

Learning Outcomes Management in Vocational School

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RESEARCH ARTICLE

Abstract

This research addresses the suboptimal learning outcomes observed in the Politeknik Ilmu Pelayaran Semarang technical drawing course, focusing on the interplay of lecturer performance, student engagement, and curriculum design. The primary objective is to enhance learning outcomes for Level I Cadets during the 2023 academic year. The study encompasses 103 Level I Cadets enrolled in the Engineering Study Program, utilizing a total sampling technique. Data collection involves a questionnaire to assess the Engineering drawing course's effectiveness. The analytical approach employs percentage descriptive techniques and regression methods, including partial and simultaneous tests, subject to meeting prerequisite test requirements such as normality, heteroscedasticity, linearity, and multicollinearity. Results indicate that lecturer and student factors and environmental elements significantly influence learning outcomes in technical drawing. However, curriculum factors do not exhibit a notable impact on learning outcomes. Collectively, lecturer performance, student engagement, curriculum design, and environmental factors jointly contribute to learning outcomes by 39%, with the remaining 61% influenced by unexplored variables such as cost, organizational climate, socio-culture, and education management. In conclusion, this study establishes a link between lecturer performance, student engagement, and the environment with learning outcomes in technical drawing courses. Conversely, curriculum factors show no significant influence. Recommendations include optimizing the roles of lecturers and students and enhancing the educational environment to foster a conducive learning atmosphere within the dormitory setting.

Keywords: Lecturer, Students, Curriculum, Environment, Learning Outcomes

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1 INTRODUCTION

Teaching and learning activities, as the fundamental elements of formal education in schools, entail complex interactions among various components of the learning process. These components can be broadly categorized into three main groups: lecturers, content or subject matter, and students (Binaghi & Guida, 2022). The collaboration among these elements encompasses critical aspects, including facilities and infrastructure, methods, media utilization, and the overall arrangement of the learning environment. This interplay establishes a conducive teaching and learning environment that fosters motivation to achieve predefined learning objectives. Of these components, lecturers hold a pivotal role in the teaching and learning process. Their involvement spans essential functions, encompassing meticulous planning, effective teaching strategy implementation, and comprehensive assessments (Oolbekkink-Marchand, Van

Der Want, Schaap, Louws, & Meijer, 2022). As key contributors to the educational landscape, lecturers significantly influence the trajectory of learning, guiding students toward academic accomplishments and cultivating an environment conducive to effective learning outcomes.

The attainment of success in learning activities is influenced by various factors, encompassing lecturers, students, curriculum, and environment. Specifically focusing on the lecturer factor, it is emphasized that each lecturer possesses a distinctive teaching pattern (Eirín-Nemiña, 2019), manifested in their behavior during instructional sessions. To optimize the outcomes of teaching and learning activities, lecturers must possess various essential skills (Brimzhanova et al., 2022). These skills include proficiency in opening lessons, effective questioning, clear explanation, adept guidance, facilitative discussion, adept classroom management, and skillful lesson closure (Gaudin & Chaliès, 2015).

In considering student factors, it is observed that each student exhibits diversity in both skills and personality (Şenyiğit & SeriN, 2022). These skills encompass inherent potential, such as talents and intelligence, and those acquired through learning outcomes. The amalgamation of skills and personality attributes in students holds sway over the dynamics and outcomes within the teaching and learning process, influencing the overall success attained during these activities. In the context of curriculum factors, the curriculum serves as a comprehensive framework detailing the content, subject matter, and methodologies of teaching and learning interactions between lecturers and students, tailored for specific educational objectives (Kalogiannakis, Papadakis, & Zourmpakis, 2021; Lockman & Schirmer, 2020; Martin, Conlon, & Bowe, 2021). This structured curriculum is designed to actualize educational goals, account for student developmental stages, align with the environment's national development needs, and foster science, technology, and art resilience. Emphasizing both learning materials and the dynamics of interaction between lecturers and students, these factors collectively contribute to shaping student success in executing the teaching and learning process. As highlighted by Monaghan, Rich, and Bombak (2022), the learning environment encompasses the condition of the space, spatial arrangement, and diverse physical circumstances within the classroom where teaching and learning activities unfold. The environment influences the learning context, potentially impacting the overall success of teaching and learning endeavors. Among the four factors above, lecturers are pivotal in shaping an environment conducive to cultivating student interest and motivation, ultimately facilitating the attainment of desired educational objectives. Consequently, it is imperative for lecturers to promptly acquaint themselves with the diverse impacts brought about by these four factors. This awareness empowers them to swiftly adapt their interaction patterns with students, ensuring a dynamic and effective teaching and learning experience.

