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—This study aims to determine the magnitude of (1) the relationship of learning interest with learning outcomes of formation and assembly (2) the relationship of learning outcomes of engineering drawing with learning outcomes of formation and assembly, (3) the relationship of interest in learning and learning outcomes of engineering drawing with learning outcomes of shaping and assembly. assembly. The population of this study was students of class XI majoring in Metal Fabrication Engineering at SMK Negeri 1 Lubuk Pakam, amounting to 36 people. Before this research was conducted, the instrument was tested on respondents who were not the research sample, namely the class XI students of SMK Negeri 1 Percut Sei Tuan, totaling 27 people. The research method used is correlational research. The research findings show that: (1) there is a relationship between interest in learning and learning outcomes of formation and assembly with a correlation coefficient of 0.719 with a coefficient of determination of 0.517. This means that 51.7% of learning outcomes of formation and assembly are determined by students' interest in learning. The coefficient of determination is also statistically significant which is indicated by a significance value of 0.000 which is below 0.05. 2) there is a significant relationship between the learning outcomes of engineering drawing and the learning outcomes of forming and assembling with a correlation coefficient of 0.598 with a coefficient of determination of 0.358. This means that 35.8% of the learning outcomes of constructing and fitting are determined by the learning outcomes of technical drawings. The coefficient of determination is also statistically significant which is indicated by a significance value of 0.000 which is below 0.05. (3) there is a relationship between interest in learning and learning outcomes of technical drawing together with learning outcomes of forming and assembly techniques with the regression equation obtained is $Y = 33.355 + 0.507\,X_1 + 0.297\,X_2$. The results showed that interest in learning and learning outcomes of engineering drawings had a significant relationship with learning outcomes of forming and assembly techniques. This is indicated by the results of the F test where the calculated F value is 21.021 > 3.28 F table. Thus, there is a positive and significant relationship between interest in learning and learning outcomes of technical drawing together with learning outcomes

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of forming and assembling students of class XI of the Metal Fabrication skill program for students of SMK Negeri 1 Lubuk Pakam.

***Index Terms*—Learning Interests, Learning Outcomes of Engineering Drawings, Learning outcomes of forming and assembling.**

I. INTRODUCTION

Education is important for the formation of the character and progress of the Indonesian nation. Without education, this nation will be very difficult to keep up with the progress of the development of knowledge and technology in this era of globalization. Therefore, education is expected to be able to create an intelligent generation, as stated in the 1945 Constitution that one of the goals of the Indonesian state is to educate the nation's life.

The purpose of National Education as regulated in Law Number 20 of 2003 is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious-spiritual strength, self-control, personality, intelligence, noble character, and the necessary skills himself, society, nation, and state [1]. The national education system must be able to ensure equal distribution of educational opportunities, improve quality as well as the relevance and efficiency of education management to face challenges by the changing demands of local, national, and global life.

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.

One of the integral parts of the education system in Indonesia is the Vocational High School (SMK) which plays an important role in improving human resources, especially in preparing the middle workforce. In accordance with the 2013 curriculum, SMK has the following objectives [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 lead to vocational mastery and specific abilities, in the educational process that is closely related to the learning process in these vocational subjects. Activities in Vocational Subjects are divided into two, namely theoretical and practical activities. Theory of Vocational Subjects is a theory that becomes a source of knowledge to understand the practice. The theory of Vocational Subjects is a reference for practical activity, if an error occurs in the use of theory, it will cause errors in practical activities. Practical activities are real steps and proof of what is contained in theory, in other words, practical activities are works based on theory.

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.

If you pay attention to success in learning a training subject, it is the ultimate goal of every student. To achieve this goal, the student must be nurtured in his personality, equipped with the knowledge, and skills while in school. It is the hope of all parties that every student can achieve the best learning outcomes. From the description above, the authors feel interested in conducting research on 1) Interest in learning; 2) Results of learning engineering drawings; 3) Results of learning formation and assembly techniques.

II. Method

This type of research uses descriptive research methods with a correlational research design. The independent variable in this study is interesting in learning which is expressed in (X1), 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. Reference [3] explained 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.

