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The Effect of Work Preparation Sheet Learning Media on Learning Outcomes of Turning Practice into Machining Practice in Vocational High Schools

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Abstract
This study aims to determine the learning outcomes of students' lathe practices who are taught by using work preparation sheets and not using the work preparation sheets in turning practice. It is also to find out the differences in the learning outcomes of students in both classes during machining practice-training courses at the eleventh grade of SMK Negeri 1 Bireuen. The research method used was a True Experimental Design research method in which the implementation used a Posttest-Only Control Design type that compares the experimental class with the control class. The population in this study was class XI TPM Mechanical Engineering at SMK Negeri 1 Bireuen which consisted of 2 classes with 58 students. Class XI TPM 1 was selected as the experimental class and class XI TPM 2 as the control class. The data collection was obtained from the results of the lathe practice. The results showed that the students of class XI TPM1 (experimental class) obtained an average value of turning the practice of 85.62. While the learning outcomes of class XI TPM2 students (control class) obtained an average value of 62.78 lathe practice. From these results, it can be concluded that learning outcomes using work preparation sheet learning during practice are better than those who do not use work preparation sheets during lathe practice.

Keywords: Media, Learning, Practice, Work Preparation Sheet, Turning

Abstrak
Penelitian ini bertujuan untuk mengetahui hasil belajar praktik membubut siswa yang diajar dengan pembelajaran menggunakan *work preparation sheet* dan untuk mengetahui adanya perbedaan hasil belajar praktik membubut siswa yang diajar dengan pembelajaran menggunakan dan tidak menggunakan *work preparation sheet* saat praktik membubut siswa kelas XI pada mata diklat praktik pemesinan di SMK Negeri 1 Bireuen**.** Metode penelitian yang digunakan dalam penelitian ini merupakan metode penelitian *True Experimemntal Design* yang pelaksanaannya menggunakan jenis *Posttest-Only Control Design* yang membandingkan kelas eksperimen dengan kelas kontrol. Populasi dalam penelitian ini adalah kelas XI TPM Teknik Pemesinan di SMK Negeri 1 Bireuen yang berjumlah 2 kelas dengan jumlah siswa 58 orang. Kelas XI TPM 1 yang terpilih sebagai kelas eksperimen dan kelas XI TPM 2 yang terpilih sebagai kelas kontrol. Pengumpulan data diperoleh dari hasil praktik membubut.Hasil penelitian menunjukkan bahwa siswa kelas XI TPM1 (kelas eksperimen) diperoleh rata-rata nilai praktik membubut sebesar 85,62. Sedangkan hasil belajar siswa kelas XI TPM2 (kelas kontrol) diperoleh rata-rata nilai praktik membubut sebesar 62,78. Dari hasil tersebut dapat diartikan bahwa hasil belajar yang menggunakan pembelajaran *work preparation sheet* saat praktik lebih baik dari pada yang tidak menggunakan *work preparation sheet* saat praktik membubut.

Kata Kunci: Media, Membubut, Pembelajaran, Praktik, *Work Preparation Sheet*,

A. Introduction

Vocational High School (SMK) is one of the vocational education institutions that have the task of preparing students to be able to work in certain areas of expertise. In its development, Vocational Schools are required to be able to create Human Resources (HR) who can keep up with advances in science and technology. Vocational High Schools as printers of a ready-to-use workforce must equip their students with knowledge and skills that are by the competence of their expertise program (Djatmiko, 2013).

Machining practice is a form of productive learning process activity that teaches machining competency materials to students who want to master these competencies in a standard and correct way or method. The machining competencies include turning, milling, drilling, flat and cylindrical grinding, scraping, sawing and so on. This activity can take place if it is supported by several main aspects, namely: aspects of practical facilities, practical materials, sequences of learning activities or learning implementation plans, job sheets/operation sheets/instruction sheets, teachers, technicians, students and other supporting aspects (Santoso, 2013). According to (Mulyasa, 2013) practicum is an activity that provides a variety of opportunities to conduct investigations and experiment skills.

