Application Of Structural Equation Modeling to Identify the Influence of Divergent Thinking, Self-Efficacy, Critical Thinking, And Self-Regulated Learning on the Learning Outcomes of Cadets at Aviation Polytechnic Surabaya

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ABSTRACT

Society 5.0 is unavoidable because it is a development of information technology marked by the transformation from analog to digital technology. Society 5.0 is more human centered based on technology. Therefore, this study is considered necessary to examine the characteristics of Human Resources (HR) in society 5.0. HR here refers to cadets who are students of the Surabaya Aviation Polytechnic and will eventually face the world of work. Cadets are human resources who can face challenges in it and are competent in all fields because society 5.0 was born to facilitate quality human life, which is also lived by quality human resources. Using a quantitative approach with Structural Equation Modeling (SEM) analysis, this study involved 216 cadets selected by purposive sampling. This research investigates the influence of Divergent Thinking, Self Efficacy, Critical Thinking, and Self-Regulated Learning on the Learning Outcomes of cadets at Surabaya Aviation Polytechnic by employing the Structural Equation Modeling - Partial Least Square (SEM-PLS) approach. The framework of this study comprises independent variables- namely Divergent Thinking (X1), Self Efficacy (X2), Critical Thinking (X3), and Self-Regulated Learning (X4) and a single dependent variable, Learning Outcomes. Emphasizing the role of cognitive and metacognitive competencies, this study highlights their significance in shaping vocational education strategies aimed at equipping graduates for the multifaceted challenges of Society 5.0, particularly within the highly dynamic aviation industry. The findings contribute meaningful perspectives for enhancing curriculum design and instructional practices to strengthen cadets' competencies and elevate overall academic achievement.

I. Introduction

Education is an inseparable part of a nation's development process. The primary emphasis in national development is placed on advancing human capital alongside economic growth, as both domains are intrinsically connected and mutually reinforcing. Quality education will certainly produce a generation of skilled and capable individuals who will lead in their respective fields. Thus, the condition of the nation will continue to improve and advance through the contributions of these extraordinary individuals in various sectors.

The quality of education is closely related to student learning outcomes. Learning outcomes are abilities possessed by students after gaining learning experience. Student learning outcomes are indicators of the efforts made by students, through which it can be seen how far they have succeeded in following the learning process. Communication established during the learning process between lecturers and cadets should be planned as much as possible, as outlined in the Semester Learning Plan (RPS). With a planned and systematic teaching and learning process, cadets can master learning materials effectively and efficiently. In addition to the observed learning process, it is also necessary to understand the characteristics of cadets and how to develop their thinking skills.

One of the high-level thinking skills that is rarely developed is critical thinking. Critical thinking skills are crucial for addressing various problems, particularly in today's competitive job market. The current demand for human resources centers on individuals who are dependable and competent, possessing strong

collaborative skills, higher-order thinking capabilities, critical reasoning, cultural awareness, and effective communication proficiencies.

Critical thinking is a focused and controlled thinking process that involves choosing beliefs or actions in a rational context. This process consists of understanding and applying various criteria, including clarity, accuracy, relevance, depth, breadth, significance, and reasonableness. Not only are critical thinking skills training critical, but human resources with divergent thinking are also currently in great demand by many companies (Adnan & Walidin, 2021). The ability to think critically is very much needed to face various problems, especially in this day and age where there is a lot of competition in fulfilling job criteria and human resources are required as reliable and high-level workers who have expertise in the modern workforce is characterized by the ability to engage in teamwork, apply advanced cognitive processes, exercise critical judgment, demonstrate pratical skills, appreciate cultural diversity, and communicate proficiently (Arnyana, 2006).

In this context, divergent thinking refers to the intentional generation of original ideas aimed at producing multiple potential solutions to a single problem scenario. This skill needs to be developed during the learning process so that it becomes trained when entering the world of work. (Reiter Palmon & Barbot B, 2019). The implementation of divergent thinking strategies requires cadets to generate various answers or alternative solutions to a problem, thus accustoming them to open their minds to the multiple options they can generate.

