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The Relationship of Learning Interest and Engineering Images Learning Outcomes with Forming and Assembly Learning Results in Class XI Metal Fabrication Engineering Expertise Program SMKN 1 Lubuk Pakam

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Abstract. The purpose of this research is to (1) establish a connection between student enthusiasm in learning and subsequent achievement in forming and assembling the connections between (2) learning outcomes in engineering drawings and (3) learning outcomes in formation and assembly, and (3) learning motivation and engineering drawing and formation and assembly outcomes. The 36 participants in this study were all students from Class XI at SMK Negeri 1 Lubuk Pakam who were majoring in Metal Fabrication Engineering. Students from Class XI at SMK Negeri 1 Percut Sei Tuan were used to test the instrument before it was administered to the research sample. Correlational analysis is the approach of choice for this study. First, a 0.719 correlation coefficient and a 0.517 coefficient of determination indicate that students' motivation to learn is associated with their success in forming and assembling knowledge. This suggests that curiosity accounts for 51.7% of the variance in the results of exercises involving group formation and assembly. The coefficient of determination is 0.000, which is less than 0.05, and statistically significant. The learning outcomes for engineering drawing and forming and assembling are significantly related to one another, with a correlation value of 0.598 and a coefficient of determination of 0.358, respectively. This means that the knowledge gained from studying technical drawings is crucial to the achievement of 35.8 percent of the knowledge gained from studying construction and fitting. The coefficient of determination is 0.000, which is less than 0.05, and statistically significant. Learning results for technical drawing and forming and assembly skills are positively related to student interest in learning, as shown by the regression equation Y=33.355+0.507 X_1+0.297 X_2. The outcomes of learning about forming and assembly processes were found to have a substantial association with the outcomes of learning about engineering drawings. The F value of 21.021 indicates this, and it is more than the cutoff value of 3.28 in the F table, therefore the F test supports this interpretation. Thus, for students in class XI of the Metal Fabrication skill program at SMK Negeri 1 Lubuk Pakam, there is a positive and statistically significant association between interest in learning and learning outcomes of technical drawing and learning outcomes of forming and assembly.

Keywords: Learning Interests, Learning Outcomes of Engineering Drawings, Learning outcomes of forming and assembling.

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1. Introduction

Education is essential for the development and advancement of the Indonesian nation. Without education, it will be difficult for this nation to keep up with the rapid advancement of knowledge and technology in this era of globalization. As stated in the 1945 Constitution, one of the objectives of the Indonesian state is to educate the nation's life. Consequently, education is expected to be able to produce

an intelligent generation.

Developing students' potential for religious-spiritual strength, self-control, personality, intelligence, noble character, and the necessary skills is central to national education, as stated in Law No. 20 of 2003 [1]. The national education system must ensure that educational opportunities are distributed fairly and that the quality, relevance, and efficiency of education administration are improved so that it can keep up with the needs of a diverse and globalized society.

Education is a deliberate effort (planned, consciously controlled, and systematically) given to students by educators so that potential students can develop directed towards certain goals, or education is a process of developing one's individual and personality which is carried out consciously and responsible for improving knowledge, skills, and attitudes as well as values so that they can adapt to their environment.

The Vocational High School (SMK) is an essential aspect of Indonesia's educational system, particularly for training the middle workforce, and has a significant impact on the country's human resource development. SMK has the following goals as outlined by the 2013 curriculum [2]:

1. Creating an Accountable Vocational Education Institution as a Center for Cultivating Competence with National Standards.
2. Educate Human Resources (HR) who have an international standard work ethic and competence.
3. Provide a variety of permeable and flexible Vocational Education services in an integrated manner between vocational education pathways and levels.
4. Expand and equalize the quality of vocational education.
5. Promote local excellence as a capital for the nation's competitiveness (Directorate of Vocational High School Development.

Based on the objectives of the SMK above, it can be said that SMK graduates are expected to master the subject matter both in theory and in practice so that they can be independent by applying the knowledge they have acquired in accordance with their field of work.

Vocational Subjects (MPK) are a number of subjects that contribute to vocational mastery and specific skills, and are closely related to the learning process in these vocational subjects. The activities in Vocational Subjects are separated into two categories: theoretical and practical. Theory of Vocational Subjects is a theory that serves as a source of information for comprehending practice. The theory of Vocational Subjects is a reference for practical activity; therefore, if there is an error in the application of theory, it will result in errors in practical activities. In other words, practical activities are based on theory and involve putting theory into practice.