Based on this view, it means that practicum activities are oriented toward tasks such as installing and maintaining tools, observing, repairing, and testing the results of installation or repairs, so that they will gain insight into work practices. Through the practicum, students will gain experience in working, as well as the operation of machines that are obtained in theory with the actual form of work.

Based on the results of field observations during Guiding Field Experience Practices (PPL) and a pre-survey through observations with students and teachers in charge of machining practice subjects at SMK Negeri 1 Bireuen, information was obtained that the machining practice subjects had not applied the Work Preparation Sheet (WPS) as an effort to improve

students' practice outcomes. Supporting teachers have not required their students to make work preparation sheets before carrying out the practice of turning. In addition, some teachers are not sure that there is an effect on improving students' skills because research has never been conducted that reveals the use of work reparation sheets (Butar-Butar, 2018).

During the mentoring period for PPL students, it was seen that most students had difficulties in recognizing, using work tools according to their functions, and using lathes correctly. It is because the job sheet is only mentioned in general without any detailed sketches of completing a job. Even at work, students do not understand the proper work steps so students learning outcomes are low.

Based on these indications, the researchers aim to examine the "influence of learning media work preparation sheet on the learning outcomes of turning practice at SMK Negeri 1 Bireuen", which emphasises more on the obligation to use work preparation sheets for students who will carry out turning practice so that differences in learning outcomes between students who created and used *WPS* and students who did not create work preparation sheet.

B. Method

The method used in this research was the experimental method. The experimental research method is a research method used to find the effect of certain treatments on others under controlled conditions (Sugiyono, 2013).

Table 1. Posttest-only control design (Sugiyono, 2013)

Pretest	Treatment	Posttest
O_1	X	O_2

The research design was chosen by two class groups, namely the experimental class and the control class. Furthermore, one group was treated with students using WPS and the other class students did not use WPS during

lathe practice. The group that was given the treatment was called the experimental group and the group that was not treated was called the control group. The effect of the treatment was (O_1: O_2). The effect of the treatment was analyzed using the statistical difference test t-test. If there is a significant difference between the experimental class and the control class, then the treatment given has a significant effect (Sugiyono, 2013).

Figure 1. Stages of research

The independent variables in this study are: the implementation of the practice of turning students who are taught by learning to use work preparation sheets in the machining practice training course, while the dependent variable is the students' practical learning outcomes in the machining practice eye. The population in this study was all students of class XI TPM1 and XI TPM2 of SMK Negeri 1 Bireuen which consisted of 53 students, totaling 2 classes. Class XI TPM1 consisted of 27 students and class XI TPM2 totaled 26 students, with a total of 53 students. The sampling technique in this study determined that the XI TPM1 class which was the experimental class was taught using the model work preparation sheet and the control class was the XI TPM2 class which was not taught using the work preparation sheet.

Work Preparation Sheet

Work preparation sheet is a combination of two terms, namely worksheet and preparation (Indriawan, 2013). A worksheet is a form that must be filled out by students to do practical work, which contains detailed work procedures and instructions to carry out activities by learning objectives. While preparation means preparation. Thus, the work preparation sheet is a form that must be filled out by students as preparation for working on practicum, which contains detailed work procedures and instructions to carry out activities by the objectives of learning. According to (Syah, 2013) a work preparation sheet is a (form) that must be made by students or filled out by students as a guide for strategic steps in working on the workpiece chronologically referring to the working drawings. The use of *WPS* aims to train students to solve problems in machining process procedures, such as (Nurogo, 2015):

1. Determining the machine to be selected and used in work and its equipment.
2. Selecting and determining the cutting equipment to be used.
3. Training to determine the correct and appropriate work steps.
4. Predicting the time spent working on the workpiece.
5. Knowing your weaknesses and shortcomings during work.
6. Working carefully and safely by paying attention to work safety.
7. Working according to procedures.
8. Being serious and careful in work, etc.

Work preparation sheet is a machining practice learning that uses job production, students are required to determine or make their work steps which are then consulted with the teacher concerned to determine whether or not the work steps that have been made are correct. Jobs like this usually refer to jobs in the machining industry, which are commonly called work preparation, which is then abbreviated as WPS.