At present, the self-efficacy of cadets, defined as an individual's belief in their capability to perform tasks and attain specific objectives, requires ongoing observation and enhancement within the educational process. This construct plays a vital role in academic achievement, as learners with high self-efficacy tend to exhibit greater motivation and resilience in addressing educational challenges, thereby positively influencing their learning outcomes (Schunk & DiBenedetto, 2021; Jiang & Bong, 2014). According to Sari (2019), Learning outcomes are the abilities that students have after they have gained learning experience.

While each of these variables has been individually associated with academic success in various educational settings, their collective influence and complex relationships, particularly in the specific context of aviation vocational education, remain an area that requires further investigation. Cadets in aviation polytechnics face unique pressures, including rigorous curricula, demanding practical training, and high-stakes performance assessments. Their learning outcomes reflect not only their cognitive abilities but also their self-efficacy, problem-solving approaches, and capacity for independent learning. Therefore, examining how divergent thinking, self-efficacy, critical thinking, and self-regulated learning collectively contribute to their academic achievement is essential for designing effective pedagogical interventions.

The academic community always strives to produce superior and competent graduates that a company needs. It is hoped that in the future, in the world of work, someone will already have skills in divergent thinking, self-efficacy, critical thinking, and high self-regulated learning. Given the importance of divergent thinking, self-efficacy, critical thinking, and self-regulated learning, a study is necessary to investigate the impact of these factors on employee performance. This study, titled "Application of Structural Equation Modeling to Identify the Effect of Divergent Thinking, Self-Efficacy, Critical Thinking, and Self-Regulated Learning on Employee Performance," aims to achieve this goal. Learning Achievements of Surabaya Aviation Polytechnic Cadets.

II. Method

This research adopts a quantitative methodology, grounded in the positivist paradigm. As articulated by Sugiyono (2016), quantitative research involves a systematic investigation of specific populations or samples, typically selected through random sampling techniques. Data are collected using standardized instruments and subsequently analyzed using statistical procedures to empirically test predetermined hypotheses. Quantitative research is a research method based on the philosophy of positivism, used to research a particular population or sample. Sampling techniques are generally carried out randomly, data collection uses research instruments, and data analysis is quantitative/statistical to test the established hypothesis.

Quantitative research, as described by Chevillet & Tewari (2014) and Antwi & Hamza (2015), refers to a methodological approach rooted in postivist philosophy. It involves the empirical examination of a defined population or sample, usually obtained through random selection, utilizing structured instruments for data collection, followed by statistical analysis aimed at validating or rejecting formulated hypotheses. The method of Structural Equation Modeling (SEM) is an effective instrument for multivariate statistical analysis, which combines elements of factor analysis with multiple regression analysis of factors (Ajayi 2017).

A. Population And Sample

The population is a broad topic of discussion comprising items or issues that scientists ascribe certain traits and qualities to, which are then researched and concluded. According to Sugiyono (2017), the population is a region of generalization made up of things or topics that possess specific traits and traits that are dictated by researchers to be researched, followed by conclusions

drawn. The participants in this research were students at Surabaya Aviation Polytechnic, which offers seven courses of study. The sampling strategy is a method. In terms of sampling. The number of students in the study

was 216. The sample size was considered adequate for SEM analysis. Although there is no single rule regarding sample size in SEM, general guidelines suggest a minimum of 10-20 observations per observed variable, or an absolute minimum of 200 samples for stable parameter estimation and robust model fit indices. Given that the number of variables observed in this study is still within reasonable limits and the sample size of 216 exceeds general recommendations, the statistical power and reliability of the SEM analysis are considered adequate. In this study, the purposive sampling technique was used because the sample was taken based on specific considerations or criteria that must be met. The research criteria are cadets who are currently studying in the first semester.

B. Data And Data Collection Methods

The types of information used in this study include both primary and secondary data. Primary data is obtained by collecting information from participants through the distribution of surveys. Questionnaires represent a method for collecting information by providing questions and statements for participants to answer in written form. On the other hand, secondary data comes from sources such as websites and literature related to the topic under discussion, which can act as a reference for the research.