In learning at SMKN 1 Lubuk Pakam, especially the metal fabrication engineering department. There is one subject that is quite important for students of that major. The subjects are forming and assembly techniques. In the process of learning the formation and assembly technique there are several stages that students must go through, namely: 1) Reading technical drawings; 2) Using hand tools; 3) Using powered tools/handheld operation; 4) Performing work with common machines; 5) Using heating equipment, heat cutting, and gouging manually; 6) Perform mechanical cutting; 7) Perform mechanical cutting; 8) Perform welding routines using the manual arc welding process; 9) Welding with manual metal arc welding process; 10) Assemble fabricated components; 11) Welding with MIG welding process (GMAW); 12) Carry out fabrication, shaping, bending, and molding; 13) Repair/replace/change the fabrication results; 14) Drawing the opening/expansion of the advanced geometry of the cylindrical/rectangular body; 15) Draw an aperture/expansion of advanced geometry of conical/chronic objects. After making observations at SMK N 1 Lubuk Pakam, the authors obtained information on the value of learning outcomes for forming and assembling data obtained from teachers who teach formation and assembly subjects 2017/2018 school.

Table 1. List of Values for Forming and Assembling Subjects for the 2017/2018 Academic Year.

Kategori	Kelas	Nilai	KKM	Jumlah Siswa	Persentase
Sangat baik (A)	XI TFL	86-100	70	6	16.6%
Baik (B)		71- 85		22	61.1%
Cukup (C)		56-70		2	5.55%
Kurang (D)		<55		4	11.2%
Jumlah				36	100%

From the data from observations carried out by the author, at SMK Negeri 1 Lubuk Pakam, as for the data acquisition of learning outcomes for the 2017/2018 school year. that 7 students scored above 86-100 in the percentage of 16.6%, 23 students scored above 71-85 in the percentage of 61.1%, 2 students scored above 56-70 in the percentage of 5.55%, and 4 students scored <55 in the percentage 11.2%, and the minimum completeness criteria is 70.

In the author's observations when carrying out PPL at the school concerned, in the Formation and assembly learning there are still students who have difficulty in learning, but these students do not want to try to solve the difficulties experienced or consult about the problems faced by their teachers, this is due to the lack of student interest in learning these subjects. As a result of this, the value of learning outcomes obtained by students is still low. Several factors influence learning outcomes, including interest in learning, learning motivation, and study habits with mastery of science at the level of memorization not with understanding so that it is difficult to transfer to situations that On the other hand, teachers are less qualified, both in taking the methods used or in mastering the subjects they hold, teachers demand standard lessons above the child's ability, this usually happens to young teachers who are inexperienced so they cannot measure the ability of students.

In this regard, there is a possibility of basic subjects that might affect the learning outcomes of forming and assembly techniques. One of the subjects is a technical drawing, which is a productive training subject that leads to basic mastery. The technical drawing is carried out in the classroom and is divided into two, namely theoretical and practical activities. The theory of this technical drawing subject is fundamental and important, where students gain basic knowledge about the principles in the drawing which aims to provide information in the process of working on the product. However, in the teaching and learning process, there are still students who play and pay less attention when following the subject. these lessons, this is what may cause students to have low grades due to not understanding the basic concepts of technical drawing. Thus, the learning outcomes obtained by students are still low. From these results, it is suspected that if the learning outcomes of basic engineering drawings are good, it will have a positive impact on students' understanding of forming and assembly worksheet drawings, so that they will make a positive contribution to increasing high formation and assembly engineering learning outcomes.

Success in learning a training subject is every student's ultimate objective, if one focuses on it. To attain this objective, the student's personality must be developed and he must acquire the necessary knowledge and skills while in school. All parties hope that every student can attain the best possible learning outcomes. The authors are interested in conducting research on 1) Interest in learning; 2) Results of learning engineering drawings; and 3) Results of learning formation and assembly techniques based on the aforementioned description.

2. Method

This study employs a correlational research design and descriptive research methods. The variable of interest in learning, denoted by (X1), is the independent one in this investigation, learning outcomes of technical drawing which are expressed in (X2) and the dependent variable is learning outcomes of formation and assembly which are expressed in (Y).

Interest in learning data (X1) was collected using a Liker Scale model questionnaire, while the data on learning outcomes of engineering drawings were obtained from tests, and data on the results of formation and assembly were obtained from the documentation.

The instrument trial was carried out on the research sample, namely to 27 students of SMK Negeri 1 Percut Sei Tuan majoring in machining in the 2017/2018 academic year. Testing of the instrument needs to be done to determine the level of validity and reliability of each item of the questionnaire/question that

will be tested in the study.

The population used in this study were students of SMK N 1 Lubuk Pakam in 2018, totaling 36 people majoring in metal fabrication engineering. According to Arikunto [3], explaining that in sampling if the number of subjects is less than 100, it is better to take all so that this study is a population study. Data analysis techniques used are normality test, linearity test, multicollinearity test, and correlation analysis.

3. Result and Discussion

After obtaining the analysis requirements test, the next step is to test the hypothesis, before testing the hypothesis first, the correlation between variables is calculated using a zero level correlation, the results of which can be described as follows: A person's interest in learning is one activity that motivates them to engage in a variety of mental and physical pursuits. Individual experiences involving cognitive, affective, and psychomotor interactions with their environment resulting in a change in behavior. With an interest in learning, it will support good technical drawing learning outcomes, with good technical drawing learning outcomes it will be able to provide an understanding of working drawings which will continue in the formation and assembly process. Thus, the higher interest in learning and good technical drawing learning outcomes, the better assembly, and shaping learning outcomes.

