidence and performance in learning tasks. Similarly, (Law, Geng, and Li[26], 2019) confirmed that self-efficacy and motivation together enhance student engagement and academic achievement, particularly in blended

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learning environments. (Efklides[27], 2011) further highlighted that motivation, cognition, and affect interact dynamically in self-regulated learning, suggesting that both psychological and emotional preparedness determine academic success. Moreover, (Lonka, Ketonen, and Vermunt[28], 2021) found that students who view learning as meaningful and self-directed are more motivated and tend to achieve better academic results.

RESEARCH METHODS

This study uses a quantitative approach with an explanatory correlational design. The population consists of all active cadets at the Surabaya Aviation Polytechnic in the odd semester of the 2024/2025 academic year. The sampling technique used proportional random sampling using the Slovin formula, resulting in n = 120 respondents from a population of 172 respondents. The independent variables include self-efficacy (X1) and learning motivation (X2), which are measured through a questionnaire. The dependent variable is learning outcomes (Y), which are measured through cumulative grade point average scores. The self-efficacy and learning motivation instruments in the form of questionnaires have been tested for validity and reliability as shown in the following table:

Table 1: Results of the Validity Test of Self-Efficacy and Motivation Variables

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
X1.1	61.44	63.610	.756	.904
X1.2	61.39	66.392	.591	.909
X1.3	61.48	66.185	.629	.908
X1.4	61.48	66.941	.586	.910
X1.5	61.45	63.913	.719	.905
X1.6	61.41	66.244	.601	.909
X1.7	61.47	65.881	.636	.908
X1.8	61.48	67.226	.587	.910
X2.1	61.53	67.730	.524	.911
X2.2	61.36	66.484	.581	.910
X2.3	61.47	66.251	.616	.909
X2.4	61.41	66.765	.585	.910
X2.5	61.40	69.603	.440	.913
X2.6	61.44	65.576	.600	.909
X2.7	61.47	66.822	.579	.910
X2.8	61.46	65.662	.599	.909

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Source: The results of the analysis from the primary data source

In Table 1 above, with a value of n = 120, the table r value is 0.179. It is considered valid if the table r is less than the calculated r. Therefore, based on the data above, the variables of self-efficacy and motivation are declared valid.

Table 2: Results of Reliability Testing of Self-Confidence and Motivation Variables

Reliability Statistics

Cronbach's Alpha	N of Items
.891	8

Reliability Statistics

Cronbach's Alpha	N of Items
.870	8

Source: The results of the analysis from the primary data source

In Table 2 above, Cronbach's alpha for self-efficacy is 0.891 and for motivation is 0.870, where Cronbach's alpha > 0.6 is considered reliable.

RESULT AND DISCUSSION

Correlation analysis is used to measure the strength and direction of the relationship between the variables of Self Efficacy (X1), Motivation (X2), and Learning Outcomes (Y). The criteria for the strength of the relationship are based on the Pearson Correlation (R) value. The strength of the relationship between two variables is indicated by the Pearson Correlation (R) value with the following hypotheses:

H01: There is no significant correlation between X1 and Y.

H02: There is no significant correlation between X2 and Y.

H11: There is a significant correlation between X1 and Y.

H12: There is a significant correlation between X2 and Y.

Based on the decision-making criteria, if the probability (sig value) > 0.05, then H0 is not rejected, and if the probability (sig value) < 0.05, then H0 is rejected.

Table 3: Results of Correlations

Correlations

		SEf X1	MT X2	HB Y
SEf X1	Pearson Correlation	1	.475**	.867**
	Sig. (2-tailed)		.000	.000
	N	120	120	120
MT X2	Pearson Correlation	.475**	1	.850**
	Sig. (2-tailed)	.000		.000

	N	120	120	120
HB Y	Pearson Correlation	.867**	.850**	1
	Sig. (2-tailed)	.000	.000	
	N	120	120	120

**. Correlation is significant at the 0.01 level (2-tailed).

Source: The results of the analysis from the primary data source

Table 3 shows the results of the relationship between X1 and Y. The Pearson Correlation value between Self Efficacy (X1) and Learning Outcomes (Y) is 0.867. This value is in the range of 0.75 - 1.00, indicating a very strong correlation. The significance value (sig.) of 0.000 (< 0.05) indicates that this correlation is real and significant. This means that the higher the cadets' Self Efficacy, the higher their learning outcomes. And the relationship between X2 and Y, the Pearson Correlation value between Motivation (X2) and Learning Outcomes (Y) is 0.850. Like X1, this also indicates a very strong correlation. The significance value of 0.000 (< 0.05) confirms that this relationship is also real and significant. So, the higher the cadets' motivation, the higher their learning outcomes.

Based on the decision obtained from the table above, the sig value = 0.000 < 0.05, so H0 is rejected, which means there is a significant positive correlation between X1 and Y. The correlation coefficient R = 0. indicates that the level of relationship between the two variables is very strong to moderate on a scale of 0–1. The **) sign on the R value indicates that the correlation is significant at the 0.01 level of significance.

Based on these results, it can be concluded that both self-efficacy and learning motivation are significantly and positively related to cadets' academic achievement. This finding supports (Bandura's[29], 1997) theory that individuals with higher self-efficacy are more likely to engage in effective learning strategies, persist through challenges, and achieve better academic outcomes. (Zimmerman[30], 2008) further explains that self-efficacy contributes to self-regulated learning, allowing students to plan, monitor, and evaluate their learning more effectively. Similarly, (Chen, Gully, and Eden[31], 2001) emphasized that self-efficacy can be reliably measured and is strongly associated with learners' confidence and task performance across various educational contexts.