Work preparation sheets are the main tasks that must be carried out and completed by students before practice so that WPS can be a guide for students to work well in completing tasks/jobs assigned by the teacher, then its implementation is carried out with the following procedure:

1. The teacher first explains the distribution of the job that will be done by students clearly and in detail.
2. The teacher explains the steps for doing the job in general so that students get a general picture as well.
3. Students carry out the making of WPS at the specified time according to jobs their respective and their respective sequences.
4. The WPS finished must be a mandatory guideline for students who will do practical work assignments.
5. Teachers supervise and assist students in the use of WPS.

Turning Practice

The turning process is a machining process to produce machine parts cylindrical which are machined using a lathe (Saifuddin MN, 2010). The function of this machine is to change the shape and size of the workpiece by cutting the rotating workpiece using a chisel. The basic form of the lathe process can be defined as the process of machining the outer surface of a cylindrical object or a flat lathe (J.T.Black & Kohser, 2019):

a. Rotating workpiece.

b. Cutting tool (single-point cutting tool).

c. The movement of the tool is parallel to the axis of the workpiece at a certain distance so that it will remove the outer surface of the workpiece.

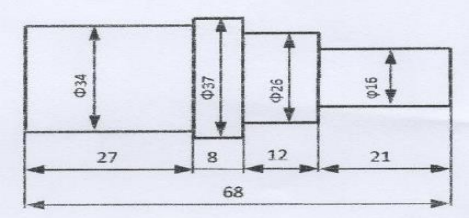

Figure 2. Workpieces of multilevel turning practice (dimensions in mm).

The specimen shaft with four diameters that are shown in figure 2. The diameter shaft 1st is 34 mm, the diameter shaft 2nd is 37 mm, shaft 3rd is 26 mm and the diameter shaft 4this 16 mm.

Research data processing

A test is used to obtain data. The test used in this study is an objective test to measure students' learning achievement, especially in the cognitive field (Sugiyono, 2013).

1. Normality test

   Test data normality is used to determine whether the data to be analyzed with parametric statistics is normally distributed or not. The technique used to test the normality of the data was Chi-Square (χ2). Broadly speaking, the normality test of the data with 2 was done by comparing the normal curve formed from the data that have been collected with the standard normal curve. If the comparison of the curves does not show a significant difference, then the data to be analyzed is normally distributed. To find out the value of Chi-Square (χ2), can also be calculated by using the formula (Sugiyono, 2013):

2. Homogeneity Test

   This test was carried out to know whether the variances of the two variables are homogeneously distributed or not. This research used the SPSS version 18 application *for windows for* the homogeneous test. The criteria for making hypothesis decisions were based on significant values as follows: If the significant value is > 0.05 then the data variance is

homogeneous. If the significant value < 0.05 then the data variance is not homogeneous.

3. Hypothesis Test

The hypothesis in this study is in the form of a comparative hypothesis of two independent samples. Therefore, to test this hypothesis, the t-test formula is used (t-test). The t-test is performed if the data is normally distributed. Ho = There is no difference in students' learning outcomes between groups using *WPS* and groups who are not using the *WPS*. Ha: There is a difference in students' learning outcomes between groups using *WPS* and groups not using the *WPS*. Decision: If t count > t table, then Ha is accepted. If t count < t table, then Ha is rejected.

Hypothesis testing was using a *t-test*. The criteria for acceptance of Ho and Ha on the t-test are if $T_{count} > T_{table}$ then Ho fails to be accepted and Ha is not rejected, and if $T_{count} < T_{table}$ then Ho is not rejected and Ha fails to be accepted, using a significance level of 5%. The t-test formula is as follows (Trianto, 2012):

The formula above is used to determine the difference in the learning outcomes of students' turning practice in machining practice between students who use *WPS* and students who do not use *WPS*. This was based on the data obtained from different samples (classes). Furthermore, to find out the increase in students' learning outcomes of turning practice using descriptive analysis. The whole calculation process is completely computer-assisted SPSS program series (*Statistical Program for Social Science*) version 16.0 (Trianto, 2012).