The results of the Hypothesis Testing can be seen in the following SPSS output table:

Table 2. Correlation of learning interest (X1) with learning outcomes of formation and assembly (Y).

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.719[a]	.517	.503	1.77987	.517	36.393	1	34	.000	1.877

a. Predictors: (Constant), X1

b. Dependent Variable: Y

The correlation coefficient is 0.719, as seen in Table 2. With a sample size of 36 and a significance level of 5%, this value is looked up in $r_{\_table}$. Obtaining $r_{\_table}$ at 0.2785 allows us to show that $r_{\_count}$ is bigger than $r_{\_table}$. The correlation between the two variables is 0.517. To put it another way, motivation to learn accounts for 51.7% of the variance in forming and assembling outcomes.

Table 3. Correlation of technical drawing learning outcomes (X2) with formation and assembly learning outcomes (Y).

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.598[a]	.358	.339	2.05223	.358	18.949	1	34	.000	1.699

a. Predictors: (Constant), X2

b. Dependent Variable: Y

Table 3 displays the correlation coefficient, which turns out to be 0.598. This statistic was looked up in $r_{\_table}$ using N=36 and a 5% threshold of significance. Obtaining $r_{\_table}$ at 0.2785 allows us to show that $r_{\_count}$ is bigger than $r_{\_table}$. The correlation coefficient is 0.358. This suggests that mastery of engineering drawings accounts for 35.8% of the success in learning about shaping and assembly.

Table 4. Correlation (X1) and (X2) with (Y).

Model Summary[b]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.748[a]	.560	.534	1.72385	.560	21.021	2	33	.000	1.799
a. Predictors: (Constant), X2, X1										
b. Dependent Variable: Y										

There is a 0.748 correlation between X1 (learning interest) and X2 (technical drawing learning results) in Table 4. The estimated coefficient of determination of 0.560 indicates that the learning results of technical drawing (X2) and desire in learning (X1) jointly explain 56% of the formation and assembly learning outcomes.

The results of this correlation study also show that the outcomes of learning technical drawing have a coefficient of determination of 0.358, meaning that 35.8% of the formation and assembly results are affected by this variable, while the outcomes of learning interest have a coefficient of determination of 0.517, meaning that 51.7% of the results are affected by this variable. Students in SMK N 1 Lubuk Pakam's metal fabrication engineering expertise program in grade eleven are the only ones included in this study. The findings of this study have limited applicability. For the simple reason that each school caters to a slightly distinct set of student interests.

4. Conclusion

The following are the study's conclusions, which are based on the described research results: 1) Class XI students in SMK Negeri 1 Lubuk Pakam's Metal Fabrication Engineering Expertise Program have shown a strong correlation between their motivation to learn and their proficiency in forming and assembly. The obtained values are a coefficient of determination of 0.517 and a correlation coefficient of 0.719. Therefore, the formation and assembly results dictated by learning are 51.7%. This suggests that a student's motivation to learn can affect their performance in the skills of formation and assembly. 2) Class XI students in SMK Negeri 1 Lubuk Pakam's Metal Fabrication Engineering Expertise Program show a positive and statistically significant correlation between the outcomes of learning engineering drawing and forming and assembly. Coefficient of determination is 0.358, while the computed correlation coefficient is 0.598. This suggests that mastery of engineering drawings accounts for 35.8% of the success in learning about shaping and assembly. This suggests that the success of a course in engineering drawing predicts the success of a course in forming and assembly procedures. 3) The learning outcomes of technical drawing and the learning outcomes of shaping and assembling are positively and meaningfully related to one another. at SMK Negeri 1 Lubuk Pakam, students in Class XI participate in the Metal Fabrication Engineering Expertise Program. The obtained determination is 0.560, and the correlation coefficient is 0.748. As a result, the multiple regression equations Y = 33,355 + 0,507 X1 + 0.297 X2 account for 56% of the variance in formation and assembly learning outcomes when controlling for motivation in learning (X1) and technical drawing learning outcomes (X2). This suggests that the success of children in learning to form and assemble is proportional to their level of motivation and interest in learning.

5. Recommendation

At SMK Negeri 1 Lubuk Pakam, that a favorable correlation exists between students' levels of motivation to learn and their success in acquiring knowledge of forming and assembly methods. Therefore, it is important to pique students' curiosity about formation and assembly in order to improve their performance in these courses. The formation and assembly learning outcomes are correlated positively with the technical drawing outputs. Thus, it is necessary to provide teachers with opportunities for innovative teaching or other means of enhancing student learning. Third, both learning curiosity and technical drawing proficiency were found to strongly correlate with forming and assembly proficiency. In other words, if both student interest in studying and learning results of technical drawing are enhanced, it is believed that learning outcomes of forming and assembly will also improve. For future studies to improve learning outcomes of forming and assembly procedures, researchers should build upon this study's findings by creating independent factors that have an impact.

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