Numerous lecturers perceive students as a decisive factor influencing the outcome of the teaching and learning process, potentially leading to deficiencies in individual and class-wide learning experiences. This perspective highlights a lack of certainty among lecturers regarding the effectiveness of the conducted teaching and learning activities. Learning is a transformative process that manifests as a novel pattern, transcending mere reactions through skills, attitudes, habits, intelligence, or comprehension of a command (Hessen & Kuncel, 2022). It involves the conscious endeavor of individuals to modify their behavior (Dereñ, Skonieczny, & Łukaszykiewicz, 2022; Falcón-Pérez & Fuentes-Perdomo, 2019), resulting in a comprehensive novelty derived from personal experiences, particularly interactions with the environment. Learning continually modifies behavior, attitudes, and skills through ongoing learning activities. The enduring or transient nature of behavioral changes before and after learning is contingent on deliberate and sustained learning endeavors. Song, Xing, Duan, Cohen, and Mou (2022) defined interaction as communication and relationships inherent in human activities with the natural environment, others, and the divine. Such interactions can be intentional or unintentional, with intentional interactions involving educational and learning dynamics. Simultaneously, involuntary interactions denote an individual's engagement with their environment. Teaching and learning interactions represent a conscious effort to educate, nurture, and guide students toward maturity.

As per Dwivedi et al. (2022), the essential considerations in teaching and learning interactions encompass material aspects. This includes how lecturers captivate students' attention to new

lessons, the lecturer's focus on current and forthcoming subject matter, the sequence of material delivery, the establishment of social interactions during teaching and learning activities, and the conclusion of learning materials. Additionally, attitudes during teaching, whether towards the classroom setting or the number of students, as well as attitudes towards the needs, desires, and attention of students, time management, and attire, play crucial roles in shaping the dynamics of these interactions. Lecturer skills requiring development encompass initiating lessons, offering motivation, engaging students, posing questions, employing non-verbal cues, managing students, and planning time effectively. The attainment of success in teaching and learning activities is contingent upon various factors, notably those related to lecturers, students, curriculum, and the learning environment (Alnajjar, Al-Qeyam, Awwad, & Alkhutaba, 2022; Stössel, Baumann, & Wegner, 2021).

To attain optimal results in teaching and learning activities, lecturers need to possess various essential skills, as identified by Gebru, Khan, and Raza (2022). These skills include opening lessons effectively, posing thought-provoking questions, providing clear explanations, guiding discussions, managing classes adeptly, and concluding lessons skillfully. Additionally, lecturers must remain attentive to matters pertinent to teaching and learning activities, as Julia, Supriyadi, and Iswara (2022) and Vaisarova and Reynolds (2022) emphasized. It is imperative to recognize that students are individuals with distinct needs. Consequently, lecturers must comprehend each student's circumstances to facilitate the smooth progression of subsequent teaching and learning activities. Additionally, lecturers should be attuned to the potential within students, enabling them to build on prior knowledge and capture their attention effectively during the learning process.

Lecturers must consider a child's ability to adapt to various situations. A child adept at adjusting to classroom or learning environments will likely experience enhanced ease in the learning process. Amidst teaching, lecturers grapple with curriculum-related aspects, requiring them to factor in the child's developmental stage and be mindful of individual differences, learning pace, and other pertinent considerations. Lecturers must possess comprehensive teaching methods well-suited for effectively delivering learning materials to students. Selecting an appropriate teaching method is crucial when instructing on a specific subject. Subsequently, lecturers are tasked with the evaluation of students. Assessments serve the purpose of determining whether students have attained the intended learning outcomes. Beyond its evaluative function, assessment holds psychological significance, as it should be conducted to influence student learning motivation positively.