C. Research Variables

As stated by Sugiyono (2016) research variables refer to any elements in various forms that the researcher chooses to investigate to gather information about them, leading to conclusions. This study includes both independent and dependent variables. The independent variables are Divergent Thinking (X1), Self-Efficacy (X2), Critical Thinking (X3), and Self-Regulated Learning (X4). At the same time, the dependent variable is Learning Outcomes.

The approach taken to gather data in this research involved the distribution of questionnaires. The measurement employed is a scale ranging from 1 to 5, with indicating strong disagreement and 5 signifying strong agreement. In evaluating the responses of participants, the questionnaire utilized a Likert scale. Responses are assigned a value of 1 for strong disagreement, 2 for disagreement, 3 for neutrality, 4 for agreement, and 5 for strong agreement. The variables assessed are turned into indicators, which then serve as criteria for formulating instrument items presented as statements or questions with a framework, as in Figure 1.

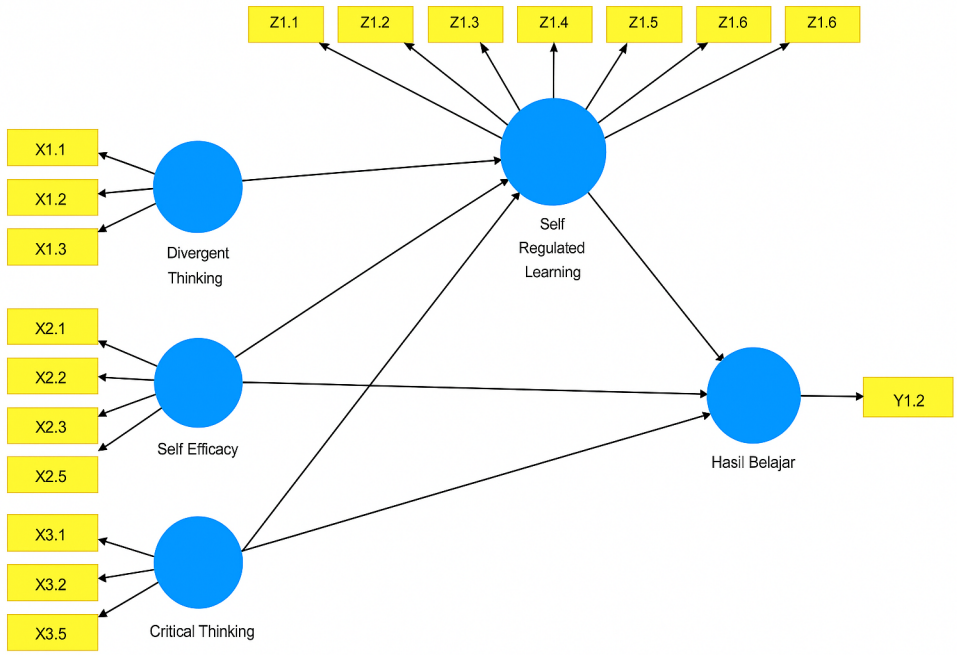

Fig. 1. Variable Dimension

D. Data Analysis

Data processing in this study used SEM smartPLS (Partial Least Squares - Structural Equation Modeling) software. (Purwanto & Santoso, 2021). PLS can clarify how variables are connected and carry out evaluations in a single examination. The goal of PLS is to assist researchers in validating theories and determining the existence of relationships among latent variables. The writer employs Partial Least Squares since this research deals with latent variables that can be quantified through their indicators, enabling the author to execute analyses with precise and thorough computations. These results are displayed in tables and visuals to promote a more organized comprehension in analyzing statistical data using the SEM PLS approach (Hair & Ringle, 2019).

III. Results and Discussion

Key indicators for evaluating the measurement model include convergence validity with smart, reflective

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indicators, which prove that the statements of each latent variable can be understood by respondents as intended by the researcher.

Convergent validity assessment provisions for reflective indicators (Latan, H., 2015).

- Confirmatory research loading factor value > 0.7
- Exploratory assessment of loading factor value > 0.6
- Confirmatory and Exploratory Assessment, Average Variance Extracted (AVE) value > 0.5
- According to Chin (1998). Initial research on the development of a measurement scale with a loading factor value of 0.5 - 0.6 is considered sufficient.
- Loading factor value ,â• 0.5.