This Multiple Linear Regression Analysis is used to determine the extent of the influence of the variables Self Efficacy (X1) and Motivation (X2), both jointly and partially, on Learning Outcomes (Y).

Table 4 : Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

[29] Bandura and Albert.

[30] Zimmerman.

[31] Chen, Gully, and Eden.

1	.816[a]	.667	.661	.3139702

a. Predictors: (Constant), MT X2, SEf X1

b. Dependent Variable: HB Y

Source: The results of the analysis from the primary data source

The R Square value is 0.667 in Table 4 above, which means that 66.7% of the variation in learning outcomes (Y) can be explained by the regression model that includes Self-Efficacy (X1) and Motivation (X2). The remaining 33.3% is influenced by other variables outside this model that have not been examined by researchers.

Table 5 : Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.296	.230		1.284	.202
	SEf X1	.425	.053	.490	8.082	.000
	MT X2	.422	.056	.460	7.583	.000

a. Dependent Variable: HB Y

Source: The results of the analysis from the primary data source

The t-test (Partial Effect) with a significance value (Sig.) in table 5 above for Self Efficacy (X1) is 0.000 and for Motivation (X2) is also 0.000. Since both values are less than 0.05, H0 is rejected. This confirms that Self-Efficacy and Motivation partially (individually) have a positive and significant effect on Learning Outcomes (Y). Based on the Unstandardized Coefficients (B) column, the regression equation formed is Y= 0.296 + 0.422X1 + 0.425X2, which can be interpreted as follows:

1. If X1 increases by one unit, and X2 remains constant, then Y will increase by 0.422 units.
2. If X2 increases by one unit, and X1 remains constant, Y will increase by 0.425 units.
3. It can be concluded that X2 has a greater effect on Y than X1, because the regression coefficient of X2 is higher than the regression coefficient of X1.
4. If X1 and X2 are zero, the value of Y is equal to the constant a, which is 0.296.

The results of the multiple linear regression analysis show that both Self-Efficacy (X1) and Motivation (X2) together influence Learning Outcomes (Y). The R Square value of 0.667 indicates that 66.7% of the variance in learning outcomes can be explained by the combination of self-efficacy and learning motivation, while the remaining 33.3% is influenced by other factors not examined in this study. The t-test results also show that both Self-Efficacy (X1) and Motivation (X2) have a partial and significant positive effect on Learning Outcomes (Y), with significance values of 0.000 (< 0.05) for both. Motivation (X2) has a slightly higher regression coefficient (0.425) compared to self-efficacy (0.422), suggesting that learning motivation has a stronger influence on learning outcomes than self-efficacy.

This finding aligns with the results of (Guay, Vallerand, and Blanchard[32], 2000), who found that intrinsic motivation enhances engagement and perseverance in learning. (Law, Geng, and Li[33], 2019) also confirmed that self-efficacy and learning motivation jointly influence students' engagement and academic performance in blended learning environments. Furthermore, (Efklides[34], 2011) emphasized that motivation, cognition, and affect interact dynamically in self-regulated learning, which indicates that psychological readiness is crucial for achieving learning success. In higher education contexts, (Lonka, Ketonen, and Vermunt[35], 2021) found that students who perceive learning as meaningful and self-directed show stronger motivation and better academic results.

In the context of aviation vocational education, these findings emphasize the importance of psychological readiness and motivation for achieving both theoretical mastery and technical competence. Aviation cadets are expected to meet high performance standards, requiring persistence, self-discipline, and confidence to apply complex concepts in practice. The results of this study support the view that cadets who believe in their own abilities and who are motivated to learn tend to perform better academically and are more capable of overcoming learning challenges. Similar conclusions were drawn by (Isda[36] et al., 2021; and Kardipah & Wibawa[37], s2020), who found that confidence and learning interest are essential for success in technical and skill-based education environments.

Overall, this study empirically confirms that self-efficacy and learning motivation are significant determinants of academic learning outcomes among aviation cadets. These results strengthen the theoretical framework proposed by (Bandura[38], 1997; Zimmerman[39], 2008; and Law[40] et al., 2019), which emphasizes that psychological and motivational factors are fundamental in shaping academic achievement. The implications of this study suggest that aviation vocational institutions should develop learning strategies and training models that enhance both self-efficacy and learning motivation to improve cadets' overall academic performance.

CONCLUSION

[32] Guay and Vallerand.

[33] Law, Geng, and Li.

[34] Efklides.

[35] Lonka, Ketonen, and Vermunt.

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[37] Kardipah and Wibawa.

[38] Bandura and Albert.

[39] Zimmerman.

[40] Law, Geng, and Li.

This study aims to examine the influence of Self Efficacy (X1) and Motivation (X2) on the learning outcomes (Y) of cadets at the Surabaya Aviation Polytechnic. Based on the data analysis, several key findings can be concluded that directly answer the research objectives.

1. Self-efficacy has a significant effect on cadets' learning outcomes.
2. Motivation has a significant effect on cadets' learning outcomes.
3. Multiple linear regression analysis shows that Self-Efficacy and Motivation simultaneously and partially have a positive and significant effect on cadets' learning outcomes. The R Square value of 0.667 indicates that 66.7% of the variation in learning outcomes can be explained by these two variables, while the rest is influenced by other factors. These findings answer the main problem formulation, namely the significant influence of self-efficacy and motivation on learning achievement.

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