The subsequent factor to consider is the student, each of whom exhibits diversity in skills and personality (Haenilah et al., 2022; ŞenyiğİT & SeriN, 2022). Students' skills encompass both inherent potential (such as talents and intelligence) and those acquired through learning outcomes. The variations in students' skills and personalities play a pivotal role in shaping the dynamics and success attainable in the teaching and learning activities. Abushandi (2021) and Harun, Kartowagiran, and Manaf (2021) indicate that two distinct factors influence student learning outcomes. Internal factors, originating from within the students, encompass physical and spiritual conditions. External factors from outside the students involve the environmental conditions surrounding them.

A curriculum is a collection of learning materials designed to accomplish specific objectives. Politeknik Ilmu Pelayaran Semarang's curriculum aligns with STCW 2010 standards, with courses tailored to maritime education objectives. These objectives outline the anticipated changes in student behavior, a direct outcome of the teaching and learning activities. Consequently, students' success in orchestrating the teaching and learning process hinges on the quality of learning materials and the interaction patterns between lecturers and students. According to Kulturel-Konak (2020), preparing a curriculum involves carefully considering essential factors such as the philosophy and objectives of education, the psychology of learning, and child-related aspects. The author emphasizes the significance of recognizing the interconnection between subjects, maintaining flexibility, engaging students actively, aligning with daily life experiences, encouraging diverse activities among children, and allowing flexibility in developing children's interests.

The final factor under investigation is the learning environment, encompassing the condition of space, spatial arrangement, and diverse physical circumstances within the classroom where teaching and learning unfold. The learning environment directly impacts the educational process, consequently influencing the success of teaching and learning activities. As highlighted by Hoang et al. (2022) and Wang, Dai, and Mathis (2022), student achievement in attaining learning outcomes is shaped by various factors, notably the social and non-social aspects of their environment. The focus of this study is the dependent variable, namely learning outcomes. These outcomes represent individuals' accomplishments following their activities (Datay, Boulle, Mant, & Yudkin, 2010). Individuals inherently dedicate earnest effort to attain improved results and achieve commendable milestones in pursuing any task. In this context, learning outcomes signify the gains derived from completed activities, with learning being the demonstration of knowledge or skills developed by individuals, typically reflected in grades or numerical assessments provided by instructors.

2 METHODOLOGY

In alignment with the selected title, the targeted population for investigation encompasses all first-year students enrolled in the Politeknik Ilmu Pelayaran Semarang Engineering Expertise Program during the 2022/2023 academic year who have undergone technical drawing courses. The comprehensive population under scrutiny comprises 103 students, and the study employs the total sampling technique. Preliminary questionnaire trials were conducted on populations sharing similar characteristics to refine the research instrument.

An independent variable, denoted as X, is a factor that exerts influence on the dependent variable, as described by Smit et al. (2023). Within the scope of this study, the independent variables are pivotal elements impacting learning outcomes. These include indicators of lecturer factors (X1), student factors (X2), curriculum factors (X3), and environmental factors (X4). A dependent variable, denoted as Y, constitutes a set of symptoms or factors that either exist or manifest and are influenced by the independent variable, as outlined by Smit et al. (2023). In this study, the dependent variable is represented by the learning outcomes of technical drawing training for first-year students in the Politeknik Ilmu Pelayaran Semarang Engineering Expertise Program during the 2022/2023 academic year. The researchers employ two primary criteria for data collection: the documentation method and the questionnaire method. The instrument's validity is assessed through the product-moment correlation, with a set value of 0.60. The study's reliability is determined using the alpha formula.

The analytical techniques applied in this research encompass percentage descriptive analysis and regression analysis. The prerequisites for this study are evaluated through various tests, including the Data Normality Test, Heteroscedasticity Test, Linearity Test, and Multicollinearity Test. These tests are conducted using the computer-aided SPSS program version 25. The primary analytical approach employed is Regression Analysis. Hypothesis testing involves multiple regression analysis, incorporating both partial and simultaneous tests.

The partial test assesses the significance of regression efficiency and partial correlation, determining the relationship of each independent variable (X1, X2, X3, and X4) with the dependent variable (Y). Decision-making relies on probability numbers, where a probability number 0.05 indicates a significant relationship between specific variables. For instance, if the probability number resulting from the analysis is 0.05, it implies a significant relationship between variables X1 and Y, with control over variables X2, X3, and X4. Similarly, the test assesses the relationships of variables X2 with Y, X3 with Y, and X4 with Y, each controlled for the other independent variables. Simultaneous testing evaluates the significance of multiple correlations, analyzing relationships among two or more variables where independent variables influence a single dependent variable. This research utilizes correlation analysis to ascertain the associations between lecturer factors (X1), student factors (X2), curriculum factors (X3), and environmental factors (X4) with learning outcomes (Y).