Convergent Validity with SMART PLS reflective indicators helps verify that participants comprehend the definitions of each latent variable as the researcher intended. Outer loading can be seen from the convergent quality test. The question items as indicators of research variables with values less than 0.657 are indicators X1.1, followed by indicators X3.4 and X3.5. This means that the responses to the questionnaire items reviewed from convergent validation can still explain the latent variables, even though the loading factor on SMARTPLS appears red. All values depend on the research as stipulated above. Confirmatory research above 0.7 or exploratory research above 0.6 is still acceptable. For this problem, we focus on the AVE value greater than 0.5, as evident from the construct reliability and validated in Table 1.

Table 1. Reliability and Validity Constructs

Variabel	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Critical Thinking	0.753	0.759	0.835	0.503
Divergent Thinking	0.595	0.614	0.783	0.547
Hasil Belajar	1.000	1.000	1.000	1.000
Self Efficacy	0.703	0.713	0.807	0.456
Self Regulated Learning	0.782	0.785	0.847	0.480

Here, it is evident that the self-efficacy variable and the self-regulated learning variable have an AVE value that is less than 0.5. This AVE value will need to be raised to pass the convergent validity assessment. If the AVE value improves, the loading factor value is expected to increase as well, particularly by considering the lowest AVE value, which belongs to self-efficacy. From the self-efficacy variable, namely variable Y1, we observe that its outer loading is low, specifically X2.3, which is 0.611. A load factor of 0.611 means that, in general, 61.1% of the items/questions in X2.3 are less able to explain the self-efficacy variable Y1, so it is less valid in terms of convergence. Then, the lowest loading value of the other factors is in the self-regulated learning variable in question, Z1.4, which has a value of 0.601. Next, if we look at divergent thinking, the lowest value is 0.647, and for critical thinking, the weakest values are 0.667 and 0.661.

Table 2. Outer Loading

Indicator	Critical Thinking	Divergent Thinking	Hasil Belajar	Self-Efficacy	Self-Regulated Learning
X1.1					
X1.2		0.647			
X1.3		0.783			
X2.1			0.736		
X2.2			0.689		
X2.3			0.611		
X2.4			0.711		
X2.5			0.621		
X3.1				0.740	
X3.2				0.755	
X3.3				0.716	
X3.4				0.667	
X3.5				0.661	
Y1.2					1.000
Z1.1					0.704
Z1.2					0.746
Z1.3					0.711
Z1.4					0.600
Z1.5					0.716
Z1.6					0.668

You can use a diagram to delete low values. The lowest value is then deleted to fix the AVE, recalculated, and the results of the AVE that has been fixed in the construct reliability and validity are seen. Then, check if the outer loading exceeds 0.6 to ensure it is valid for convergence.