III. 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: Interest in learning is one form of activity of a person who encourages to carry out a series of mental and physical activities. body to obtain a change in behavior as a result of individual experiences in interactions in their environment involving cognitive, affective, and psychomotor. 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

In Table 2 it can be seen that the correlation coefficient is 0.719. This value is consulted on r_{table} with N=36 and a significance level of 5%. The value of r_{table} is obtained at 0.2785 so that the value of r_{count} is greater than r_{table}. The coefficient of determination is 0.517. This means that 51.7% of learning outcomes for forming and assembling are determined by interest in learning.

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

In Table 3 it can be seen that the correlation coefficient is 0.598. This value was consulted in r_{table} with N=36 and a significance level of 5%. The value of r_{table} is obtained at 0.2785 so that the value of r_{count} is greater than r_{table}. The coefficient of determination is 0.358. This means that 35.8% of the learning outcomes of forming and assembling are determined by the results of learning engineering drawings.

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

In Table 4, learning interest (X1) and technical drawing learning outcomes (X2) together have a correlation coefficient of 0.748. The coefficient of determination obtained is 0.560, which means that 56% of the learning outcomes of formation and assembly can be explained by interest in learning (X1) and learning outcomes of technical drawing (X2).

Furthermore, in the findings of this correlation research, there is a greater influence on interest in learning, namely the coefficient of determination of 0.517, thus means that 51.7% has an influence on the results of formation and assembly while the learning outcomes of technical drawing have a coefficient of determination of 0.358, thus means 35.8 % has an effect on the results of the formation and assembly. This research is only generalized to class XI students of the metal fabrication engineering expertise program at SMK N 1 Lubuk Pakam. This study cannot be

generalized to a larger scale. Because the characteristics of students' own interest in learning are different from other schools.

IV. Conclusion

Based on the research results that have been described, the conclusions of this study are as follows:

1. There is a positive and meaningful relationship between interest in learning and learning outcomes of forming and assembling in class XI students of the Metal Fabrication Engineering Expertise Program at SMK Negeri 1 Lubuk Pakam. The correlation coefficient obtained is 0.719 with a coefficient of determination of 0.517. This means that 51.7% of learning outcomes for formation and assembly are determined by learning. This indicates interest in learning has an influence on learning outcomes of formation and assembly.
2. There is a positive and significant relationship between the learning outcomes of engineering drawing and the learning outcomes of forming and assembling in class XI students of the Metal Fabrication Engineering Expertise Program at SMK Negeri 1 Lubuk Pakam. The correlation coefficient obtained is 0.598 with a coefficient of determination of 0.358. This means that 35.8% of the learning outcomes of forming and assembling are determined by the results of learning engineering drawings. This means that the higher the learning outcomes of engineering drawing in students, the higher the learning outcomes of forming and assembly techniques.
3. There is a positive and meaningful relationship jointly between interest in learning and learning outcomes of technical drawing with learning outcomes of forming and assembling. in class XI students of the Metal Fabrication Engineering Expertise Program at SMK Negeri 1 Lubuk Pakam. The correlation coefficient obtained is 0.748 with the determination obtained is 0.560. This means that 56% of learning outcomes of formation and assembly can be explained by interest in learning (X1) and learning outcomes of technical drawing (X2), and by the multiple regression equations Y = 33,355 + 0,507 X1 + 0.297 X2. This implies that the greater the interest in learning and the high learning outcomes of technical drawing in students, the higher the learning outcomes of forming and assembling.

The recommendation of this study are as follows:

1. To SMK Negeri 1 Lubuk Pakam that the relationship between interest in learning and learning outcomes of forming and assembly techniques is positive. Therefore, it is necessary to increase students' interest in learning in the subjects of formation and assembly, so that the results obtained from the learning will also increase.
2. Another factor, namely learning outcomes of technical drawings also has a positive relationship to learning outcomes of formation and assembly. Therefore, student learning needs to be improved by providing teacher innovation in teaching or with other things that can improve student learning outcomes.
3. Interest in learning and learning outcomes of technical drawing together turned out to have a positive relationship with learning outcomes of forming and assembling. That is, the increase in interest in learning and student learning outcomes of technical drawing need to be improved together so that it is expected to be able to improve learning outcomes of forming and assembling.
4. For researchers, to be able to follow up further on the results of this study by developing independent variables that have an effect on improving learning outcomes of forming and assembly techniques.

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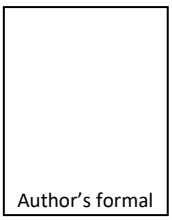

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