C. Result and Discussion

This research was conducted at SMK Negeri 1 Bireuen. The population in this study was class XI, with a total of 154 students. The sample size in this study was 58 students, which were divided into 26 samples for the control class and 32 samples for the experimental class. The purpose of this study

was to determine the differences in the learning outcomes of students' turning practices who were taught by using *work preparation sheets* and students who were not using the work preparation sheets during the turning practice at SMK Negeri 1 Bireuen.

There are two variables in this study, namely the implementation of the practice of turning students who are taught by learning using *work preparation sheets* in machining practice subjects as an independent variable, while the dependent variable is the result of students' practical learning in machining practice subjects. The use of *WPS* during lathe practice was only applied to the experimental class, namely class XI TPM 1. The control class did not use *WPS* when practicing turning, namely class XI TPM 2. The data in this study were obtained from the scores of students' learning practice turning practice test scores. The results of the research in the experimental class and control class were presented as follows.

Description of data

The data of the score from the practice of turning off the control class. Subjects in the control class were 26 students. Data processing using computer-assisted SPSS (Statistical Program for Social Science) version 18.0. After processing the data, descriptive statistics were obtained consisting of the maximum value, minimum value, and average standard deviation. Table2 presents descriptive statistics of the data from the posttest the experimental class and the control class using SPSS software.

Table 2. Descriptive statistical data post-test

Class Treatment	**N**	**X_{min}**	**X_{mak}**	**$\bar{x}$**	**S**
Experiment Class	26	60	100	85,62	8,71
Control Class	26	40	85,20	62,78	10,44

From table 1 it was known that the average score (mean) achieved by the control class students on the results of their practice of turning was 62.60; the middle score (median) of 62.60; the mode was 85.2 and the standard deviation was 10.44. Meanwhile, for the experimental class, the

average score (mean) achieved by students was 85.622; the score (median) of 80,00; the mode was 100 and the standard deviation was 8,71.

1. Normality Test

Test for the experimental class and control class was conducted to determine whether the data obtained were normally distributed or not. The normality test for the two classes was carried out by the test *Kolmogorov-Smirnova* using the program *SPSS* with a significance level of 0.05. The display *output* can be seen in Table 3 below:

Table 3. Normality Test

Class Treatment	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Experiment Class	0,11	32	0,20	0,941	0,08
Control Class	0,11	32	0,20	0,941	0,08

Based on the results of the output of the normality test using the test Kolmogorov-Smirnov in Table 3, the significance value in the significant column. The significant value of the data showed that both experimental and control classes obtained value of 200 which was greater than 0.05, so it can be said that the two classes, both experimental and control classes, are normally distributed. Therefore, it was rejected and accepted, meaning that the data was normally distributed.

2. Homogeneity Test

Test for the experimental class and the control class was conducted to determine whether the data obtained were homogeneous or inhomogeneous using the program *SPSS* with a significance level of 0.05. A homogeneous test of the two classes was carried out to be able to provide accurate measurements on hypothesis testing. After processing the data, the display *output* can be seen in Table 4 below:

Table 4. Homogeneity Test

Levene Statistic	**df_1**	**df_1**	**Sig.**
3,68	1	56	0,06

Based on the results of the homogeneity test output using SPSS in table 4, the significance value in the significant column of data was 0.060. The significant value was based on the mean score was 0.060 < 0.05 then the variance of the two classes, both experimental and control classes, was similar or homogeneous.

3. Hypothesis Testing

Data analysis in this study was conducted by testing the hypothesis using the t-test. The requirement to perform the t-test was that the data must be normally distributed. The data analyzed were learning achievement (practice learning outcomes) in the experimental class and learning achievement (practice learning outcomes) in the control class. Before data analysis, a data analysis requirement test was conducted, which consisted of a test for the normality of the data distribution.

The t-test of the data from the lathe practice was to determine whether there was a difference between the experimental class and the control class. Where the experimental class was treated using *WPS* during the practice of turning and the control class did not use *WPS* during the practice of turning. The hypothesis test used was the t-test of two unpaired sample data (independent t-test) because the data analyzed were obtained from different class groups. The null hypothesis (Ho) and the alternative hypothesis (Ha) in this study are:

Ho: There is no difference in students' learning outcomes in turning the practice of turning between the class that uses *WPS* during turning practice and the class that does not use *WPS* during turning practice.