3 RESULTS AND DISCUSSIONS

3.1 Data Normality Test

In regression analysis, one crucial requirement is the normal distribution of both regression data and models. The assessment of data normality is conducted through a normality test using the SPSS version 25 computer program. This analysis is further reinforced by examining the Plot of Regression Standardized Residual. A regression model is normally distributed if the graph generated from the SPSS version 25 output approximates the diagonal line. As indicated by the graph, the points closely align with the diagonal line, affirming the normal distribution of the regression model. A comprehensive presentation of the data normality test results is shown in Figure 1.

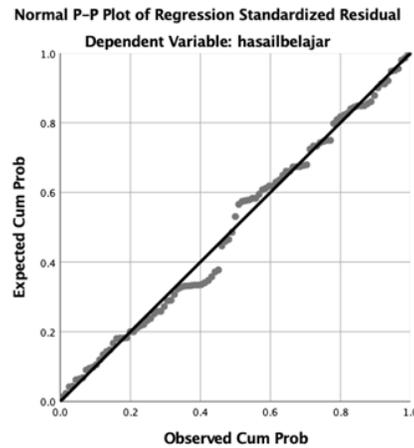


Figure 1. P-P Plot of regression model normality testing.

3.2 Heteroscedasticity Test

Heteroscedasticity testing is visually assessed through the Multivariate Standardized Scatterplot. The decision-making criterion hinges on the absence of a discernible pattern in the distribution of residual values, indicating a random appearance. When the residual values do not exhibit a specific pattern but appear random, it suggests that the regression model is homogeneous and devoid of heteroscedasticity. The outcomes of the heteroscedasticity test are depicted in Figure 2.

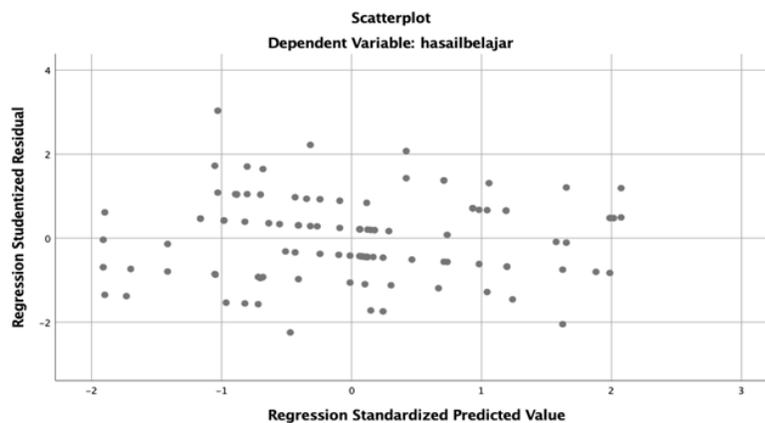


Figure 2. Heteroscedasticity Test

Interpreting the graph above, the scattered points lack a distinct pattern, displaying a random distribution. Consequently, it can be concluded that the regression model is homogeneous and devoid of heteroscedasticity.

3.3 Multicollinearity Test

For the multiple regression model to be valid, independent variables must exhibit no perfect relationship or multicollinearity. The assessment of multicollinearity is conducted through the variance inflation factor (VIF) value. Multicollinearity is indicated between independent variables when the tolerance is < 0.1 and VIF > 10. The comprehensive results of the multicollinearity test are provided in Table 1.

Table 1. Multicollinearity Test Results

		Coefficients		
Model		Correlations	Collinearity Statistics	
		Part	Tolerance	VIF
	(Constant)			
1	lecturer	.114	.960	1.042
	student	.120	.775	1.290
	Curriculum	.152	.848	1.180
	environment	.147	.776	1.289

Observing the table, each independent variable exhibits a tolerance value > 0.1, and the VIF value is < 10. This leads to the conclusion that the regression model is free from multicollinearity.

3.4 Hypothesis Test Results

Hypothesis testing in this study uses regression analysis which includes two tests, namely the partial test and the simultaneous test.