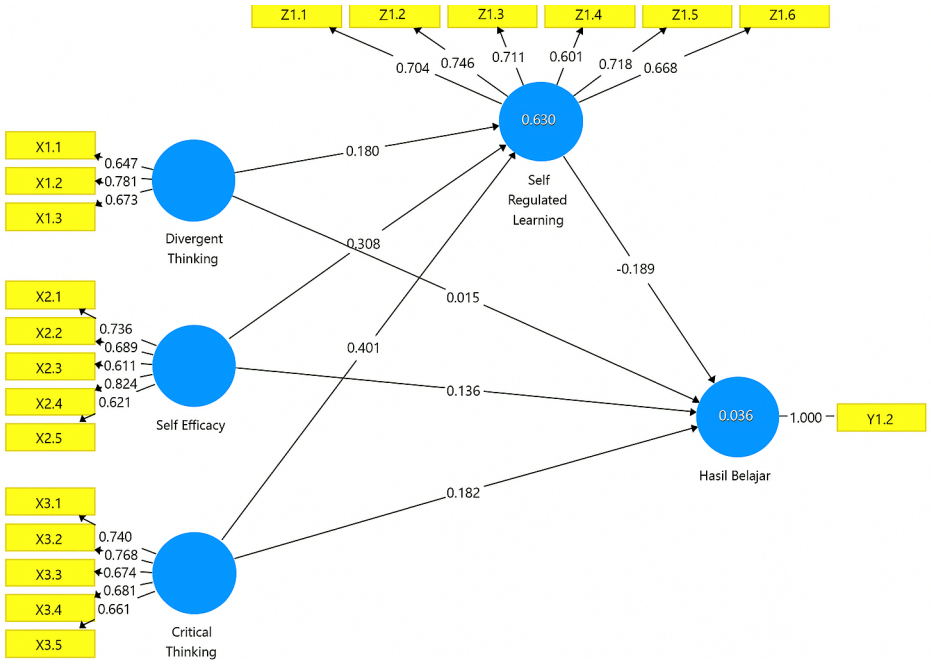

Fig. 2. Hypothesis Testing

For the reliability test, a value greater than 0.6 is selected, so we refer to Table 3 for reliability and construct validity.

Table 3. Reliability and Validity Constructs

Variabel	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Critical Thinking	0.753	0.759	0.835	0.503
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The Cronbach's Alpha value for each variable must be above 0.6. In addition, the composite reliability must be greater than Cronbach's alpha. Therefore, it can be concluded that the variable passes the reliability test. After conducting validity and reliability tests, the first structural model analysis is model fit.

The direction of influence can be seen from the path coefficient value. This value is used to determine the magnitude of the partial influence. It shows the direction of the relationship between variables, whether the relationship between variables is positive or negative, with a range of values between -1 and 1. In the table below, the value of the critical thinking variable is 0.182, indicating a positive direction for the hypothesis. Then, the value of the divergent thinking coefficient on learning outcomes is also positive, so the hypothesis is positive. It can be concluded that the entire path coefficient table is positive, so the hypothesis also has a positive direction.

Table 4. Path Coefficient

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Critical Thinking -> Hasil Belajar	0.182	0.185	0.109	1.673	0.094
Critical Thinking -> Self Regulated Learning	0.401	0.405	0.070	5.742	0,000
Divergen Thinking -> Hasil Belajar	0.015	0.018	0.097	0.155	0.877
Divergen Thinking -> Self Regulated Learning	0.190	0.190	0.071	2.688	0.007
Self Efficacy -> Hasil Belajar	0.136	0.139	0.127	1.074	0.283
Self Efficacy -> Self Regulated Learning	0.308	0.311	0.072	4.292	0.000

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Self Regulated Learning -> Hasil Belajar	-0.199	-0.206	0.114	1.755	0.079

Hypothesis testing can be done with the initial step, namely the hypothesis test of the direct influence of the critical thinking variable on learning outcomes. The regression coefficient value can be seen in the original sample, which is 0.182 with a positive relationship direction, and the P Value is 0.094, greater than 0.05. Then, if using a comparison of T-Statistics with a Z-score value of 1.673 smaller than 1.96, it can be determined that the alternative hypothesis is dismissed and H0 is acknowledged, leading to the conclusion that the critical thinking factor does not contribute significantly to improved learning results. Then the influence of the divergent thinking variable on the learning outcome variable. Here, the regression coefficient value is 0.015 with a positive relationship direction and a p value of 0.877, greater than 0.05. If the p-value is greater than 0.05, then automatically the T-statistic value is smaller, and HA is rejected, and H0 is accepted. It is concluded that divergent thinking does not have a significant effect on learning outcomes. The following table is the divergent thinking variable on the self-regulated learning variable. With a regression coefficient value of 0.190 with a positive relationship direction and a p value of 0.007 less than 0.05, then if using a T-Statistic comparison of 2.688 this is greater than 1.96 then HA is accepted and H0 is rejected so it can be concluded that divergent thinking has a significant positive effect on self-regulated learning which means that every one unit increase in divergent thinking can increase changes in self-regulated learning by 19%.

Additionally, concerning the direct impact of self-efficacy on learning results, the regression coefficient stands at 0. 136, indicating a positive correlation, while the P value is 0. 283, which exceeds 0. 05. When the P value is higher, the T statistic subsequently becomes lower, with its value being 1. 074. Therefore, it can be inferred that the alternative hypothesis (HA) is dismissed, and the null hypothesis (H0) is accepted. Consequently, self-efficacy does not significantly influence learning outcomes.