Ha: There is a difference in students' learning outcomes in turning the practice of turning between the class that uses *WPS* during turning practice and the class that does not use *WPS* during turning practice.

Ho and Ha acceptance criteria are if t count is greater than t table (t count > t table) then Ho fails to be accepted and Ha is not rejected, and if t count is less than t table (t count < t table) then Ho is accepted and Ha rejected. The complete t-test results can be seen as follows.

Table 5. Test *Independent Sample* Learning Outcomes

Independent Samples Test					
t-test for	t	df	Sig.	Mean	Std.Error
Equality	(2-tailed)	Difference of Means			
Equal Variances	6,75	56	0,00	22,84	3,39
Assumed Equal Variances not assumed	6,56	46	0	22,84	3,48

Based on the results of the output test independent sample t-test in table 4. known with the significant value (2-tailed) of 0.00 < 0.05 then, as the basis for decision making in the independent sample t-test, it can be concluded that H_o was rejected H_a was accepted. The conclusion from the test results, that the increase in students' learning outcomes who received the guided inquiry model was not the same as the students who received conventional learning, thus, the guided inquiry model had a significant influence on students' learning outcomes. After the data were tested for the analysis requirements, it was known that the test scores for the experimental class and the control class test were normally distributed. Therefore, the data analysis technique using the t-test can be used for this research. Because there are requirements that must be met before carrying out the analysis with the t-test, namely the data is normally distributed, then the next step was to do a lathe practice test. That was by giving treatment to the experimental class. The experimental class was treated using WPS during the practice of turning, while the control class did not use WPS when practising turning.

The value data obtained in the practice of turning were as follows. The t count was 3,68 with db 70. Then the t count score was consulted

with the t table value at a level significant of 5% and db 70. The t table score at a significant level of 5% and d b 70 is 2.00. It showed that the t count score was greater than the t table score (3,68 >2,000). The results of the t-test indicated that there were differences in the value of the lathe practice above, where the experimental class was higher than the control class. This difference was due to the treatment given to the experimental class, namely the use of WPS during practice. So that the effect of using WPS supports the existing theoretical framework, and the data obtained support the proposed hypothesis.

From the results of the study, the learning achievement of lathe practice in the treated class was higher than that of the untreated class. This can be seen from the difference in the average value of the lathe practice between the experimental class and the control class, which was 81.59 > 62.78 which indicates that the average of the experimental class was higher than the control class. So it can be concluded that the class that was treated with the use of WPS during practice increased more than the classes that did not use WPS.

Classes that use WPS during the practice of turning have been shown to have positive effects and results in improving the learning outcomes of turning practice. Classes that use WPS are improved than classes that do not use WPS. Students who use WPS are more planned when doing lathe practice. The plan steps will be taken during the lathe practice and it is stated in the work preparation sheet. During the practice of turning, students just carried out what has been planned, so that it is more effective and reduces product defects and will certainly improve practice results.

Students who do not use WPS during practice will be confused when they face a machine for turning practice because they have not planned the steps that will be taken during practice. They usually just follow their friends and don't know the right steps, so if their friends are

wrong, the student is also wrong. Thus, the results of students' lathe practice will not be maximized.

Thus, the overall research on the effect of the learning media work preparation sheet on the learning outcomes of turning practice at SMK Negeri 1 Bireuen supports the existing theoretical framework, and the data obtained support the hypothesis proposed through research.

E. Conclusion

Average learning outcomes of turning practice in class XI SMK Negeri 1 Bireuen in the machining practice training subjects taught by learning using work preparation sheets (experimental class) and not using work preparation sheets when turning practice (control class) were different. The average value of the experimental class obtained a higher value, namely experimental class 81.59 > the control class 62.78. The learning outcomes of the practice of turning in the class that used WPS were higher than in the class that did not use the WPS during the practice of turning.

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