3.5 Partial Test

Based on the results of regression analysis, regression coefficients are obtained as listed in Table 2.

Table 2. Partial Test Results

		Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations	
		B	Std. Error	Beta			Zero-order	Partial
	(Constant)	86.917	2.092		41.539	.000		
1	lecturer	.606	.057	.117	1.154	.002	.107	.116
	student	.550	.038	.013	.119	.006	.075	.121
	Curriculum	.046	.089	.056	.521	.604	.019	.053
	environment	.710	.048	.167	1.482	.001	.157	.148

Referring to the table above, the regression coefficients are as follows: 0.606 for the lecturer factor variable, 0.550 for the student factor variable, 0.046 for the curriculum factor variable, and 0.710 for environmental factors. The constant is 86.917. Therefore, the regression model derived is as follows:

$$Y = 0.606X_1 + 0.550X_2 + 0.046X_3 + 0.710X_4 + 86.917$$

The model shows that:

1. For every one-unit increase in the lecturer factor score, there will be a corresponding increase in learning outcomes by 0.606, assuming all other variables remain constant.
2. Each increment of one unit in the student factor score is associated with a rise in learning outcomes by 0.550, with all other variables held constant.
3. Each rise of one unit in the curriculum factor score corresponds to increased learning outcomes by 0.046, assuming other variables remain constant.
4. Each elevation of one unit in the environmental factor score increases learning outcomes by 0.710, with other variables constant.

3.6 Partial Test of Lecturer Factor Variables

The outcome of hypothesis testing utilizing a partial test, facilitated by SPSS program version 25, revealed a regression coefficient of 0.606 with a significance value of 0.002. Given that the significance value of 0.002 is less than the predetermined level of significance (0.05), it can be concluded that the alternative hypothesis (H_a) is accepted. This signifies that, in partial terms, the stated alternative hypothesis suggesting an influence of lecturer factors on learning outcomes is substantiated.

3.7 Student Factor Variable Partial Test

The results of hypothesis testing through a partial test utilizing SPSS program version 25 yielded a regression coefficient of 0.550 with a significance value of 0.006. As the significance value of 0.006 is less than the predetermined level of significance (0.05), it can be concluded that the alternative hypothesis (H_a) is accepted. This indicates that, in partial terms, the proposed alternative hypothesis stating the influence of student factors on learning outcomes is supported.

3.8 Partial Test of Curriculum Factor Variables

The results of hypothesis testing through a partial test utilizing SPSS program version 25 revealed a regression coefficient of 0.046 with a significance value of 0.604. Since the significance value of 0.604 is greater than the predetermined level of significance (0.05), it leads to the conclusion that the alternative hypothesis (H_a) is rejected. This indicates that, in partial terms, the stated alternative hypothesis suggesting an influence of curriculum factors on learning outcomes is not supported.

3.9 Partial Test of Environmental Factor Variables

The results of hypothesis testing through a partial test utilizing SPSS program version 25 yielded a regression coefficient of 0.710 with a significance value of 0.001. Given that the significance value of 0.001 is less than the predetermined level of significance (0.05), it can be concluded that the alternative hypothesis (H_a) is accepted. This indicates that, in partial terms, the proposed alternative hypothesis stating the influence of environmental factors on learning outcomes is substantiated.

3.10 Simultaneous Test

Hypothesis testing asserting the simultaneous influence of lecturer factors, student factors, curriculum factors, and environmental factors on accepted learning outcomes can be examined through the results of the F test. The outcomes of the simultaneous tests are presented in Table 5.

**Table 3. Simultaneous Test Results (Test F)
Model Summary(b)**

Model	R	R Square	Adjusted R Square	Std. The error in the Estimate	Change Statistics			
					F Change	df1	df2	Sig. F Change
1	.525(a)	.276	.225	3.218	5.421	4	57	.001

(a) **Predictors:** (Constant), environmental factors, curriculum factors, student factors, lecturer factors

(b) **Dependent Variable:** Learning outcomes

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.197a	.390	-.001	1.57669	.039	.005

The result of the F test yields a p-value of 0.005. As the significance value is less than 0.05, it leads to the rejection of H_0 and the acceptance of H_a . This implies that a significant simultaneous influence of lecturer factors, student factors, curriculum factors, and environmental factors on accepted learning outcomes supports H_a . The R square value of 0.390 indicates that lecturer factors, student factors, curriculum factors, and environmental factors collectively explain 39% of the variance in learning outcomes. The remaining 61% is influenced by unexamined factors such as cost, organizational climate, socio-cultural, education management, etc.