The following table presents the impact of the Self Efficacy variable on the Self-Regulated Learning variable, which has a regression coefficient of 0. 308 and a positive correlation, alongside P values that are below 0. 05, specifically 0. 000. Furthermore, when comparing the T-Statistics with a Z-score of 4. 282, which is higher than 1. 96, it leads to the conclusion that the alternative hypothesis (Ha) is upheld while H0 is rejected. Hence, the Self-Efficacy variable has a noteworthy positive effect on Self-Regulated Learning. This indicates that for every one unit increase in Self-Efficacy, Self-Regulated Learning can improve by 30-8%.

The final table illustrates the relationship between self-regulated learning and learning outcomes, showing a coefficient of -0. 199, indicating a negative relationship, with P values that are greater than 0. 05. When the P values exceed this threshold, the T Statistics consequently are below 1. 96, recorded at 1. 755. Thus, it can be determined that HA is rejected, and H0 is accepted. Hence, self-regulated learning does not significantly impact learning outcome variables.

1) First structural equation

Self-regulated learning = 0.308. Self-efficacy + 0.190. Divergent thinking + 0.401. Critical thinking + e

2) The second structural equation

Learning outcomes = 0.136. Self-Efficacy + 0.015. Divergent Thinking + 0.182. Critical Thinking + (-0.199). Self-Regulated Learning + e.

The influence of critical thinking on learning outcomes is not significant. Meanwhile, the influence of critical thinking on learning outcomes through the mediation variable self-regulated learning is also not important, so it is called partial mediation.

Table 5. Structure of Eq

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Critical Thinking (X3) -> Hasil Belajar (Z)	0.182	0.185	0.107	1.701	0.089
Critical Thinking (X3) -> Self Regulated Learning (Y)	0.401	0.402	0.069	5.791	0.000
Divergen Thinking (X2) -> Hasil Belajar (Z)	0.015	0.019	0.100	0.151	0.880
Divergen Thinking (X2) -> Self Regulated Learning (Y)	0.190	0.189	0.069	2.755	0.006
Self Efficacy (X1) -> Hasil Belajar (Z)	0.136	0.135	0.125	1.084	0.278
Self Efficacy (X1) -> Self Regulated Learning (Y)	0.308	0.314	0.070	4.379	0.000

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Self Regulated Learning (Y) -> Hasil Belajar (Z)	-0.199	-0.206	0.115	1.739	0.082
Critical Thinking -> Self Regulated Learning -> Hasil Belajar	-0.080	-0.083	0.049	1.633	0.103
Divergen Thinking -> Self Regulated Learning -> Hasil Belajar	-0.038	-0.040	0.028	1.349	0.178
Self Efficacy -> Self Regulated Learning -> Hasil Belajar	-0.061	-0.065	0.040	1.541	0.123

Partial Influence (Bootstrapping Analysis) is carried out to assess the level of significance of partial influence, which can be analyzed using bootstrapping calculations with the following provisions:

If the P value < 0.05, then Ha is accepted, and H0 is rejected, meaning that the exogenous variable has a significant effect. If the P value > 0.05, then Ha is rejected, H0 is accepted, meaning that the exogenous variable does not have a significant impact.

Or,

If the t count exceeds the Z-score of 1.96, then Ha is accepted, and H0 is rejected, indicating that the exogenous variable has a significant effect. If t count < Zscore 1.96, then Ha is rejected, H0 is accepted, meaning that the exogenous variable does not have a significant impact.

Bootstrapping is calculated with subsamples of 5000 because it must be larger than the sample. Here are the results of bootstrapping.

Table 6. Total Indirect Effects

	Critical Thinking	Divergent Thinking	Hasil Belajar	Self Efficacy	Self Regulated Learning
Critical Thinking	-0.080				
Divergent Thinking	-0.038				
Hasil Belajar					
Self Efficacy	-0.061				
Self Regulated Learning					

Further analysis uses blind folding to see the Predictively Relevant values. The predictive relevance value is used to see how good the observation value is and to assess the structural suitability of the model's relevance.

Provision:

When the predictive relevance value (Stone-Giesser value Q Square) is greater than 0, the observed value demonstrates strong predictive relevance for the structural model. In cases where the predictive relevance value (Stone-Giesser value Q S)

Table 7. Total Predictive Relevant

Variabel	SSO	SSE	Q^2 (=1-SSE/SSO)
Critical Thinking	1030.000	1030.000	
Divergent Thinking	618.000	618.000	
Hasil Belajar	206.000	206.353	-0.002
Self Efficacy	1030.000	1030.000	
Self Regulated Learning	1236.000	874.478	0.292

F Square describes the magnitude of the influence of the predictor latent variable (exogenous latent variable) on the endogenous latent variable in the structural order. Chin 1998 categorizes F-Square into three types:

F square value 0.02, weak influence category
F square value 0.15, moderate influence category
F square value 0.35, strong influence category

Table 8. F Square

Variabel	Critical Thinking	Divergent Thinking	Hasil Belajar	Self Efficacy	Self Regulated Learning
Critical Thinking	—		0.014		0.210
Divergent Thinking		0.000			0.051
Hasil Belajar			—		
Self Efficacy			0.008	—	0.118
Self Regulated Learning			0.015		—

In the critical thinking aspect of self-regulated learning, the figure stands at 0.210. According to the F-Square classification, the degree of impact that the critical thinking factor has on self-regulated learning is considered moderate. Suppose every value is below 0. 35. In that case, it can be inferred that the level of influence of each external variable on this internal variable is moderate due to being lower than 0. 35. GoF PLS (Goodness of Fit PLS) is utilized to evaluate how well the entire model fits, assessing both the outer and inner models to determine if the observed values align with the values anticipated by the model.

Value 0.00 - 0.24 small category
Value 0.24 - 0.37 is in the moderate category
Value 0.38 - 1 high category
GoF = ,àöAverage AVE X Average R Square

To calculate the AVE value, look at the construct reliability and validity.

Table 9. Construct Reliability and Validity

Variabel	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Critical Thinking	0.753	0.759	0.835	0.503
Divergent Thinking	0.595	0.614	0.783	0.547
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Self Efficacy	0.703	0.713	0.807	0.456
Self Regulated Learning	0.782	0.785	0.847	0.480

Table 10. Goodness of Fit PLS

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Critical Thinking	0.753	0.759	0.835	0.503
Divergen Thinking	0.595	0.614	0.783	0.547
_ Hasil Belajar	1.000	1.000	1.000	1.000
Self Efficacy	0.703	0.713	0.807	0.456
Self Regulated Learning	0.782	0.785	0.847	0.480
				2.986
				0.597287

	R Square	R Square Adjusted	
Hasil Belajar	0.006	0.017	
Self Regulated Learning	0.630	0.625	
	0.667		0.333331919

The bright orange figures represent the average AVE, while the green indicates the average R Square, and the blue shows the outcome of the average AVE multiplied by the average R Square. So, the GoF result is 0.45, which is a high category. So, we can conclude that the model value has been fit, seen from the SMR, then the R Square value, Loading Factorial, and seen from the GoF, also Q Square

IV. Conclusion

Overall, this study suggests that divergent thinking, self-efficacy, and critical thinking have the potential to impact cadets' learning outcomes positively. However, the role of self-regulated learning as a mediator was not proven to be significant in this context. These results emphasize the importance of developing creative thinking skills, self-confidence, and critical analysis skills in improving the academic performance of cadets at the Surabaya Aviation Polytechnic. The research model shows that exogenous variables (Divergent Thinking, Self-Efficacy, Critical Thinking, and Self-Regulated Learning) simultaneously contribute 62.5% to the endogenous variable (Learning Outcomes). Self-efficacy has the most significant positive influence on Self-Regulated Learning, with an increase of 30.8% for every one-unit increase in Self-Efficacy. This study emphasizes the importance of developing creative thinking skills (Divergent Thinking), self-confidence (Self-Efficacy), and critical analysis skills (Critical Thinking) in improving the academic achievement of cadets of Surabaya Aviation Polytechnic. Although Self-Regulated Learning does not show a significant influence on Learning Outcomes, its role in the learning process still needs to be considered.

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