4 DISCUSSION

This emphasizes that lecturers should possess a spectrum of skills, encompassing lesson opening, questioning, explaining, discussion guiding, class management, and lesson-closing skills, to optimize the outcomes of the teaching and learning process (Jia & Hermans, 2022; Alvira & Satoto, 2022; Sinring, Aryani, & Umar, 2022). Lecturers are urged to be mindful of students, recognizing them as individuals with distinct needs. Understanding the conditions of students is essential to cultivate a positive atmosphere during teaching and learning activities. Lecturers should consider adapting to their environment and play a role in enhancing students' motivation to learn. Furthermore, lecturers are expected to possess comprehensive knowledge, employ suitable teaching methods, and choose the most effective approach to attain specific lesson objectives. Regular assessment is crucial for lecturers to gauge the achievement of learning outcomes (Albreiki, Habuza, & Zaki, 2022).

Each student exhibits diversity in skills and personality, encompassing potential skills such as talents, intelligence, and skills acquired through learning outcomes. The variety in students' skills and personalities significantly influences the dynamics and success achievable in teaching and learning. Factors influencing student learning outcomes stem from physiological and psychological aspects. Physiologically, it pertains to students' physical condition, while psychologically, it involves aspects such as intelligence, attitudes, talents, interests, and motivation (Courtney, Karakus, Ersozlu, & Nurumov, 2022; Thomas et al., 2022). Considerations in curriculum preparation should encompass philosophy and educational goals, learning psychology, and child-related factors. The author suggests several key elements for curriculum development, including fostering inter-subject relationships, ensuring flexibility, collaborative preparation involving both lecturers and students, maintaining a child-centered approach in daily life, encouraging diverse

activities, providing flexibility for interest development, and promoting cognitive and learning skills in children.

The findings of this study lead to the conclusion that environmental factors significantly impact student learning outcomes, particularly in the context of technical drawing training subjects. Students perceive the conditions at Politeknik Ilmu Pelayaran Semarang, characterized by boarding school arrangements, as less conducive for studying due to crowded activities and resulting fatigue, leading to a reluctance to engage in learning (Al-Shlowiy, 2022; Daniela et al., 2022; Vitvitskaya, Suyo-Vega, Meneses-La-Riva, & Fernández-Bedoya, 2022). The coaching environment is perceived as somewhat rigid and semi-military. This environment plays a crucial role in shaping the learning situation, consequently influencing success in the teaching and learning process. Student success in achieving learning outcomes is shaped by various factors, encompassing both the social and non-social environment. Consequently, the research underscores the significance of teaching and learning activities, as well as the interaction patterns between lecturers and students, and the environment as determining factors for student success in the teaching and learning process (Al-Shlowiy, 2022; Daniela et al., 2022; Vitvitskaya et al., 2022).

5 CONCLUSIONS

A notable influence exists between lecturers, students, and environmental factors on the learning outcomes of the Engineering Drawing course for first-year students in the Politeknik Ilmu Pelayaran Semarang engineering expertise program for the 2022/2023 academic year. However, no significant impact is observed between curriculum factors and learning outcomes. Collectively, lecturer factors, student factors, curriculum factors, and environmental factors jointly contribute to the learning outcomes of the Technical Drawing training course for first-year students in the Politeknik Ilmu Pelayaran Semarang engineering expertise program for the 2022/2023 academic year, accounting for 39% of the variance.

Based on the study's findings, it is noted that 61% of the outcomes are influenced by factors not explored in this research, such as cost, organizational climate, socio-cultural, and education management. The author suggests optimizing the role of lecturers in communication, teaching, and utilizing suitable digital teaching media to enhance students' comprehension of the material. In evaluating student drawings, lecturers must provide thorough feedback on shortcomings or errors. Furthermore, fostering enthusiasm, motivation, and a nurturing teaching approach akin to guiding one's children is recommended. The academic environment should prioritize academic culture, emphasizing attention to educational patterns while avoiding seniority and authoritarian behavior within the academic community.

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